

Louisiana Hazardous Substances Emergency Events Surveillance (HSEES) System

2001-2009: A Cumulative Report



**Prepared by William C. Trachtman, MS, Allison N. Koehler, MPH, and
Syed Atif Ahsan, MSPH**

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EXECUTIVE SUMMARY

The Hazardous Substances Emergency Events Surveillance (HSEES) system, maintained by the Agency for Toxic Substances and Disease Registry (ATSDR), actively collects information to describe the public health consequences of acute releases of hazardous substances in participating states. The Louisiana Department of Health and Hospitals, Office of Public Health, Center for Environmental Health Services, Section of Environmental Epidemiology and Toxicology has participated in this surveillance system since 2001. This report summarizes the characteristics of events reported to Louisiana from 2001 through 2009. Information about acute events involving hazardous substances was collected, including the substance(s) released, number of victims, number and types of injuries, and number of evacuations. The data were computerized using an ATSDR-provided web-based data entry system.

From January 1, 2001 through December 31, 2009 there were 6988 events that met the HSEES surveillance definition. In 4960 (71.0%) events, only one substance was released. The most commonly reported categories of substances were volatile organic compounds, other inorganic substances, and acids. During this reporting period, 259 events (3.7% of all reported events) resulted in a total of 653 victims. The most frequently reported injuries were respiratory irritation and gastrointestinal system problems. Evacuations were ordered for 108 (1.8%) events.

INTRODUCTION

The Centers for Disease Control and Prevention defines surveillance as the

“ongoing, systematic collection, analysis, and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know. The final link of the surveillance chain is the application of these data to prevention and control. A surveillance system includes a functional capacity for data collection, analysis, and dissemination linked to public health programs”[1].

Since 1990, the Agency for Toxic Substances and Disease Registry (ATSDR) has maintained an active, state-based Hazardous Substances Emergency Events Surveillance (HSEES) system to describe the public health consequences of releases of hazardous substances. The decision to initiate a surveillance system of this type was based on a study published in 1989 about the reporting of hazardous substances releases to three national databases: the National Response Center Database, the Hazardous Material Information System (HMIS), and the Acute Hazardous Events Database [2].

A review of these databases indicated limitations. Many events were missed because of specific reporting requirements (for example, the HMIS did not record events involving intrastate carriers or fixed-facility events). Other important information was not recorded, such as the demographic characteristics of victims, the types of injuries sustained, and the number of persons evacuated.

As a result of this review, ATSDR implemented the HSEES system to more fully describe the public health consequences of releases of hazardous substances.

HSEES has several goals:

- To describe the distribution and characteristics of acute hazardous substances releases;
- To describe morbidity and mortality among employees, responders, and the general public that resulted from hazardous substances releases; and
- To develop strategies that might reduce future morbidity and mortality resulting from the release of hazardous substances.

For a surveillance system to be useful, it must not only be a repository for data, but the data must also be used to protect public health.

In the last few years, the last goal of the HSEES system has been emphasized; i.e., to develop strategies to reduce subsequent morbidity and mortality by having each participating state analyze its data and develop appropriate prevention outreach activities. These activities are intended to provide industry, responders, and the general public with information that can help prevent chemical releases and reduce morbidity and mortality if a release occurs.

The Louisiana Department of Health and Hospitals, Office of Public Health, Center for Environmental Health Services, Section of Environmental Epidemiology and Toxicology has participated in this surveillance system since 2001. In 2009, fourteen state health departments participated in HSEES: Colorado, Florida, Iowa, Louisiana, Michigan, Minnesota, New Jersey, New York, North Carolina, Oregon, Texas, Utah, Washington, and Wisconsin.

This report provides an overview of HSEES for 2001 through 2009 in Louisiana, summarizes the characteristics of acute releases of hazardous substances and their associated public health

consequences, and demonstrates how data from the system are translated into prevention activities to protect public health.

METHODS

In 2005 an updated data-collection form was approved by the Office of Management and Budget. Information was collected about each event, including substance(s) released, victims, injuries (adverse health effects and symptoms), and evacuations.

Various data sources were used to obtain information about these events. These sources included, but were not limited to, the Louisiana Department of Public Safety and Corrections, Office of State Police, the Louisiana Department of Environmental Quality (LDEQ), the U.S. Coast Guard National Response Center, and the U.S. Department of Transportation, Hazardous Materials Information System (HMIS). Census data were used to estimate the number of residents in the vicinity of most of the events. All data were computerized using a web-based data entry system provided by ATSDR.

A HSEES event is defined as an uncontrolled or illegal acute release of any hazardous substance (except petroleum when petroleum is the only substance released), in any amount for substances listed on the HSEES Mandatory Chemical Reporting List, or, if not on the list, in an amount greater than or equal to 10 lbs or 1 gallon. Threatened releases of qualifying amounts will be included if the threat led to an action (e.g., evacuation) to protect the public health. Petroleum-only releases are not included because of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). [Note: The Petroleum Exclusion clause of

CERCLA excludes any form of petroleum that has not been refined to the point of becoming a single-chemical product]. HSEES defines victims as people who experience at least one documented adverse health effect within 24 hours after the event or who die as a consequence of the event. Victims who receive more than one type of injury or symptom are counted once in each applicable injury type or symptom. Events are defined as transportation related if they occur (a) during surface, air, pipeline, or water transport of hazardous substances, or (b) before being unloaded from a vehicle or vessel. All other events are considered fixed-facility events.

For data analyses, the substances released were categorized into 15 groups. The category “mixture” comprises substances from different categories that were mixed or formed from a reaction before the event; the category “other inorganic substances” comprises all inorganic substances except acids, bases, ammonia, and chlorine; and the category “other” comprises substances that could not be grouped into one of the other existing categories.

RESULTS

From January 1, 2001 through December 31, 2009, a total of 6988 acute hazardous substances events met the HSEES surveillance definition. A total of 5778 (82.7%) events occurred in fixed facilities. The parishes with the most events (Table 1) were East Baton Rouge (1028 [14.7%]), Calcasieu (961 [13.8%]), and Ascension (790 [11.3%]).

Table 1.—Number of events meeting the surveillance definition, by parish and type of event—
Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009

Parish	Type of Event				All Events	
	Fixed Facility		Transportation		No. Events	%*
	No. Events	%*	No. Events	%*		
Acadia	7	0.1	9	0.7	16	0.2
Allen	6	0.1	1	0.1	7	0.1
Ascension	667	11.6	123	10.2	790	11.3
Assumption	3	0.1	1	0.1	4	0.1
Avoyelles	2	0.0	1	0.1	3	< .1
Beauregard	2	0.0	5	0.4	7	0.1
Bienville	3	0.1	2	0.2	5	0.1
Bossier	21	0.4	36	3.0	57	0.8
Caddo	103	1.8	137	11.3	240	3.4
Calcasieu	899	15.6	62	5.1	961	13.8
Caldwell	4	0.1	1	0.1	5	0.1
Cameron	21	0.4	2	0.2	23	0.3
Catahoula	1	0.0	2	0.2	3	< .1
Claiborne	0	0.0	5	0.4	5	0.1
Concordia	0	0.0	2	0.2	2	< .1
De Soto	11	0.2	8	0.7	19	0.3
E. Baton Rouge	925	16.0	103	8.5	1028	14.7
E. Carroll	0	0.0	2	0.2	2	< .1
E. Feliciana	1	0.0	2	0.2	3	< .1
Evangeline	1	0.0	1	0.1	2	< .1
Franklin	2	0.0	2	0.2	4	0.1
Grant	10	0.2	2	0.2	12	0.2
Iberia	8	0.1	8	0.7	16	0.2
Iberville	484	8.4	48	4.0	532	7.6
Jackson	2	0.0	1	0.1	3	< .1
Jefferson	232	4.0	97	8.0	329	4.7
Jefferson Davis	3	0.1	8	0.7	11	0.2
Lafayette	25	0.4	46	3.8	71	1.0
LaFourche	24	0.4	16	1.3	40	0.6
La Salle	2	0.0	1	0.1	3	< .1
Lincoln	6	0.1	5	0.4	11	0.2
Livingston	12	0.2	9	0.7	21	0.3
Madison	3	0.1	8	0.7	11	0.2
Morehouse	2	0.0	5	0.4	7	0.1
Natchitoches	8	0.1	8	0.7	16	0.2

Orleans	63	1.1	79	6.5	142	2.0
Ouachita	239	4.1	25	2.1	264	3.8
Plaquemines	168	2.9	24	2.0	192	2.7
Pointe Coupee	6	0.1	45	3.7	51	0.7
Rapides	22	0.4	27	2.2	49	0.7
Red River	No HSEES Events					
Richland	2	0.0	7	0.6	9	0.1
Sabine	3	0.1	1	0.1	4	0.1
St. Bernard	513	8.9	11	0.9	524	7.5
St. Charles	666	11.5	49	4.0	715	10.2
St. Helena	No HSEES Events					
St. James	249	4.3	30	2.5	279	4.0
St. John	101	1.7	15	1.2	116	1.7
St. Landry	29	0.5	6	0.5	35	0.5
St. Martin	1	0.0	10	0.8	11	0.2
St. Mary	11	0.2	8	0.7	19	0.3
St. Tammany	17	0.3	11	0.9	28	0.4
Tangipahoa	9	0.2	22	1.8	31	0.4
Tensas	0	0.0	1	0.1	1	< .1
Terrebonne	18	0.3	22	1.8	40	0.6
Union	6	0.1	2	0.2	8	0.1
Vermilion	14	0.2	3	0.2	17	0.2
Vernon	3	0.1	4	0.3	7	0.1
Washington	10	0.2	2	0.2	12	0.2
Webster	20	0.3	9	0.7	29	0.4
W. Baton Rouge	93	1.6	26	2.1	119	1.7
W. Carroll	1	0.0	0	0.0	1	< .1
W. Feliciana	2	0.0	0	0.0	2	< .1
Winn	2	0.0	1	0.1	3	< .1
State Waters	6	0.1	1	0.1	7	0.1
Total	5774	100.0	1210	100.0	6984	100.0

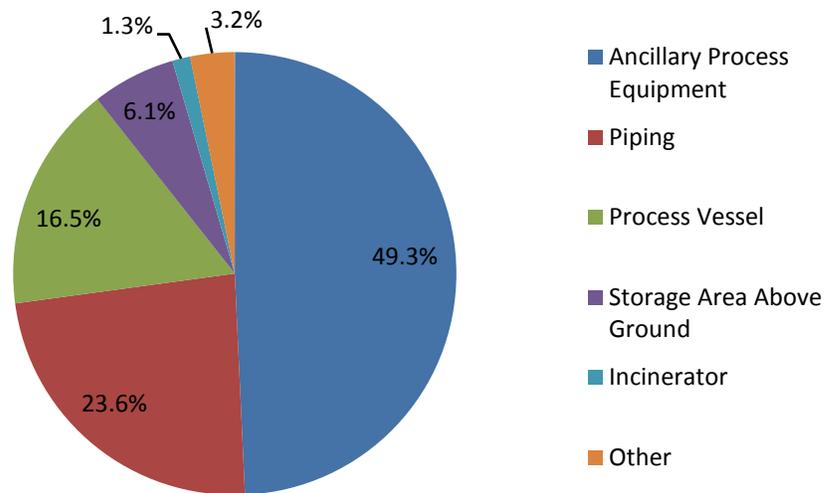
* Percentage = (number of events by type of event per parish ÷ total number of events in that parish) x 100

‡ Parish unknown for 4 fixed facility events

For each fixed-facility event occurring in mining, manufacturing, or utilities, one or two choices can be selected to describe the type of area where the event occurred or the equipment involved with the event. Only one type of area was reported for 4918 (95.4%) events, a combination of two area types were reported for 144 (2.8%) event, and the type of area was unknown for 92

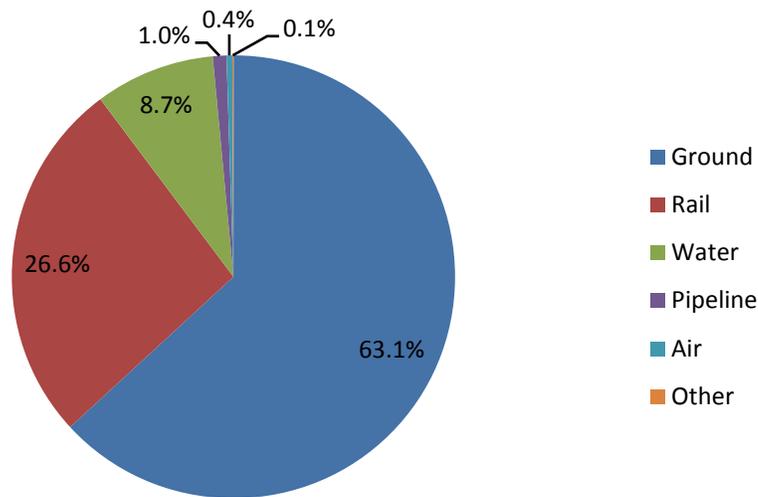
(1.8%) events. Among events with one type of area reported, the main areas were classified as follows: 2423 (49.3%) ancillary process equipment, 1160 (23.6%) piping, and 813 (16.5%) process vessel (Figure 1). Of the events with two areas, 89 (61.8%) involved piping in combination with other types of areas.

Figure 1.—Primary areas or equipment of fixed facilities involved in mining, manufacturing, or utility events where only one type of area was reported—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009



The type of transportation was reported for 1202 (99.3%) transportation-related events. Of those transportation-related events, 759 (61.3%) occurred during ground transport (e.g., truck, van, or tractor) and 320 (26.6%) involved transport by rail (Figure 2). Fewer events involved other transportation modes. The largest proportions of transportation-related events occurred from a moving vehicle or vessel (351 [33.6%]) or in route and was later discovered at a fixed facility (252 [24.1%]).

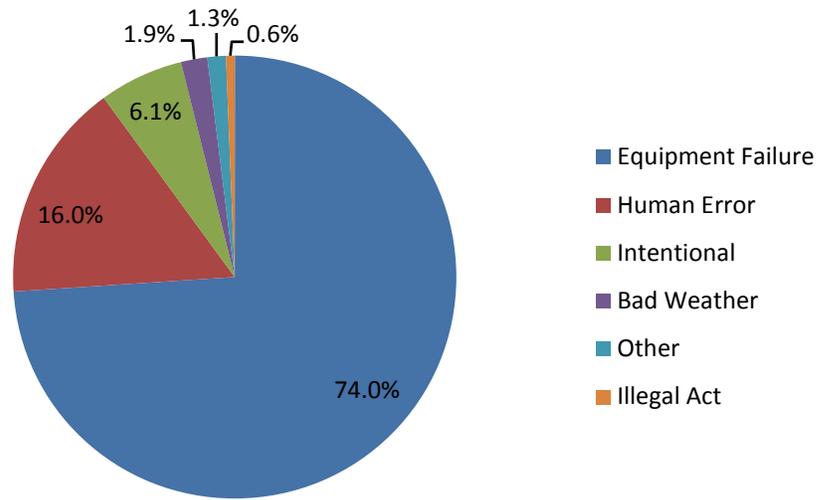
Figure 2.—Distribution of transportation-related events, by type of transport—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009



*The type of transportation was unknown for 8 transportation-related events

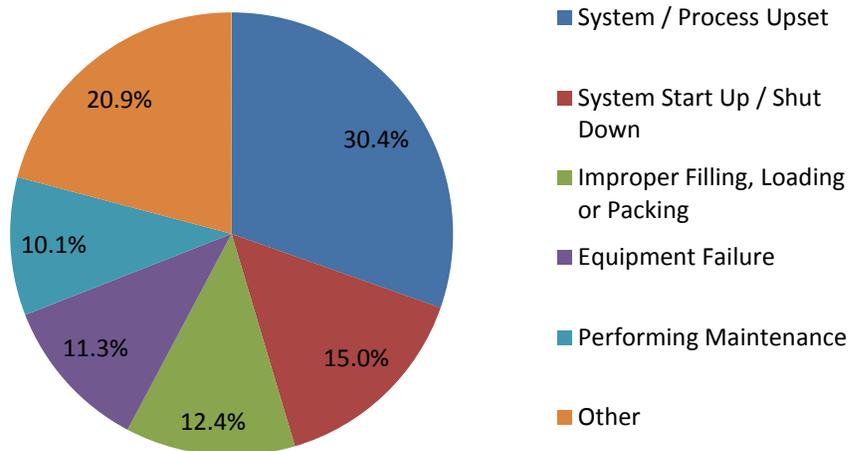
Primary and secondary factors contributing to the events were reported. Primary factors were reported for 6884 (98.5%) events (Figure 3a). For those events in which primary factors were reported, most (78.4%) fixed-facility events reported equipment failure as the primary factor, and most (46.4%) transportation-related events also reported equipment failure as the primary factor. Secondary factors were reported for 3560 (50.9%) events (Figure 3b). Of the reported secondary factors, most (35.5%) fixed-facility events involved system/process upset and most (49.8%) transportation-related events involved improper filling, loading, or packing.

Figure 3a.—Primary factors reported as contributing to events—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009



*Primary factors were unknown for 104 events

Figure 3b.—Secondary factors reported as contributing to events—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009.



*No secondary factor was reported for 3428 events

Only one substance was released in 71% of all events. Two substances were released in approximately 15% of the events, and over 14% involved the release of more than two substances (Table 2). Fixed-facility events were more likely than transportation events to have two or more substances released in an event (34.1% vs. 4.5%).

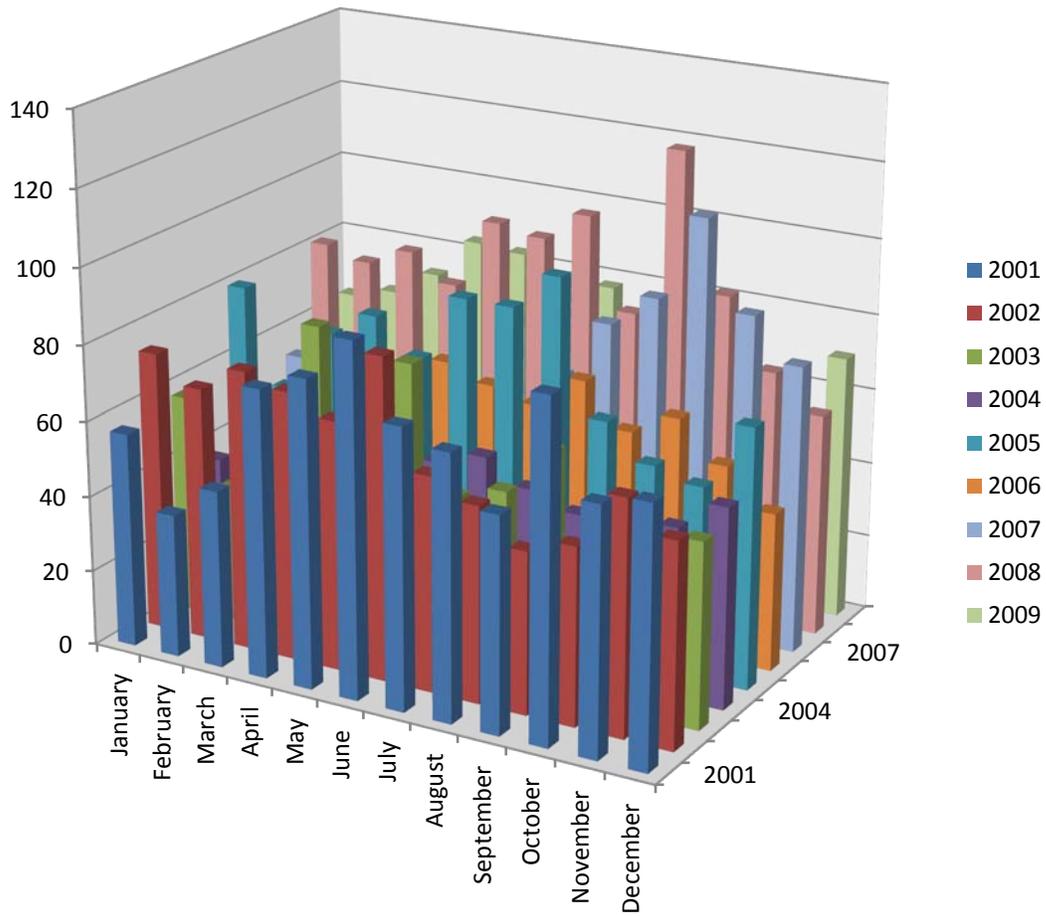
Table 2.—Number of substances involved per event, by type of event—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009

No. Substances	Type of Event						All Events		
	Fixed Facility			Transportation					
	No. Events	%	Total Substances	No. Events	%	Total Substances	No. Events	%	Total Substances
1	3805	65.9	3805	1155	95.5	1155	4960	71.0	4960
2	977	16.9	1954	38	3.1	76	1015	14.5	2030
3	441	7.6	1323	9	0.7	27	450	6.4	1350
4	216	3.7	864	4	0.3	16	220	3.1	880
≥ 5	339	5.9	2350	4	0.3	24	343	4.9	2374
Total‡	5778	100.0	10296	1210	99.9	1298	6988	99.9	11594

‡ Percentages do not total 100% because of rounding.

HSEES events were more likely to occur in industrial areas as opposed to commercial, residential or agricultural areas. In addition, HSEES events were more likely to occur in the 6 hours before noon (34.7%) and the 6 hours after and including noon (29.2%), compared with the 6 hours before midnight (18.3%) and the 6 hours after and including midnight (17.4%). Twenty-six events did not have a time specified. Additionally, 15-16% of events occurred on each weekday as compared with 9-11% on a weekend day. When summated over the entire time period, the highest number of events occurred in May (631 [9.0%]) (Figure 4).

Figure 4.— Monthly breakdown of HSEES events—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009



Industries

The largest proportions of HSEES events were associated with the manufacturing (5056 [72.4%]) and transportation / warehousing (1193 [17.1%]) industries (Table 3). Within manufacturing, chemical manufacturing (1758 [34.8%]) and petroleum manufacturing (1147 [22.7%]) accounted for most of the events. The largest number of events with victims occurred in the manufacturing industry (109 [42.1%]). The total number of victims was greatest in the manufacturing industry (253 [38.7%]) followed by the number of victims in transportation industry (169 [25.9%]). The subcategory chemical manufacturing (North American Industry Classification System [NAICS] code 325 and subcategories) accounted for 38.7% of all victims in the manufacturing industry. Although the manufacturing industry resulted in a large proportion of events with victims and a large number of victims, only 2.2% of all 5056 events resulted in victims. Conversely, 555% of all events in the Educational Services (NAICS code 61 and subcategories) resulted in victims, but this industry represents a small proportion (1.3%) of events with victims. The incident with the largest number of injuries was in the transportation industry (NAICS Code 484). Fifty people (LA20040980) were slightly injured when a tanker leaked monoethanolamine.

Table 3.—Industries involved in hazardous substance events and events with victims, by category— Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009

Industry Category	Total Events		Events with Victims		Percentage of Events with Victims	Total no. Victims # (maximum) *
	No.	%	No.	%		
Accommodation and Food Services	1	0.1	1	0.4	100.0	3 (3)
Administrative and Support and Waste Management and Remediation Services	13	0.2	2	0.8	15.4	3 (2)
Agriculture, Forestry, Fishing and Hunting	16	0.2	5	1.9	31.3	7 (3)
Arts, Entertainment, and Recreation	4	0.1	2	0.8	50.0	13 (8)
Construction	23	0.3	3	1.2	13.0	13 (9)
Educational Services	9	0.1	5	1.9	55.6	34 (25)
Finance and Insurance	No HSEES Events					
Health Care and Social Assistance	6	0.1	1	0.4	16.7	10 (10)
Information	No HSEES Events					
Management of Companies and Enterprises	No HSEES Events					
Manufacturing	5056	72.4	109	42.1	2.2	253 (30)
Mining	148	2.1	4	1.5	2.7	5 (2)
Not an Industry/Not Identified/Unknown	204	2.9	25	9.7	12.3	40 (6)
Other Services (except Public Administration)	19	0.3	8	3.1	42.1	27 (17)
Professional, Scientific, and Technical Services	9	0.1	1	0.4	11.1	2 (2)
Public Administration	18	0.3	3	1.2	16.7	9 (7)
Real Estate and Rental and Leasing	3	0.1	0	0.0	0.0	0 (0)
Retail Trade	30	0.4	3	1.2	10.0	13 (11)
Transportation and Warehousing	1193	17.1	59	22.8	4.9	169 (50)
Utilities	103	1.5	11	4.2	10.7	22 (6)
Wholesale Trade	133	1.9	17	6.6	12.8	30 (5)
Total‡	6988	100.0	259	100.2	-	653 (50)

*Minimum number of victims per event = 1.

‡ Percentages do not total 100% because of rounding.

Substances

A total of 11594 substances were released in all events, of which 168 (1.4%) substances were reported as threatened to be released. The individual substances most frequently released were sulfur dioxide, benzene, nitrogen oxides (NO_x), and hydrogen sulfide (Appendix). Substances were grouped into 16 categories. The substance categories most commonly released in fixed-facility events were volatile organic compounds (3780 [36.7%]), other inorganic substances (3427 [33.3%]), and acids (520 [5.1%]) (Table 4). In transportation-related events, the most common substance categories released were acids (280 [21.6%]), volatile organic compounds (215 [16.6%]), and paints and dyes (125 [9.6%]).

Table 4.—Number of substances involved, by substance category and type of event—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009

Substance Category	Type of Event				All Events	
	Fixed facility		Transportation		No. Substances	%
	No. Substances	%	No. Substances	%		
Acids	520	5.1	280	21.6	800	6.9
Agricultural Chemicals & Pesticides	233	2.3	52	4.0	285	2.5
Ammonia	339	3.3	46	3.5	385	3.3
Bases	114	1.1	123	9.5	237	2.0
Chlorine	266	2.6	30	2.3	296	2.6
Formulations	1	0.1	0	0	1	0.1
Hetero-organics	55	0.5	23	1.8	78	0.7
Hydrocarbons	259	2.5	24	1.8	283	2.4
Mixture Across Chemical Category	100	1.0	20	1.5	120	1.0
Other	192	1.9	40	3.1	232	2.0
Other Inorganic Substances	3427	33.3	88	6.8	3515	30.3
Oxy-organics	340	3.3	48	3.7	388	3.3
Paints and Dyes	46	0.4	125	9.6	171	1.5
PCB's	6	0.1	1	0.1	7	0.1
Polymers	326	3.2	46	3.5	372	3.2
Unknown	292	2.8	137	10.6	429	3.7
Volatile Organic Compounds	3780	36.7	215	16.6	3995	34.5

Total[‡]	10296	100.1	1298	100.0	11594	100.0
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[‡] Percentages do not total 100% because of rounding.

Victims

A total of 653 victims were involved in 259 events (3.7% of all events) (Table 5). Of the 259 events with victims, 180 (69.5%) events involved only one victim, and 33 (12.7%) involved two victims. Of all victims, 414 (63.4%) were injured in fixed-facility events.

Table 5.—Number of victims per event, by type of event—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009

No. Victims	Type of Event						All Events		
	Fixed facility			Transportation					
	No. Events	%	Total Victims	No. Events	%	Total Victims	No. Events	%	Total Victims
1	112	65.9	112	68	76.4	68	180	69.5	180
2	24	14.1	48	9	10.1	18	33	12.7	66
3	7	4.1	21	3	3.4	9	10	3.9	30
4	6	3.5	24	3	3.4	12	9	3.5	36
≥5	21	12.4	209	6	6.7	132	27	10.4	341
Total	170	100.0	414	89	100.0	239	259	100.0	653

To represent the magnitude of the effects of substances involved in injuries, the number of events in a specific substance category was compared with the number of events in the same category that resulted in victims. In events that involved one or more substances from the same substance category, substances were counted once in that category. In events that involved two or more substances from different categories, substances were counted once in the multiple substance category. Substances released most often were not necessarily the most likely to result in victims

(Table 6). For example, events categorized as other inorganic substances constituted 23.2% of all events; however, only 1.6% of these events resulted in injuries. Conversely, events involving hetero-organics accounted for 0.8% of all events, but 10.7% of the 56 events resulted in injuries.

Table 6.—Frequency of substance categories in all events and events with victims—Louisiana Hazardous Substances Emergency Events Surveillance System, 2001-2009

Substance Category	All Events		Events with Victims		
	No.	%	No.	Percentage of all Releases with Victims	Percentage of Events with Victims in Substance Category
Acids	590	8.4	55	21.2	9.3
Agricultural Chemicals & Pesticides	171	2.4	7	2.7	4.1
Ammonia	343	4.9	26	10.0	7.6
Bases	215	3.1	20	7.7	9.3
Chlorine	261	3.7	25	9.7	9.6
Formulations	1	> 0.1	0	0.0	0.0
Hetero-Organics	56	0.8	6	2.3	10.7
Hydrocarbons	48	0.7	1	0.4	2.1
Mixture Across Chemical Category [†]	107	1.5	12	4.6	11.2
Multiple Substance Category*	1373	19.6	18	6.9	1.3
Other [‡]	130	1.9	15	5.8	11.5
Other Inorganic Substances [§]	1620	23.2	26	10.0	1.6
Oxy-Organics	135	1.9	14	5.4	10.4
Paints and Dyes	165	2.4	0	0.0	0.0
PCB's	6	0.1	0	0.0	0.0
Polymers	242	3.5	2	0.8	0.8
Unknown	263	3.8	22	8.5	8.4
Volatile Organic Compounds	1262	18.1	10	3.9	0.8
Total[¶]	6988	100.0	259	99.9	3.7

*Substances in events that involved multiple substances were counted only once in a substance category when all the substances were associated with the same category. If events involved multiple substances from different substance categories, they were counted only once in the multiple substance category.

[†]Substances from different categories that were mixed or formed from a reaction before the event.

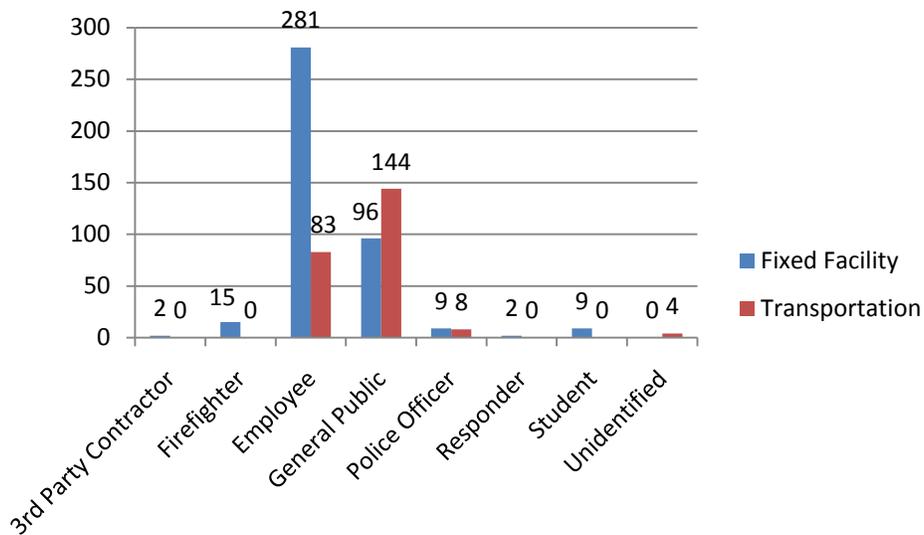
[‡]Not classified.

[§]All inorganic substances except for acids, bases, ammonia, and chlorine.

[¶]Percentages do not total 100% because of rounding.

Employees (364 [55.7%]) constituted the largest proportion of the population groups injured, followed by members or the general public (240 [36.8%]) (Figure 5). In fixed-facility events, 26 emergency response personnel were injured. Of those, most (15 [57.7%]) were firefighters. In transportation-related events, 8 police officers were injured.

Figure 5.—Number of victims, by population group and type of event—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009



*The population group was unknown for 4 victims

Victims were reported to have sustained a total of 876 injuries or symptoms (Table 7). Some victims had more than one injury or symptom. Of all reported injuries/symptoms, the most common in fixed-facility events were respiratory irritation (189 [33.8%]) and gastrointestinal

problems (78 [13.9%]). In transportation-related events, respiratory irritation (71 [22.5%]) and gastrointestinal problems (49 [15.5%]) were also reported most frequently.

Table 7.—Frequencies of injuries/symptoms, by type of event*—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009

Injury/Symptom	Fixed Facility		Transportation		All Events	
	No. injuries	%	No. injuries	%	Total no.	%
Burns (Chemical)	47	8.4	12	3.8	59	6.7
Burns (Thermal)	12	2.1	6	1.9	18	2.1
Burns (Not Specified)	3	0.5	2	0.6	5	0.6
Dizziness/Central Nervous System Symptoms	24	4.3	29	9.2	53	6.1
Eye Irritation	72	12.9	35	11.1	107	12.2
Gastrointestinal System Problems	78	13.9	49	15.5	127	14.5
Headache	41	7.3	39	12.3	80	9.1
Heart Problems	2	0.4	5	1.6	7	0.8
Heat Stress	3	0.5	0	0.0	3	0.3
Other	25	4.5	5	1.6	30	3.4
Respiratory Irritation	189	33.8	71	22.5	260	29.7
Shortness of Breath	21	3.8	6	1.9	27	3.1
Skin Irritation	15	2.7	11	3.5	26	3.0
Trauma (Both Chemical-Related and Non-Chemical Related)	1	0.2	0	0.0	1	0.1
Trauma (Chemical-Related)	18	3.2	7	2.2	25	2.9
Trauma (Not Chemical-Related)	9	1.6	30	9.5	39	4.5
Trauma (Not Specified)	0	0.0	9	2.8	9	1.0
Total ‡	560	100.1	316	100.0	876	100.1

*The number of injuries is greater than the number of victims (653) because a victim could have had more than one injury.

‡ Percentages do not total 100% because of rounding.

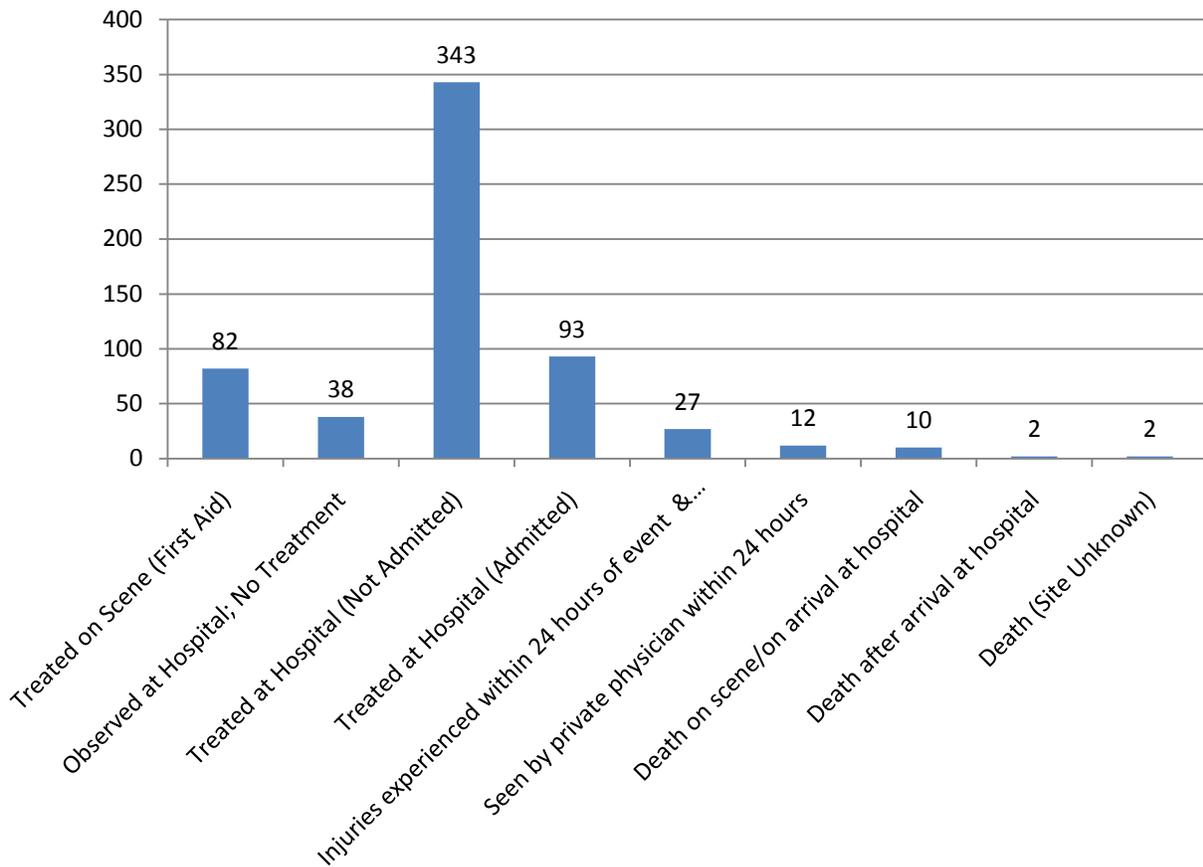
The median age of the 266 (40.7%) for whom exact age was reported was 34 years (range: 0–100 years). For the 323 (49.5%) injured persons for whom an age category was reported, 3 (0.9%)

were under 1 year of age, 12 (3.7%) were 1–4 years of age, 37 (11.5%) were 5–14 years of age, 10 (3.1%) were 15–19 years of age, 148 (45.8%) were 20–44 years of age, 73 (22.6%) were 45 - 64 years of age, and 6 (1.9%) were >65 years of age. In 3 (0.9%) events the age category was reported as 18 years of age or older and 31 (9.6%) were reported as under 18 years of age. Of the 330 injured persons for whom age was not reported, 246 (74.5%) were presumably adults (because their population group was reported as responders or employees), and 80 (24.2%) could have been adults or children (because their population group was reported as members of the general public and students).

Sex was known for 457 (70.0%) of the victims; of these, 346 (75.7%) were males. Of all employees and responders for whom sex was reported, 88.8% were males.

For the 609 (93.3%) injured persons for whom treatment was reported, 343 (56.3%) were treated at a hospital and not admitted, and 93 (15.3%) were treated at a hospital and admitted; 14 (2.3%) deaths were reported (Figure 6).

Figure 6.—Injury disposition—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009.



*Injury disposition was unknown for 44 victims.

PPE use was reported for 202 (55.5%) of employee-victims and 18 (52.9%) responder-victims. For victims in which PPE status was reported, most employee-victims (88.1%) and responder-victims (88.9%) had not worn any form of PPE. Employee-victims (12 [50.0%]) who wore PPE

most often used minimal protection such as gloves, eye protection, hard hat, and/or steel-toed shoes. The two responder-victims who wore PPE used firefighter turnout gear, one with respiratory protection and one without respiratory protection. Firefighter turnout gear is protective clothing usually worn by firefighters during structural firefighting operations and is similar to Level "D" protection. The Occupational Safety and Health Administration defines Level "D" protection as coveralls, boots/shoes (chemical-resistant leather, steel toe and shank), safety glasses or chemical splash goggles, and hard hats. Level "D" provides limited protection against chemical hazards.

One event resulted in 50 victims. This event involved an illegally parked tanker truck that overturned when the landing gear collapsed. Two gallons of monoethanolamine were released and 3,600 gallons were threatened to be released. Three hundred fifty residents within a one block radius were evacuated. Forty-nine members of the general public and one police officer reported to local hospitals. The most common injuries /symptoms reported were eye irritation (26 [33.8%]), headache (17 [22.1%]), and respiratory irritation (14 [18.2%]). Most (98.0%) of the victims were treated at hospital and not admitted.

Nearby Populations

The proximity of the event location in relation to selected populations was determined using geographic information systems (GIS), a computer mapping program, or state health department records. Residences were within ¼ mile of 4502 (64.4%) events, schools were within ¼ mile of 575 (8.2%) events, hospitals were within ¼ mile of 17 (0.2%) events, nursing homes were within ¼ mile of 89 (1.3%) events, licensed daycares were within ¼ mile of 614 (8.8%) events,

industries or other businesses were within ¼ mile of 5329 (76.3%) events, and recreational areas were within ¼ mile of 312 (4.5%) events.

The number of events at which persons were at risk of exposure was determined primarily using GIS. There were 4919 (70.4%) events with persons living within ¼ mile of the event; 5510 (78.8%) events with persons living within ½ mile; and 6011 (86.4%) events with persons living within 1 mile.

Evacuations

Evacuations were ordered in 127 (1.8%) events. Of these evacuations, 57.5% were of buildings or affected parts of buildings; 15.0% were of defined circular areas surrounding the event locations; 3.9% were downwind/downstream of the event; 3.1% were of circular areas surrounding the event and downwind/downstream of the event; and no criteria was defined or criteria was unknown for 20.5% of events. The number of persons evacuated was known for 37 (29.1%) events. This number ranged from 1 to 6,000 persons, with a median of 30. The median length of evacuation was 2 hours (range: 6 minutes to 4 days). Evacuation length was missing for 61 (48.0%) events. Of all 6,988 events, 210 (3.0%) had access to the area restricted; 122 (1.7%) events had in-place sheltering ordered by an official.

Decontamination

Of the 511 (78.3%) victims for whom decontamination status was known, 97 (19.0%) were decontaminated at the hospital, 60 (11.7%) were decontaminated at the scene, 2 (0.4%) were decontaminated at the scene and at the hospital, and 352 (68.9%) were not decontaminated.

Response

Six thousand, one hundred fifty-nine (88.1%) events had information on who responded to the event; 8.5% reported 2 or more categories of personnel who responded, 4.5% reported 3 or more categories, and 2.1% reported 4 or more categories. Company response teams (75.4%) responded most frequently to events, followed by law enforcement agencies (6.8%), fire departments (4.8%), third party clean-up contractors (4.4%), and environmental agency (3.5%) (Table 8). No one responded in 885 (12.7%) events.

Table 8.—Distribution of personnel who responded to the event—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009

Responder Category	No.	%
Certified HazMat Team	194	3.1
Department of Works / Utilities / Transportation	21	0.3
Emergency Medical Technicians	58	0.9
Environmental Agency	221	3.5
Fire Department	301	4.8
Health Department / Agency	16	0.3
Hospital Personnel / Poison Control Center	12	0.2
Law Enforcement Agency	425	6.8
Response Team of Company Where Release Occurred	4741	75.4
Specialized Multiagency Team	1	> 0.1
State, County, or Local Emergency Managers / Coordinators / Planning Committees	15	0.2
Third Party Clean-up Contractor	276	4.4
Other	8	0.1
Total	6289	100.0

*In 829 events, response information was not reported and in 885 events there was no response.

PREVENTION ACTIVITIES

From 2001 - 2009, the Louisiana HSEES Program performed various prevention activities.

A few of these activities include:

- LAHSEES Transportation Brochure
 - An informational brochure detailing how to decrease and prevent the release of hazardous substances during transit. Brochures were distributed to HAZMAT endorsed commercial drivers.

- Industrial Corridor Fact Sheets
 - Two fact sheets describing events within the Mississippi River Industrial Corridor and Calciseau Industrial Corridor. Fact sheets provided details to residents and industries within those corridors on how to prepare for and prevent future events.

- Hurricane Report
 - A comprehensive report describing the characteristics of releases associated with Hurricanes Katrina and Rita.

- LAHSEES Parish Profiles
 - An interactive web map was built that allowed users to click on a parish to get parish specific information relating to HSEES events. Information included the number of releases, top chemicals released, and top NAICS codes of the releasing parties.

SUMMARY OF RESULTS, 2001–2009

During 2001–2009, the largest proportion of events occurred in fixed facilities (Table 9). The total number of events was highest in 2008 and lowest in 2004. The percentage of events with victims was highest in 2005 (5.5%) and lowest in 2003 (1.2%). The average percentage of events with victims during 2001–2009 was 3.7%.

Table 9.— Cumulative data by year—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009*

Year	Type of Event			No. Substances Released	No. Victims	No. Deaths	Events with Victims	
	Fixed Facility	Transportation	Total				No.	% [†]
2001	684	131	815	1163	63	2	20	2.5
2002	630	122	752	1205	30	1	20	2.7
2003	587	87	674	1113	42	1	8	1.2
2004	474	90	564	1053	176	0	25	4.4
2005	704	163	867	1514	95	3	48	5.5
2006	515	145	660	1086	63	4	31	4.7
2007	646	172	818	1459	51	3	30	3.7
2008	845	174	1019	1752	47	0	33	3.2
2009	693	126	819	1249	86	0	44	5.4
Total	5778	1210	6988	11594	653	14	259	3.7

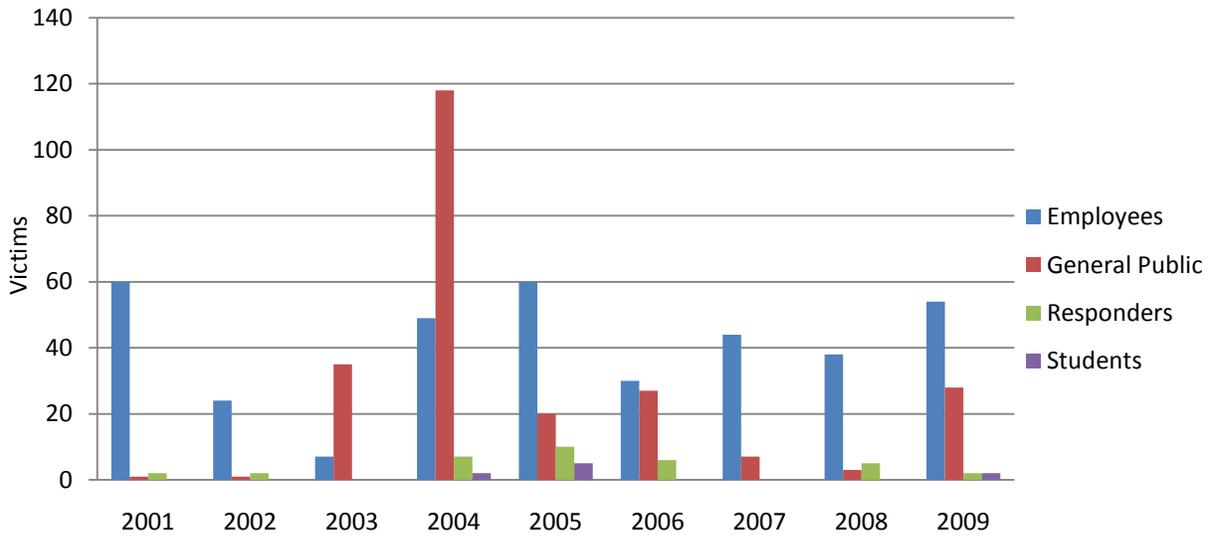
* Numbers in the table may differ from those reported in previous years because of adjustments in HSEES qualification requirements for events.

[†] Percentage of events with victims.

Respiratory irritation has consistently been one of the most frequently reported injuries and accounted for 29.7% of injuries. Employees were the most commonly reported victim (Figure 7).

Most employee-victims and responder-victims had not worn any form of PPE.

Figure 7.—Number of victims, by category and year—Louisiana Hazardous Substances Emergency Events Surveillance, 2001–2009



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1. Centers for Disease Control and Prevention. Comprehensive plan for epidemiologic surveillance. Atlanta: US Department of Health and Human Services; 1986.
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Appendix

The 10 substances most frequently involved in events—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2009

	Chemical Substance	Number of Releases
1	Sulfur Dioxide	1160
2	Benzene	654
3	Nitrogen Oxides (NO _x)	640
4	Hydrogen Sulfide	567
5	Mixture	478
6	Volatile Organic Compounds	450
7	Nitric Oxide	395
8	Ammonia	375
9	Hydrochloric Acid	301
10	Ethylene	298

Note: NO_x includes Nitrogen Oxide, Nitrogen Oxides, and Nitrogen Oxides NOS