Beauregard Parish Transportation Analysis:

Extremely Hazardous Substances

Prepared by: John C. Pine, Ed.D. Associate Professor, Institute for Environmental Studies, Erno Sajo, Associate Professor, Department of Nuclear Science, Louisiana State University, Baton Rouge, LA 70803

An analysis of extremely hazardous chemical transported in Beauregard Parish was completed by clarifying hazardous materials transported from fixed facilities within the Parish, and chemicals transported by motor carriers, pipelines, and rail lines. The focus of the hazards analysis was on extremely hazardous substances (EHS) which present an immediate threat to the health and safety of the community by an unintended release of hazardous chemicals from a fixed location at a facility or from a release associated with a transportation incident.

The study was completed by the Institute for Environmental Studies, Louisiana State University. The Beauregard Parish Office of Emergency Preparedness provided information on chemicals transported and at fixed sites in the Parish. Many facilities in the Parish provided critical information on the location of hazardous chemicals, the size of containers, potential failures of their processes, and transportation routes.

Data Sources for Hazardous Analysis

The identification of extremely hazardous substances (EHS) was made from information submitted by facilities within Beauregard Parish. These records (Tier2 reports) were made available for this study by the Louisiana State Police, Transportation and Environmental Safety Division, Right to Know Office, and the Beauregard Parish Office of Emergency Management. Tier2 records are submitted annually to the State Police and Parishes by users of hazardous materials. The facility submitting the Tier2 record identifies chemicals that are EHS.

Extremely Hazardous Substances

Chemicals may be potentially hazardous because of their toxicity or physical or chemical properties such as flammability and reactivity. Comprehensive planning for hazardous materials emergencies should encompass all hazards capable of causing loss of life, injury or damage to health, or damage to property or the environment.

Chemicals with high acute lethality have the potential for causing death in unprotected populations after relatively short exposure periods at low doses. On the basis of toxicity criteria, EPA identified a list of chemicals with high acute toxicity from the more than 60,000 chemicals in commerce. Because airborne releases of acutely lethal substances, while infrequent, can be catastrophic, a hazards analysis should make the EHS chemicals the primary focus of analysis. The identification of EHS chemicals in the community thus becomes the initial step in the hazards analysis process. Extreme Hazardous Substances (EHS) have been categorized by EPA as presenting a severe health hazard to humans exposed during a chemical accident or other

emergency, if the "exposure is less than or equal to 0.5 milligrams per liter of air for exposure time of 8 hours or less."

EHS generally refer to chemicals that are highly toxic. This means that relatively small quantities may cause significant health effects upon inhalation, ingestion, or direct contact. Conversely, a low toxicity substance generally requires larger amounts to be inhaled, ingested, or contacted for an equally significant adverse health effect (Handbook of Chemical Hazards Analysis Procedures, p. 6-2). A toxic substance is thus one that has the ability to cause damage to living tissue, impairment of the central nervous system, severe illness, or death when ingested, inhaled, or absorbed by the skin (Technical Guidance for Hazards Analysis, p. A-8).

Accidental Release Dispersion Models

Vulnerability zones were determined in this study using ALOHA (Area Locations of Hazardous Atmospheres). The ALOHA model was developed by the U.S. Environmental Protection Agency and the National Oceanic and Atmospheric Administration (NOAH) for use in emergency planing and response associated with hazardous materials. The ALOHA model is a tool for estimating the movement and dispersion of gases. The air model estimates pollutant concentrations downwind from the source of a spill, taking into consideration the toxicological and physical characteristics of the spilled material. ALOHA also considers the physical characteristics of the spill site, the atmospheric conditions, and the circumstances of the release. Like many computer applications, it can solve problems rapidly and provides results in a graphic, easy to use format.

The Buffer Zones defined in this study are areas surrounding the incident in which persons may be exposed to dangerous (upwind) and life threatening (downwind) concentrations of material. Tables 3 and 4 (Motor Carrier) and Tables 5 and 6 (Rail) provide guidance for small and large spills occurring in five weather conditions. Since an incident involves complex interdependent variables, care must be made is using the data from these tables as the only source of information on possible areas that could be affected from an accidental release of a hazardous substance

Although EHS are extremely toxic, the potential hazards presented by a spill will vary depending on the maximum amount present within an area, the physical and chemical properties of the substance spilled and the conditions under which the substance is handled (i.e., elevated temperatures and pressures). Some substances are high volatile and thus likely to become airborne, while others are non powered solids that are unlikely to become airborne and pose risks to employees, the community, or the environment.

Beauregard Parish

Beauregard Parish with a population of 30,083 (1990 Census) lies north of Calcasieu Parish, east of Texas (Newton County) and the Sabine River, South of Vernon Parish, and West of Allen Parish. DeRidder with a population of 9,865 is the largest incorporated area in the parish with Merryville second with 1,235.

Some significant Census statistics relating to emergency management for the parish include the following:

1. 5% (799 residents) of the parish residents between 16 and 65 have a disability affecting mobility or self-care limitation. Residents with special needs should understand the steps that must be taken to protect them. A family plan should be made to ensure that the disability limitation does not adversely affect the resident with a disability.
2. The parish has a total of 2,982 residents over the age of 65 with 33% (976) of these residents with a mobility or self-care limitation.
3. Of the residents over 5 years of age, 6% of the parish speaks a language other than English (1,541). Of these residents, 392 do not speak English very well. Families with non-speaking members should be aware that warnings might not be understood by some members of the family. The parish should clarify steps that can be taken to ensure that all residents understand disaster warning or orders.
4. Approximately 18% of persons in the parish have income that is below the poverty level. The methods of warning to natural or man-made disasters should include methods that are not based on television, radio, or phone efforts. Residents that have income below the poverty level may not have a phone or television and thus would not be aware of a warning provided by a local station or a phone calling system.
5. The 1990 Census shows that 10% (1,013) of the housing units in the parish do not have a phone. Alternative means of warning residents of an emergency must be provided by the parish. These could include a siren system.
6. Of the 10,362 households in the parish, 9% (910) do not have a vehicle available for transportation. Evacuation orders should take this into account and provide these residents transportation in a chemical incident or natural disaster. The number of residents without a vehicle can be determined by examining census data by block group.
7. School enrollment is 7,533 for all persons three years and older. Preprimary children total 477 and elementary and high school are 6,012. College students include 1,044. Because of the large number of students in the school system, coordination with the schools is critical to effective emergency response efforts.

The population of Beauregard Parish is centered in DeRidder (9,986) which has 33% of the parish's population. In addition, the greater DeRidder area has an additional 5,000 people outside the city limits of DeRidder; the DeRidder area thus has approximately 50% of the parish population within a two-mile area of the center of DeRidder. For planning purposes, any vulnerability zone of 2 miles or greater will include this populated area.

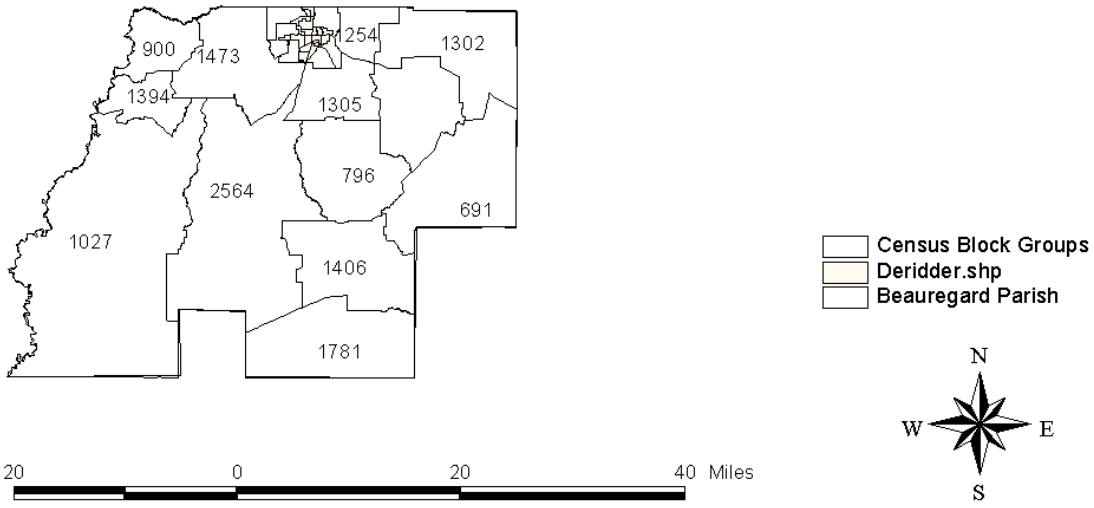


Figure 1
Population Concentrations
By Census Block Group

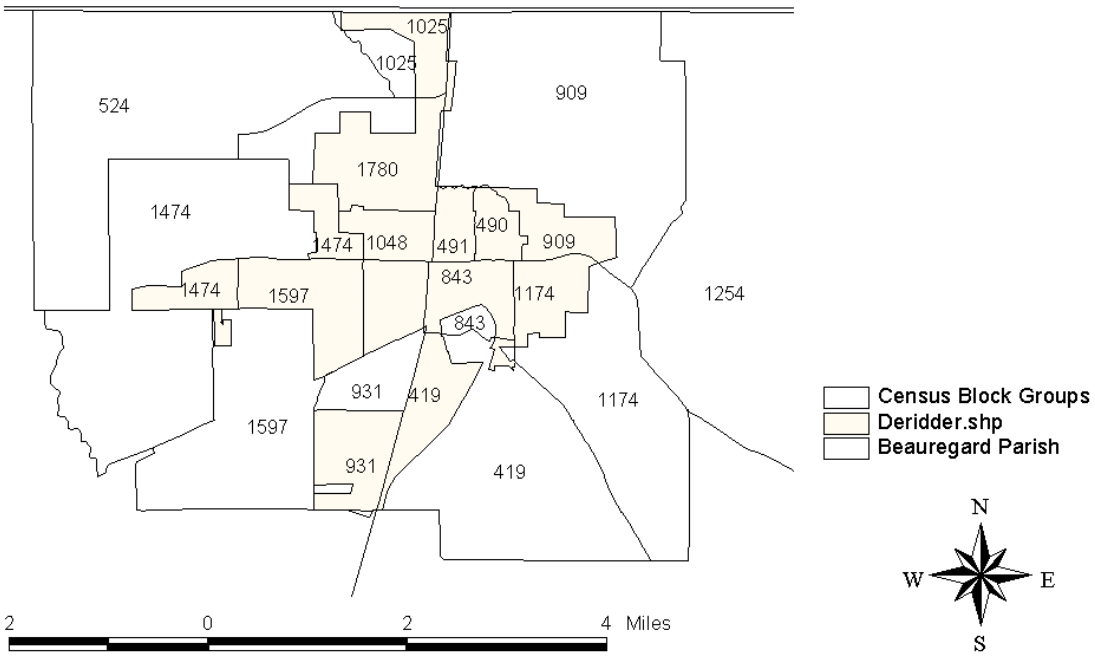


Figure 2
Population Concentrations
DeRidder Area

FINDINGS

1. Roadside Surveys

Surveys were conducted on May 9, 1997 in three locations including U.S. Highway 171 at South Beauregard High School, at Merryville School along State Highway 110, and at State Highways 27 and 110 at the Singer School. Table 1, "Transportation of Hazardous Chemicals: Roadside Surveys," provides a summary of the findings of the surveys. Each site had a large volume of truck traffic, with Singer School with 132 with, South Beauregard with 125 and Merryville with 115. Formaldehyde and Sulfuric Acid were the two EHS identified from the roadside surveys. These were identified at both Maryville and South Beauregard.

Highways 27 and 171 provide a North - South connector in the parish. These routes had the highest volume of trucks. The routes converge in downtown DeRidder making the area quite congested. U.S.Highway 171 joins U.S. Highway 190 just outside DeRidder on the eastern side making even more traffic in the downtown area. Based on the roadside surveys, over 66% of the trucks in the parish use the north / south highways and travel through DeRidder. Of this number (257), 21% of the vehicles carry hazardous cargo. The fire hazards are the most numerous risks associated with these trucks including Diesel Fuel, Liquid Petroleum Gas, and Gasoline. The suggested safety zone for incidents involving these substances is 300 meters and in a fire one-half mile. The number of trucks carrying hazardous waste almost equal those that present a significant fire threat; however, the liquid or solid hazardous waste presents more of a risk to responders and clean-up crews than to the general community.

Table 1 provides a summary of the results of the roadside surveys. A limited number of EHS were identified in the road-side-survey. Only Formaldehyde and Sulfuric Acid both EHS were observed from the road side surveys. Table 2, Hazardous Chemicals transported by Mode Beauregard Parish, provides a complete summary of EHS transported through Beauregard Parish by mode of transport.

Table # 1
Transportation Hazardous Chemicals
Roadside Survey s

Chemical	**Number of Vehicles**	**Survey Location**	
Merryville	6 chemicals	8 vehicles	Other Trucks 115

		UN Number	**Number of Vehicles**	
	Diesel Fuel	1993	2	
	Hazardous Waste (Solid)	3077	1	
	Hazardous Waste (Solid)	1625	1	
	Hazardous Waste (Liquid)	3082	2	
*	Formaldehyde	2209	1	
	Crude Oil	1267	1	

South Beauregard	9 chemicals	23 vehicles	Other Trucks 125

		UN Number	**Number of Vehicles**	
	Liquid Petroleum Gas	1075	3	
	Hazardous Waste (Liquid)	3082	4	
	Diesel Fuel	1993	4	
	Mercuric Arsenate (Solid)`	1623	1	(Poison)
	Sodium Hydroxide (Liquid)	1821	1	
	Gasoline	1203	6	
	Crude Oil	1267	2	
	Black Liquor	1760	1	
*	Sulfuric Acid	1830	1	

Singer School	14 chemicals	33 vehicles	Other Trucks 132

		UN Number	**Number of Vehicles**
	Sodium Hydroxide (Liquid)	1824	1
	Sodium Aluminate Solution	1819	2
	Gasoline	1203	11
	Diesel	1993	4
	Jet Fuel	1863	2
	Dicyclopentadiene (Liquid)	2048	2
	Hazardous Waste	3082	2
	Hazardous Waste	3077	2
	Phosphoric Acid (H=3)	1805	1

*	Formaldehyde Solution	2209	1
	Petroleum Distillate	1268	1
	Crude Oil	1267	1
	Heptane	1206	1
	Liquid Petroleum Gas	1075	2

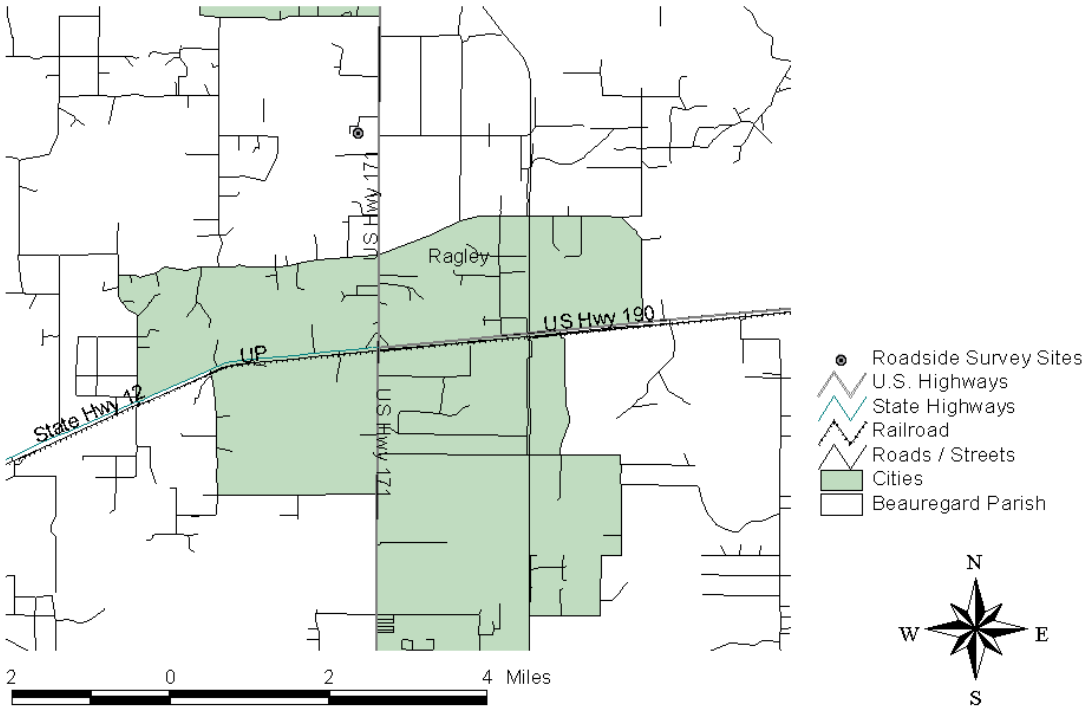
Table #2
Hazardous Chemicals Transported by Mode
Beauregard Parish

Chemical		EHS	Mode
Acrylonitrile		X	Rail
Ammonia, Anhydrous		X	Rail
Aniline	X		Rail
Chlorine		X	Rail
Chloroacetic Acid		X	Rail
Cyclohexylamine		X	Rail
Dinitro-o-cresol		X	Rail
Epichlorohydrin		X	Rail
Ethanolamine		X	Rail
Ethylene Oxide		X	Rail
Ethylenediamine		X	Rail
Formaldehyde		X	Rail / Truck
Hydrogen Chloride		X	Rail
Hydrogen Cyanide		X	Rail
Hydrazine Hydrate		X	Rail
Hydrogen Fluoride		X	Rail
Hydrazine		X	Rail
Methyl Mercaptan		X	Rail
Phosphoric Acid		X	Rail
Phenol, Molten		X	Rail
Propylene Oxide		X	Rail
Sulfur Dioxide		X	Rail
Sulphur Trioxide		X	Rail
Sulfuric Acid		X	Rail / Truck / Pipeline
Toluene Diisocyanate		X	Rail

2. Geographic Risks

The geographic risks associated with the three road-side-survey sites are very different. South Beauregard High School is located on a long straight segment of State Highway 171 (see Figure #3, "Roadside Survey – South Beauregard." Although school zone signs are present on Highway 171 near the school, incidents could result from school traffic entering or exiting the highway. Motor carriers should use caution in the school area.

Figure #3
Roadside Survey - South Beauregard



The photos below show the entrance for the South Beauregard High School and the highway that runs in front of the school. This long stretch of highway running in front of the school does not have sharp turns, but truck drivers must be aware of the school in the area and heavy traffic coming from the school onto the Highway 171 and cars turning into the school from the busy highway.

A risk zone of one-half mile for trucks transporting Sulfuric Acid would include the South Beauregard School on Highway 171. This highway also enters DeRidder and continues through the center of town. Almost all of DeRidder would fall within the one-half mile risk zone along Highway 171.

Photo 1
South Beauregard High School

Photo 2
South Beauregard High School
Highway 171

Merryville

The photos that follow show (1) the entrance to the Merryville High School, (2) the road in front of the school, and (3) a truck making a sharp turn from U.S. 190 on to State Hwy. 110 near the school.

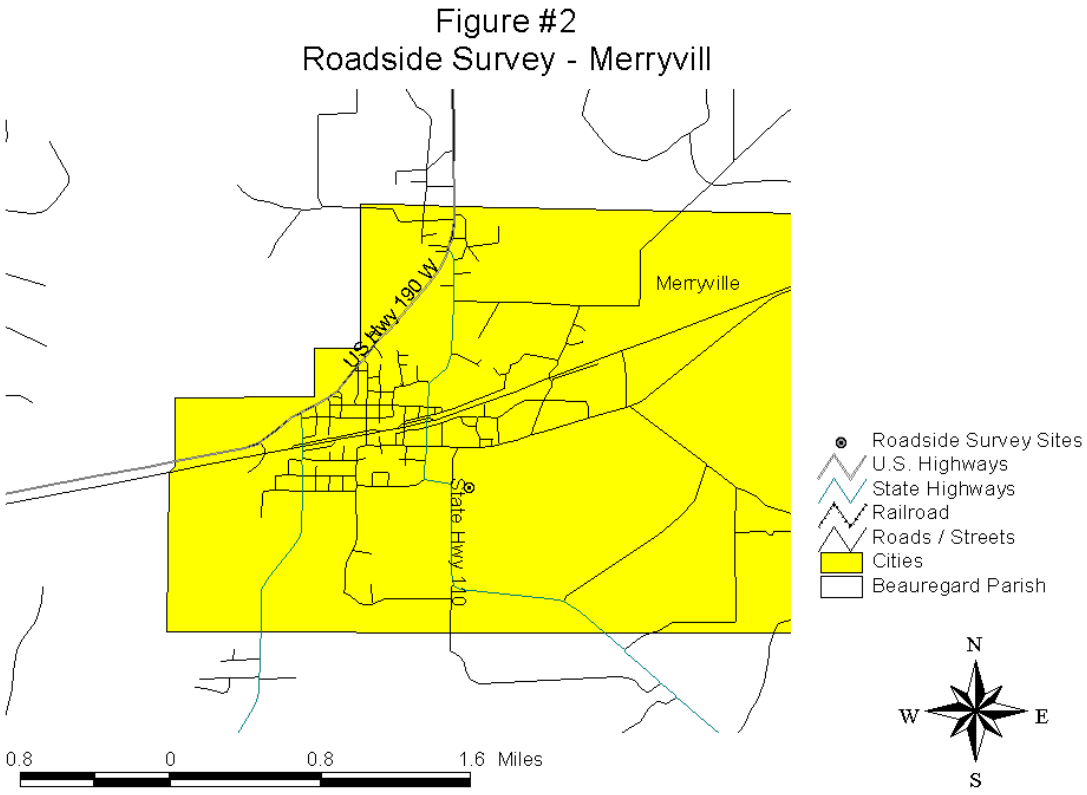
Photo 3
Merryville High School

Merryville High School and Hwy 110

Photo 5
U.S. Hwy 190 Near Merryville School

The above photo shows a truck making a turn from busy U.S. Hwy. 190 onto State Hwy. 110. Several sharp turns along Hwy. 110 make this stretch of highway a high risk area. In addition to the sharp turns on Hwy. 110, the road is quite narrow as shown in Photo 2 above.

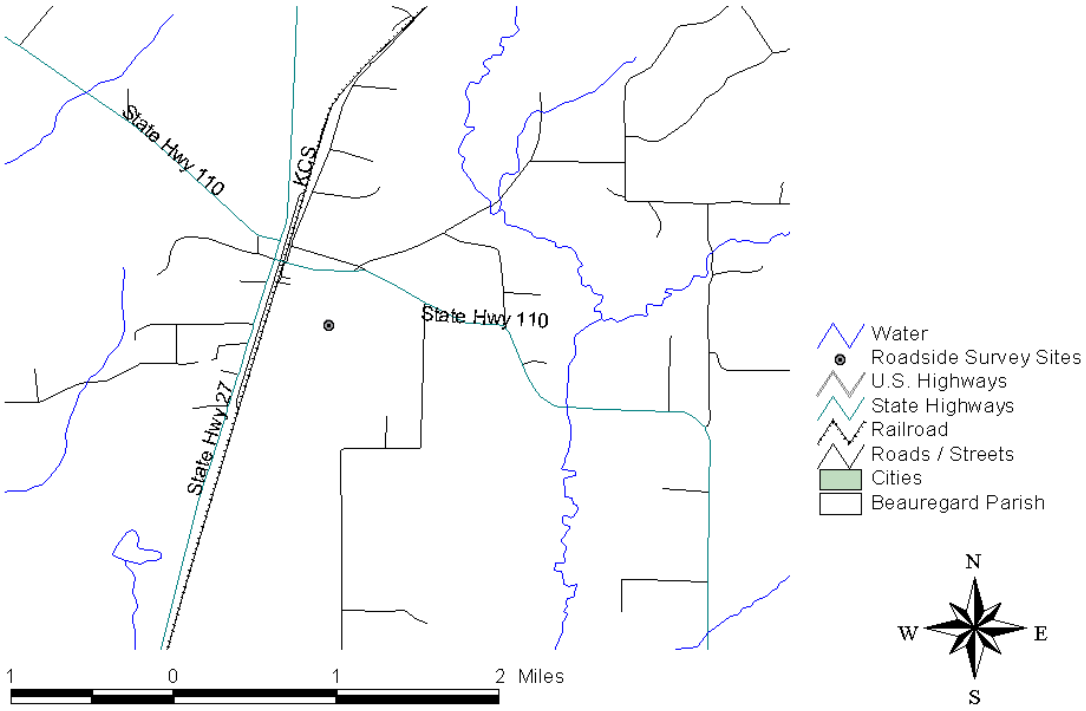
Figure “Roadside Survey – Merryville,” Highway 110 in the Merryville area makes several sharp turns within 100 feet of front of the school. Truck drivers should not only slow down, but be very cautious in making the turns near the school. Although the number of trucks carrying hazardous cargo was far less in the Merryville area (7%), the sharp turns, narrow road, and large volume of vehicles makes this a high risk area.



Singer

The Singer area involves not only the intersection of State Highways 27 and 110, but also the main line of the Kansas City Southern Railroad as shown in Figure “Roadside Survey - Singer.” Although school zone signs are present, vehicles traveling Highway 27 are entering the area from several miles of straight highway. To make this even more complex, the KCS rail line forces truck traffic to wait on Highways 110 or 27 before crossing the tracks in from of the Singer School. Although the school is in a convenient location from Highways 110 and 27, it is in a very vulnerable risk zone for incidents involving trucks or the railroad.

Figure #4
Roadside Survey - Singer



The Singer School is shown in Photo. State Hwy. 27 meets 110 in front of the school. In addition, the KCS main north south line runs in front the school. The photos below show the Singer School with the KCS line and Hwy. 110. The second photo below shows a tanker on Hwy 110, crossing the railroad, and turning onto Hwy. 27. The tanker will enter busy Hwy. 27 from behind the rail road crossing.

Photo 6
Singer School

Photo 7
Tanker turning from Hwy. 110 onto Hwy. 27

3. Motor Carrier Tank Truck Risk Scenarios

Two risk scenarios were identified for motor carrier tank trucks. The first is a four inch breach of the tank truck. This scenario is most likely the result of a break in the fitting or line in the tank. Table 3 Motor Carrier Tank Truck Buffer Zones, Incident Scenario #1: Four Inch Breach," describes the risk zones resulting from this scenario.

The second involves a major rupture of the tank. The breach is a three foot by three foot rupture where the tank rolls over and lands on its side. This large hole in the tank could result from an accident where the tank rolls and hits a guard rail. Table 4, "Motor Carrier Tank Truck Buffer Zones: Incident Scenario #2: 3' by 3' Breach," describes the risk zones resulting from this scenario.

Buffer zones were identified using ALOHA in five weather conditions. . The five weather conditions include the following.

Calm Atmosphere:	74 Degrees F. 93% Relative Humidity, Stability Class F.
Night Time, Winter:	45 Degrees F. 85 % Relative Humidity, Stability Class D.
Night Time Intermediate:	57 Degrees F. 89% Relative Humidity, Stability Class E.
Day Time Winter:	58 Degrees F. 57% Relative Humidity, Stability Class C.
DayTime summer:	88 Degrees F. 58% Relative Humidity, Stability Class C.

Tables 3 and 4 show the results of the scenarios from these weather conditions.

Risk Zones

A footprint describing the vulnerability zone from an incident involving each EHS, each of the two scenarios, and each of the five weather conditions. The footprints were analyzed in terms of vulnerability zones to determine if they could be grouped. Four zones were identified from this analysis. The first zone "A" includes vulnerability zone of less than one mile. Included in this group were chemicals with risk zones from 50 yards to 900 yards. It should be noted that the EHS identified in the road side surveys fell in this category for the two scenarios used in this study. Some of the EHS in Zone A were less than 500 yards. These substances are identified with an A*. Formaldehyde
and Sulfuric Acid both have vulnerability zones of less than one mile.

Table 3
Motor Carrier Tank Truck Buffer Zones
Incident Scenario #1: Four Inch Breach,"

Chemical	Calm Atmosphere	Night time Winter	Night time Intermediate	Day time Winter	Day time Summer
Formaldehyde	A*	A*	A*	A*	A*
Sulfuric Acid	A	A*	A*	A*	A*

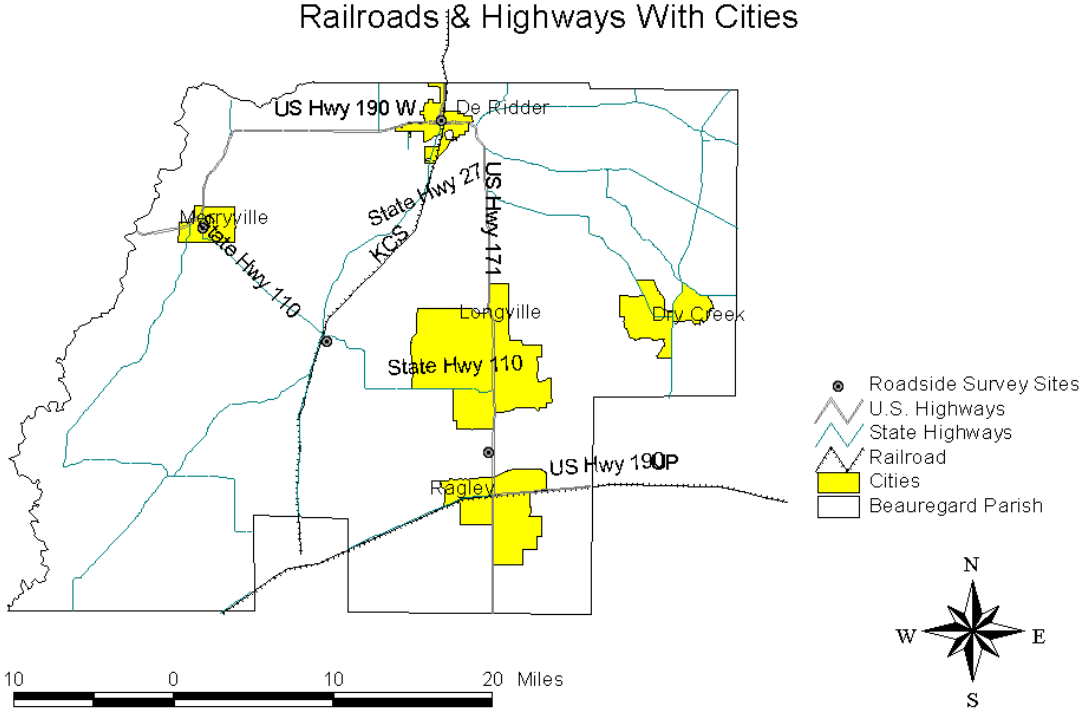
Table 4
Motor Carrier Tank Truck Buffer Zones
Incident Scenario #2: 3' by 3' Breach,"

Chemical	Calm Atmosphere	Night time Winter	Night time Intermediate	Day time Winter	Day time Summer
Formaldehyde	A	A	A	A	A
Sulfuric Acid	A	A	A	A	A

4. Rail Transportation

The Kansas City Southern (KCS) and Union Pacific (UP) have major rail lines through the parish. The KCS line is a major north south link from Lake Charles to Shreveport. The Union Pacific runs east west with connections from the Lake Charles industrial manufacturing facilities with the Mississippi River manufacturing area to the east. Figure "Transportation Routes – Railroads and Highways with Cities," shows the location of the rail lines in the parish.

Figure #1
Transportation Routes
Railroads & Highways With Cities



For the Union Pacific and KCS lines, twenty-six extremely hazardous chemicals were identified from the manifest reports provided. Almost all the substances are shipped in a liquid or gas state. Table #2 "Hazardous Chemicals Transported by Mode" provides a list of hazardous chemicals transported by rail through Beauregard Parish. The table also shows the mode of transport through the parish.

Appendix C, "TLV and IDLH Values for Hazardous Chemicals," is provided as a reference for emergency planers and responders. These reference values provided a basis for modeling accidental releases of the EHS.

---

5. Rail Risk Zones

Vulnerability Zones

Tables #5 and #6, "Rail Car Buffer Zones, Incident Scenario #1: Six Inch by 12 Inch Breach" and Rail Car Buffer Zones, Incident Scenario #2: 0.5 Inch Breach" summarize the risk zones for two types of accidents. The first is a catastrophic breach of the tank; this opening was established as a six by 12 inch breach. The size of the catastrophic opening was determined after consultation with facility transportation managers and transporters and represents a breach in the tank caused by a rail driven through the side of the tank. The second incident was a one-half inch opening in the tank; this incident would represent a leak in the tank. The Tables also reflect five weather conditions for the area. The five weather conditions include the following.

- Calm Atmosphere: 74 Degrees F. 93% Relative Humidity, Stability Class F.
- Night Time, Winter: 45 Degrees F. 85 % Relative Humidity, Stability Class D.
- Nighttime Intermediate: 57 Degrees F. 89% Relative Humidity, Stability Class E.
- Daytime winter: 58 Degrees F. 57% Relative Humidity, Stability Class C.
- Day Time Summer: 88 Degrees F. 58% Relative Humidity, Stability Class C.

Large Release Scenario

Four risk zones were identified using the five weather conditions. These buffer zones were determined using the footprints from an incident involving a hole in the tank car measuring six inches by 12 inches. Footprints were calculated using ALOHA and then analyzed to determine of they could be grouped. The risk zones included:

A. Less than One Mile;
B. From One to Three Miles
C. From Three to Six Miles
D. Over Six Miles.

Note that in the following tables, chemicals in Buffer Zone "A" which have a footprint of less than 500 yards are noted by "**A***." Emergency planners may need to which "Buffer Zone A" type of chemicals pose a limited threat to the area and differentiate these substances from those

substances, which pose a greater risk. The risk zones are listed for each of the five weather conditions.

A. The first risk zone is one mile or less. Most of the EHS chemicals including Acrylonitrile, Aniline, Epichlorohydrin, Ethanolamine, Ethylenediamine, Formaldehyde, Hydrogen Peroxide, Isopropylamine, Phenol, Propylene Oxide, Sulfuric Acid, and Toluene have a risk zone of less than one mile.

B. The second zone included from one to less than three miles. These chemicals included Dimethylamin, Ethylene Oxide, and Hydrazine.

C. The third risk zone included chemicals with a zone from three miles to six miles. These chemicals included Metylamine, Methyl Mercaptan, Sulfur Dioxide, and Trimethylamine.

D. The chemicals with the greatest risk to the parish had a zone of six miles or greater. These included Ammonia, Chlorine, Hydrogen Chloride, Hydrogen Cyanide, Hydrogen Fluoride. It should be noted that these risk zones were calculated using ALOHA which limits the time of exposure to one hour. It is possible that the risk zone will actually exceed six miles in a release that extends beyond one hour.

It should be noted in a review of the values listed in Tables 5 and 6 that the buffer zone varies with changes in weather conditions. For example, a Calm Atmosphere tends to have a larger risk zone than Night Time Winter. Further examination of Tables 5 and 6 show that not all chemicals react the same way when weather conditions vary. Chlorine, Hydrogen Chloride tend to have larger risk zones in Day Time Winter than in Day Time Summer. Other chemicals have just the reverse. Care should thus be taken not to over generalize how chemicals will affect an area as weather conditions change.

Small Release Scenario

Table 6, "Rail Risk Zones: Incident Scenario #2, 0.5 inch Breach" shows a very different set of risk zones. They tend to be less than A Zones for Benzyl Chloride to B Zones for Chlorine, Hydrogen Chloride, or Hydrogen Fluoride.

A leak in a rail tank could result in a 0.5 inch hole. Incidents involving leaks in rail tank cars will be more common but will have a dramatically different risk zone than a large release scenario as described above.

Zone A: The One-mile buffer zone shown in Figure "One Mile Rail Buffer Zone shows a buffer zone that includes all of DeRidder, Ragley, and most of Longville. In addition, major North – South transportation routes would be affected by an incident on either the Union Pacific rail line that runs through the Southern part of the parish as well as the Kansas City rail line that runs North – South through the parish. U.S. Highways 171 and 190, along with State Highways 27, 26, 110, and 12 could be affected by an incident on the rail lines.

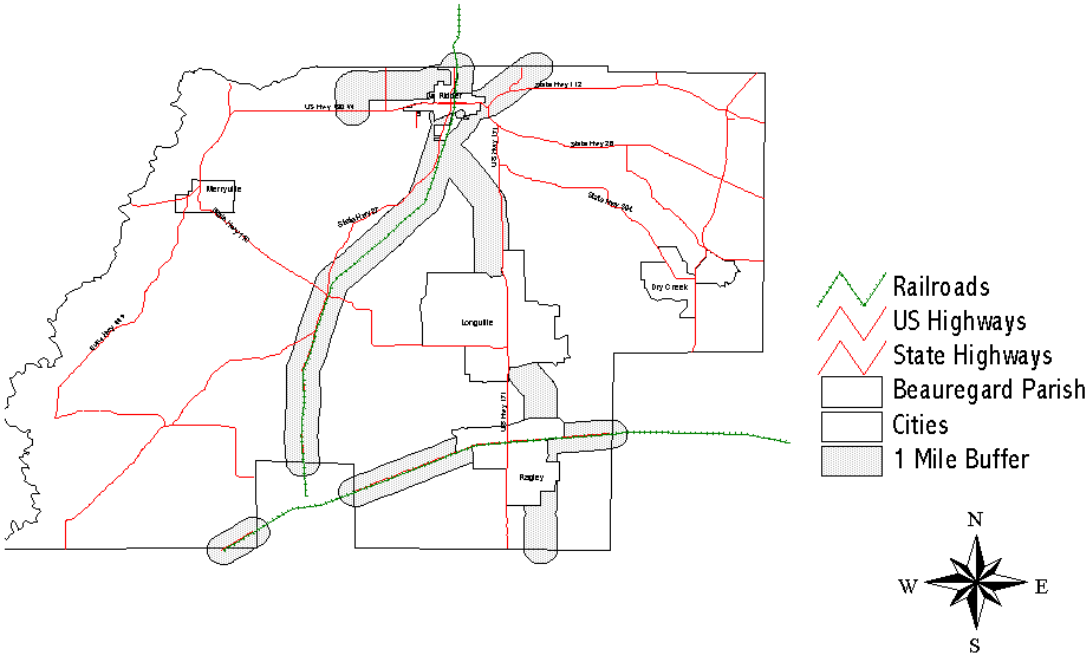
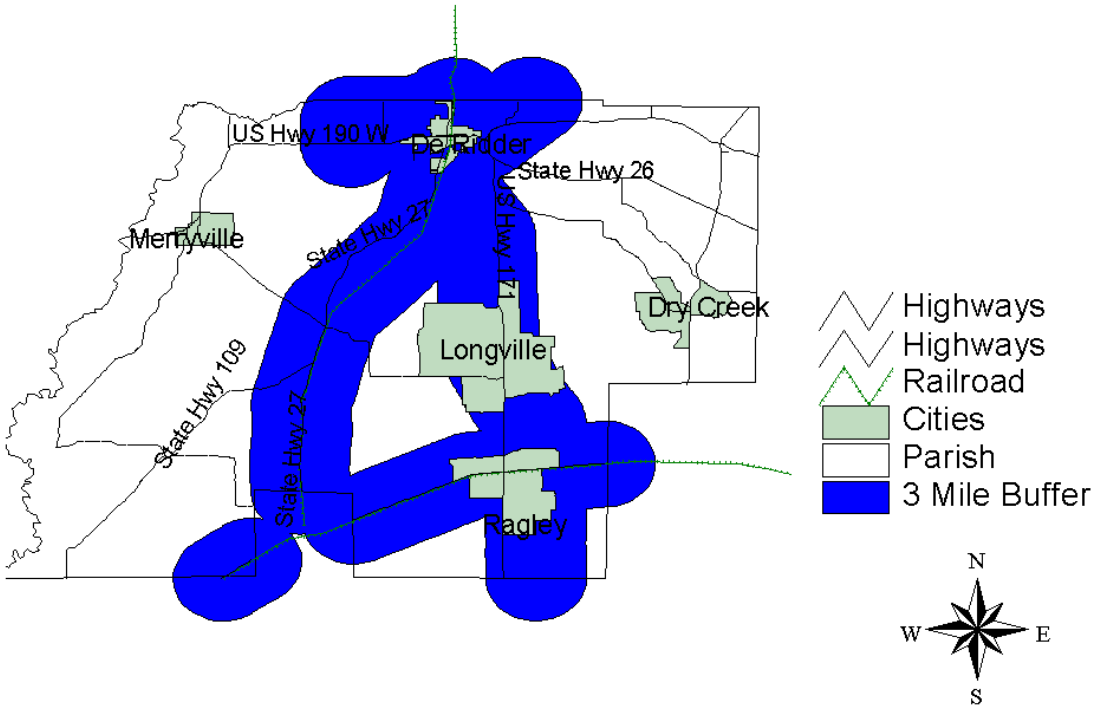


Figure
One Mile Buffer Zone

Zone B: The second zone "Zone B" includes from one to less than three miles. These chemicals included Dimethylamin, Ethylene Oxide, and Hydrazine.



Three Mile Buffer Zone

Zone C: The third risk zone "Zone C," includes chemicals with a risk zone from three miles to less than six miles. These chemicals included Metylamine, Methyl Mercaptan, Sulfur Dioxide, and Trimethylamine.

Zone D: The chemicals with the greatest risk to the parish had a zone of six miles or greater. These included Ammonia, Chlorine, Hydrogen Chloride, Hydrogen Cyanide, Hydrogen Fluoride. It should be noted that these risk zones were calculated using ALOHA which limits the time of exposure to one hour. It is possible that the risk zone will actually exceed six miles in a release that extends beyond one hour.

It should be noted in a review of the values listed in Table 8 that the risk zone varies with changes in the weather conditions. For example, a Calm Atmosphere tends to have a larger risk zone than Night Time Winter. Further examination of Table 8 shows that not all chemicals react

the same way when weather conditions vary. Chlorine, Hydrogen Chloride tend to have larger risk zones in Day Time Winter than in Day Time Summer. Other chemicals have just the reverse. Care should thus be taken not to over generalize how chemicals will affect an area as weather conditions change. The footprint is chemical specific.

The six mile buffer zone follows each of the two rail lines in the parish. The figure below shows that almost the entire parish is affected by the six mile buffer zone. Only Merryville and Dry Creek would not fall within this risk zone. Almost all schools, churches, and businesses fall within this large risk zone for incidents that occur on the Union Pacific rail line in the Southern part of the parish and the Kansas City Southern Rail line which runs North and South through the parish.

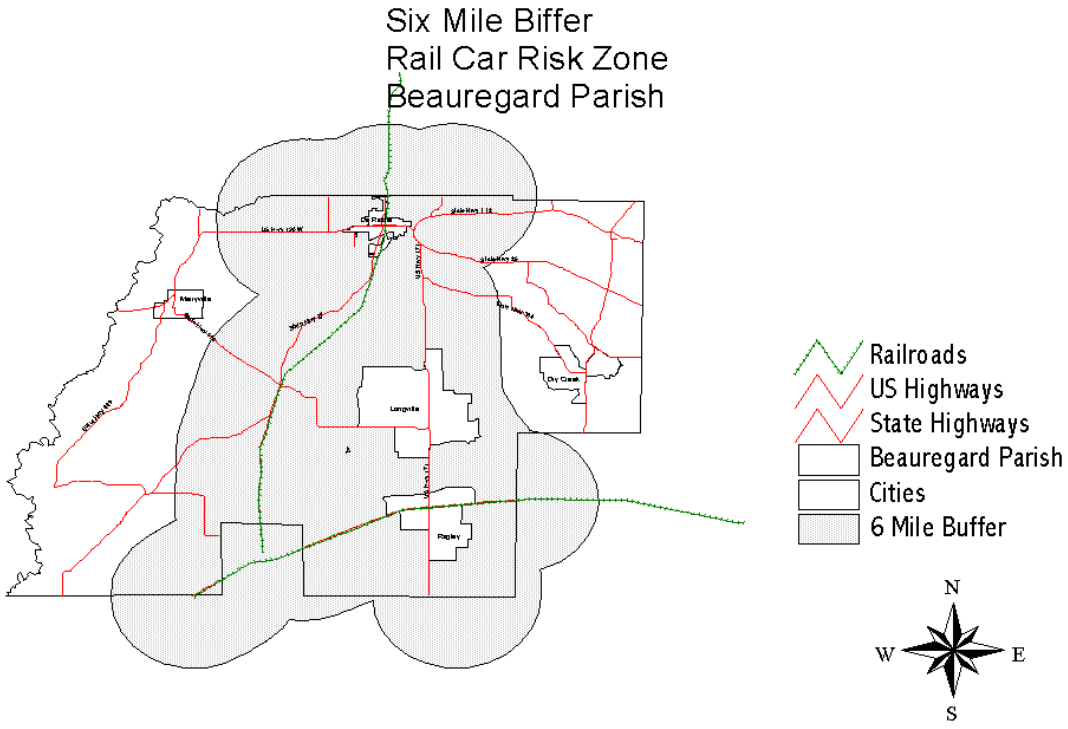


Figure
Zone D: Six Mile Rail Buffer Zone

A view of each of the three risk zones provide an excellent comparison of how the parish would be affected by an accidental release of the EHS. Even the one mile risk zone includes all of DeRidder and most of Longville and Ragley. Almost any incident involving an EHS would affect the schools, churches, and businesses in these areas. Residents and businesses should understand that the rail lines in the parish pose a risk of chemical incidents along the lines and they should

understand how to respond during an incident in their area. They are in a risk zone for EHS and should be prepared.

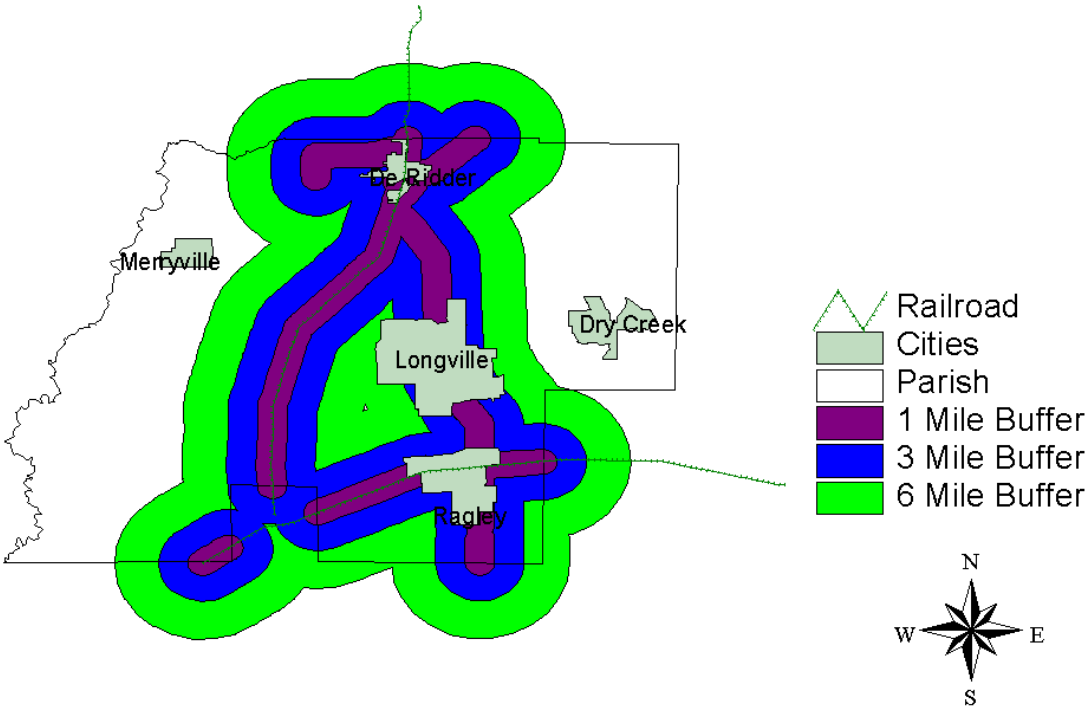


Figure
Combined Risk Zones

NOTE: Atmospheric Information: Weather parameters were taken from data provided by the Louisiana State University Regional Climate Center for Lake Charles, Louisiana. Scenarios were generated using the open country parameters to represent the rural landscapes present in Beauregard Parish. Appendix D provides a summary of the average weather conditions at the Lake Charles Airport for a one year period.

Table #5
Rail Car Buffer Zones
Incident Scenario #1: Six Inch by 12 Inch Breach

Chemical	Calm Atmosphere	Night time Winter	Night time Intermediate	Day time Winter	Day time Summer
Acrylonitrile	B	A	A	A	B
Ammonia	D	C	C	C	C
Aniline A*	A*	A*	A*	A*	
Chlorine	D	C	C	D	C
Dimethylamine	B	A	B	B	B
Ethylene Oxide	B	A	B	A	B
Epichlorohydrin	A	A*	A*	A*	A*
Ethanolamine	A*	A*	A*	A*	A*
Ethylenediamine	A*	A*	A*	A*	A*
Formaldehyde A	A	A	A	A	
Hydrogen Chloride	D	C	C	C	C
Hydrogen Cyanide	D	B	D	B	C
Hydrogen Fluoride	D	C	D	C	D
Hydrogen Peroxide	A*	A*	A*	A*	A*
Hydrazine	B	A*	A	A*	A
Isopropylamine	A	A*	A	A*	A
Methylamine	C	C	C	C	C

NOI = No Off Site Impact

Chemical	Calm Atmosphere	Night time Winter	Night time Intermediate	Day time Winter	Day time Summer
Methyl Mercaptan	C	B	B	B	B
Phenol	A*	A*	A*	A*	A*
Propylene Oxide	A	A	A	A	B
Sulfuric Acid	A*	A*	A*	A*	A*
Sulfur Dioxide	C	B	B	B	B
Toluene Diisocyanate	A*	NOI	A*	A*	A*
Trimethylamine	C	B	B	B	B

Weather Condtions

#1	Calm Atmosphere:	74 F, 93% Relative Humidity, Stability Class F
#2	Night Time, Winter:	45F, 85% Relative Humidity, Stability Class D
#3	Night Time, Intermediate:	57F, 89% Relative Humidity, Stability Class E
#4	Daytime, Winter:	58F, 57% Relative Humidity, Stability Class C
#5	Daytime, Summer:	88F, 58% Relative Humidity, Stability Class C

Table #6
Rail Car Buffer Zones
Incident Scenario # 2, 0.5 Inches Breach

Chemical	Calm Atmosphere	Night Time Winter	Night Time Intermediate	Daytime Winter	Daytime Summer
Acrylonitrile	A*	A*	A*	NOI	A*
Ammonia	A	A	A	A	A
Aniline	A*	A*	A*	A*	A*
Benzyl Chloride	A	A*	A*	A*	A*
Carbon Bisulfide	A	A*	A	A*	A
Carbon Tetrachloride	A*	A*	A*	A*	A*
Chlorine	B	B	B	B	B
Chloroform	A	A*	A*	A*	A*
Cyclohexylamine	A	A*	A*	A*	A*
Dimethylamine	A*	A*	A*	A*	A*
Ethylene Oxide	A*	A*	A*	A*	A*
Epichlorohydrin	A*	A*	A*	A*	A*
Ethanolamine	A*	A*	A*	A*	A*
Ethylenediamine	A*	A*	A*	A*	A*
Formaldehyde	A	A	A	A	A
Hydrogen Chloride	B	B	B	B	B
Hydrogen Cyanide	A	A*	A*	A*	A*
Hydrogen Fluoride	B	A*	A	A*	A
Hydrogen Peroxide	A*	A*	A*	A*	A*

Chemical	Calm Atmosphere	Night Time Winter	Night Time Intermediate	Daytime Winter	Daytime Summer
Hydrazine	A*	A*	A*	A*	A*
Methyl Mercaptan	A	A*	A*	A*	A*
Nitrobenzene	A*	A*	A*	A*	A*
Phenol	A*	A*	A*	A*	A*
Propylene Oxide	A*	A*	A*	A*	A*
Sulfuric Acid	A*	A*	A*	A*	A*
Sulfur Dioxide	A	A*	A	A*	A
Sulphur Trioxide	B				B
Toluene Diisocyanate	A*	NOI	A*	A*	NOI
Trimethylamine	A	NOI	A*	NOI	A*

Weather Conditions

#1	Calm Atmosphere:	74 F, 93% Relative Humidity, Stability Class F
#2	Night Time, Winter:	45F, 85% Relative Humidity, Stability Class D
#3	Night Time, Intermediate:	57F, 89% Relative Humidity, Stability Class E
#4	Daytime, Winter:	58F, 57% Relative Humidity, Stability Class C
#5	Daytime, Summer:	88F, 58% Relative Humidity, Stability Class C

6. Pipelines

Beauregard Parish has several large pipeline companies with routes in the parish including: Rebel Energy; Tennessee Gas Pipeline; Trans Continental Gas; and Trunkline Gas Company, Longville, LA Trunkline Gas has 10" natural gas lines coming into the parish from Texas near Merryville and a main set of lines (26, 30, and 36" lines) from northeast corner of the parish south to the Longville Station. Texas Eastern also carries natural gas with main connections at the Gillis Station shown on Figure 6 "Beauregard Parish Natural Gas Stations."

In the event of a breach of a large 26" or higher line, local officials should secure the area and evacuate approximately a one mile area around the breach. Operations employees of the pipeline should cut off the pipeline to stop the release and ensure that property is protected from an explosion. Crude oil also runs through the parish with lines run by City Service, Citgo, Conoco, SOHIO, UG, and LPG. In the event of a breach of a crude oil pipeline, operators should take the following actions.

7. Downtown DeRidder Vulnerability Zone

Downtown DeRidder is included in each of the high hazard risk zones in the parish. The KCS main north south line runs through the center of DeRidder, U.S. Highways 171 and 190 come through the City, along with State Highway 27.

Downtown DeRidder

The photo , "Downtown DeRidder" shows a truck coming through the downtown area on Hwy. 171 and 190. The truck in the photo has just crossed the main KCS North / South line.

8. Routing Considerations

Trucks destined to Westvaco and International Paper currently use two main routes in transporting materials to the facilities and taking cargo from these plants. Vehicles traveling on U.S. Hwy. 171 or 190 enter the central area of DeRidder and use Pine Street and Washington Street to reach the facilities on Crossly Road. Trucks turning from Washington Street onto Crosby Road must cross the KCS main line through DeRidder. The Photo "Crosby Road Crossing," shows the turn from Washington Street crossing the KCS line onto Crosby Road.

Photo
Crosby Road Crossing

The research team completing this transportation analysis of hazardous chemicals encourages parish officials and representatives of Westvaco and International Paper to identify alternative transportation routes for their facilities. A crossing of the KCS line away from current populated downtown area could minimize the adverse effects of an incident. A new route to the facilities from Hwy. 190 using either Nichols Road could avoid the congested downtown traffic for north bound traffic to the facilities in DeRidder. Nichols could be widened to accommodate the heavy traffic and extended directly to Crosby Road.

For traffic coming to the facilities or continuing south on Hwy. 27, 171 or 190, a bypass around DeRidder should be explored. These major highways currently channel the heavy truck traffic into the busy downtown DeRidder area. Alternatives to avoid the downtown DeRidder area should be explored. In addition, crossing the KCS main line in downtown DeRidder presents

a very hazardous situation for all vehicles including passenger cars and heavy trucks. Moving the heavy traffic which must cross the KCS line away from downtown DeRidder would avoid the exposure of the local population to potential incidents and make traffic flows in the downtown areas move easier. The possibility of alternative traffic routes should be explored by parish officials, the Kansas City Southern Railroad, and representatives of local facilities and trucking companies.

REFERENCES

"Analyzing Chemical Risks in High Hazard Area," Sponsored report submitted by John C. Pine, Public Administration Institute, Louisiana State University to the Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency , EPA 550-F-93-004. October, 1994.

Handbook of Chemical Hazard Analysis Procedures. Federal Emergency Management Agency, U.S. Department of Transportation and the U.S. Environmental Protection Agency. Washington, D.C.

Hazardous Materials Emergency Planning Guide. National Response Team, Washington, D.C., 1986.

Technical Guidance for Hazards Analysis: Emergency Planning for Extremely Hazardous Substances. U.S. Environmental Protection Agency, Federal Emergency Management Agency, and U.S. Department of Transportation. Washington, D.C., 1987.

SRA Title III (EPCRA) and *Conducting a Commodity Flow Study, Hazards Analysis on the Move*. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, EPA 550-F-93-004. October, 1993.