

The Governor's Blue Ribbon Commission  
to examine  
the adequacy of existing regulations pertaining to  
the manufacture and storage of  
highly combustible materials.  
(The Henderson Commission)



## Final Report

Presented to  
Governor Richard H. Bryan  
August 10, 1988

August 10, 1988

Honorable Richard H. Bryan, Governor  
State of Nevada  
Capitol Complex  
Carson City, Nevada

Dear Governor Bryan,

On May 12, 1988, in the wake of the disastrous explosions at the Pacific Engineering and Production Company (PEPCON) facility in Henderson, Nevada, you created The Henderson Commission by Executive Order to examine the adequacy of existing regulations pertaining to the manufacture, storage, and transportation of highly combustible materials in the State of Nevada. With that charge, the Commission held nine separate hearings to receive testimony regarding hazardous industry from experts and lay people, alike, with particular emphasis on the aspects of health and safety, fire prevention, zoning, insurance, and transportation.

Pursuant to your direction that the Commission present its findings to you in the form of recommendations within 90 days, I am pleased to present this final report which contains the results of our efforts. Given the breadth of the assignment and the time frame allotted, the Commission did an exemplary job of determining the most serious areas of concern and developing specific remedies to correct them.

As your primary concern in creating the Commission was to better protect the lives and property of all Nevadans, so, too, was this foremost in the minds of the commissioners. I am confident that the recommendations contained in this report, if adopted, will go far in accomplishing the goals that prompted you to form the Henderson Commission.

On behalf of the commissioners, I commend you for your concern and support for this project. We stand ready to assist again should you call upon us in the future.

Respectfully Yours,

A handwritten signature in dark ink, appearing to read "Bob Miller", with a long, sweeping horizontal line extending to the right.

Bob Miller  
Chairman  
Henderson Commission

# **THE HENDERSON COMMISSION**

## **Chairman**

**Bob Miller  
Lieutenant Governor  
Las Vegas, Nevada**

## **Members**

**Reverend Caesar J. Caviglia V.F.  
St. Peter's Catholic Church  
Henderson, Nevada**

**Danny Evans  
President, United Steelworkers Local 5282  
Henderson, Nevada**

**Mark Fine  
President, American Nevada Corporation  
Henderson, Nevada**

**Gerald F.S. Hiatt, Ph.D.  
U.S. Environmental Protection Agency  
San Francisco, California**

**Rex Jordan  
State Fire Marshal  
Carson City, Nevada**

**Pete Mulvihill  
Reno Fire Department  
Reno, Nevada**

**Pat Thompson  
City Manager  
Sparks, Nevada**

**Bruce Woodbury  
Clark County Commissioner  
Boulder City, Nevada**

## **Staff**

**Steve Frady  
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Novella Watson-Lee**

## TABLE OF CONTENTS

	Page
Letter to the Governor.....	i
Commission Roster.....	ii
Statement of the Chairman.....	1
Recommendations concerning FIRE.....	3
Recommendations concerning HEALTH AND SAFETY.....	5
Recommendations concerning ZONING.....	6
Recommendations concerning INSURANCE.....	9
Recommendations concerning COMMUNITY PLANNING AND RESPONSE.....	10
Recommendations concerning TRANSPORTATION.....	12
Bibliography.....	13
Appendices	



## **STATEMENT OF THE CHAIRMAN**

Just before noon on May 4, 1988, the first of two major explosions at the PEPCON site in Henderson rocked the entire Las Vegas Valley and in so doing, created a new awareness in the minds of all Nevadans to the potential dangers associated with the production, storage, and handling of hazardous materials.

The aftermath of the explosions left many questions unanswered: Why did it happen? Who was to blame? Could it have been prevented? Where could people turn to for help? What was the extent of the damage? Who was in charge? How can the state make sure that such an accident does not happen again? What other imminent dangers exist in our communities?

On May 12th, the Henderson Commission was formed by an Executive Order of Governor Richard H. Bryan to find the answers to these and other important questions concerning the hazardous materials industry in Nevada.

As outlined in our Executive Order, the Commission approached its task through separate hearings in the categories of fire, health and safety, insurance, and zoning. Early on in our proceedings, we realized the full breadth of the problem required the addition of two new categories—community planning and response, and transportation.

Without question, the most unsettling fact we learned was that we have such limited knowledge regarding the identification, location, utilization, and transportation of hazardous materials in our state. Nevada still does not possess a sufficient amount of this information to completely insure the safety of its residents. However, after receiving over 50 hours of testimony, the Commission learned enough to develop 43 specific recommendations that will significantly improve the situation.

To begin with, businesses must be held accountable for the potential dangers that their operations present to the community. They should be required to provide local governments with a detailed analysis of what dangers exist and how they intend to mitigate them. If the peril cannot be reduced, the business has an obligation to relocate its facilities. Laws need to be developed to facilitate this moving process for local governments. Hazardous businesses must never be located too close to residential areas.

Public protection will not allow us to rely on voluntary compliance of health and safety regulations by hazardous industries. Penalties for violations need to be significantly increased (at least doubled), with additional penalties adopted for serious and repeat offenses. The enforcement of these fines must be aggressive.

In this regard, dangerous industries are not being inspected enough. The Commission feels it is imperative that high hazard businesses be inspected no less than four times a year, and more frequently if necessary. All hazardous industries require at least one rigorous annual inspection.

Citizens have a right to know the safety history of any business. The Division of Occupational Safety and Health must open its records for public access, while maintaining the confidentiality of those reporting the violations.

Everyday, there are literally hundreds of hazardous materials being transported on the highways and railroads of our state. Again, this is an area where we just do not have the necessary information. We do not know enough about the materials on board or the routes being taken. The motor carrier division of the Nevada Highway Patrol, which monitors these transports, needs to be expanded to give the state adequate enforcement capabilities. Assessment fees might pay for this growth and prove to be a funding source for our ultimate goal of port-of-entry check stations on Nevada's borders.

Properly regulated, industries that handle hazardous materials need not pose safety threats to their employees or the general public. Nevada's economic development future is bright, and our remarkable population growth will continue well into the 21st century. The Commission feels that the recommendations listed on the following pages will create the desirable environment in which all Nevadans can live and work without fear for their safety.

On behalf of the entire Henderson Commission, I would like to thank Governor Bryan and the citizenry of Nevada for entrusting us with this important task and for assisting us in its completion.

Bob Miller  
Chairman

## **Recommendations concerning**

### **FIRE**

**1. The 1988 Uniform Fire Code (UFC) and the 1988 Uniform Building Code (UBC) should be adopted as soon as possible by the State Fire Marshal.**

The UFC and UBC set minimum safety standards for businesses in Nevada. Local jurisdictions may adopt more stringent standards, but to maintain public safety, they cannot adopt less stringent standards. Portions of the new codes deal specifically with hazardous materials and will do more to protect the safety of all Nevadans.

**2. The 1988 Uniform Fire Code and the 1988 Uniform Building Code must be enforced as soon as possible to areas that pose the most serious threat to public safety.**

Certain businesses pose more of an immediate danger to life and property than others. Local entities must enforce safety standards by giving priority to the most hazardous businesses.

**3. Those businesses that create the highest degree of hazard must be inspected no less than four times a year, and more frequently if necessary, by the authorities having jurisdiction. All businesses that handle hazardous materials must be rigorously inspected at least once a year.**

Businesses that store large quantities of hazardous materials pose the greatest threat to public safety. They must be given frequent and thorough inspections.

**4. Businesses that handle hazardous materials must provide local governments with impact statements prior to any construction or additions to their facilities.**

Businesses must be held accountable for the potential dangers that their operations present to the community. They must submit an impact statement that contains a structured analysis of how existing fire protection services within a community would be affected in the event of an emergency. The statement must also indicate how the business intends to mitigate or eliminate any dangers that exist.

**5. The functions and services provided by state agencies concerned with emergency response and accident investigation should be clarified for the public.**

Testimony before the Commission indicated a lack of coordination and a duplication of efforts by state and local agencies in response to the PEPCON explosion. Many people were unclear about which agency to contact for assistance. A clarification of each agency's responsibilities would improve cooperation and facilitate delivery of services to the public.

**6. The public has the right to know what hazardous materials the federal government keeps on its installations located in the state.**

The federal government owns approximately 87% of Nevada's land. On some of that property, they handle hazardous materials. The public has a right to know what and where these materials are, so that local jurisdictions can prepare emergency response plans. The Commission supports Nevada's role in our national defense and does not intend for this recommendation to compromise matters of security.

**7. Contractors working on federal installations must be required to perform up to minimum state fire, health and matters codes.**

The safety on Nevadans who are employed by federal operations, or who live in proximity to them, should be protected by minimum standards adopted by the state.

**8. The Incident Command System must be adopted immediately as a standard for Nevada's fire and emergency response agencies.**

The ICS 220 System is a recognized system of command that provides a complete, formalized protocol for emergency response. In responding to the PEPCON disaster, questions of responsibility and authority resulted in unnecessary confusion.

**9. Penalties for fire code violations must be significantly increased, at a minimum doubled, with additional penalties for violations in high hazard occupancies and for repeated violations. These penalties need to be aggressively pursued.**

Low fines do nothing to deter businesses from breaking the law. With the threat of a severe penalty, businesses will be more inclined to pay close attention to safety regulations. Under current conditions, some fines are as little as \$25.00. Stricter penalties would underscore the seriousness that Nevada places upon unsafe situations that threaten the life or property of its citizenry.

**10. A state certification program for fire inspectors must be established.**

Too great a potential exists that inspectors will overlook hazards if they are not properly trained. There must be a high degree of proficiency and training.

**11. The State Board of Fire Services must be expanded to include an expert on hazardous materials.**

The current make-up of the Board does not include an expert in hazardous materials. With the rapid growth in this industry and the broad concern for additional safety precautions, an expert in matters of hazardous materials must be added to the State Board of Fire Service.

**12. Public safety requires that inspecting agencies cooperate with each other before, during, and after hazardous industry inspections.**

When local governments fail to cooperate in matters of public safety, an unacceptable condition results. Cooperation will lead to more thorough safety inspections, quicker resolution of on-site deficiencies, and better dissemination of information to concerned parties.

**13. Local governments should be encouraged to utilize the State Fire Marshal's Office as a source of expertise regarding hazardous materials incident training, research information on chemical substances, and assistance in planning for high hazard industries in rural counties.**

Some local governments lack the expertise to handle emergencies involving hazardous materials. The State Fire Marshal's Office can provide valuable information and training to assist them.

**14. Fire inspection agencies need to have the authority to shut down an operation that poses imminent and serious danger, even when the violation is being contested or under legal review.**

The burden of proof currently rests upon the inspecting agency to establish, in court, the immediate danger of a violation before it can enforce abatement of it. The burden of proof should be reversed so that any possibility of potential harm is addressed first, and business concerns second.

## **Recommendations Concerning**

### **HEALTH AND SAFETY**

**15. Penalties for violations of health and safety standards and regulations must be significantly increased, at a minimum doubled, with additional penalties for high hazard violations and repeat offenses. These penalties need to be aggressively pursued.**

Existing penalties for these violations as outlined in the NRS 618.645 through 618.705, provide for fines ranging from \$1,000 to \$10,000. These amounts are often minuscule in relation to industry profits. In order to motivate fuller compliance by businesses, penalties as defined by the Nevada Division of Occupational Safety and Health (DOSH), should be significantly increased.

**16. The Division of Occupational Safety and Health needs to have the authority to shut down a seriously violated operation that poses imminent danger, even when the violation is being contested or under legal review.**

The burden of proof currently rests upon DOSH to establish, in court, the immediate danger of a violation before it can enforce abatement of it. The burden of proof should be reversed so that any possibility of potential harm is addressed first, and business concerns second.

**17. Employees must be allowed to participate in the development, implementation, and maintenance of a facility's health, safety, and emergency programs.**

Employee involvement will promote better awareness, preparedness, and cooperation of all concerned.

**18. The public must be given access to the inspection reports and citations of violations of the Division of Occupational Safety and Health.**

The right of concerned citizens to know the safety history of a business should be given priority over other issues of confidentiality. The names of those making violation reports shall remain confidential, if they request it.

**19. Inspectors for the Division of Occupational Safety and Health should be required to receive periodic training regarding industries involved in the production, storage, and handling of hazardous materials.**

This industry grows and changes at an extremely rapid pace. As the state agency with the main responsibilities for inspecting businesses dealing with hazardous materials, DOSH inspectors must maintain a high level of expertise.

**20. The Division of Occupational Safety and Health should develop and adopt specific recommendations for hazardous industries.**

All violations found during inspections of hazardous businesses are cited under DOSH General Duty Clause. More stringent health and safety standards need to be in place for businesses that pose a greater risk of danger.

## **Recommendations concerning**

### **ZONING**

**21. Provisions for public safety have to be included in planning ordinances for industries that produce, store, or transport hazardous materials.**

If safety considerations are addressed in initial planning stages, future problems can be avoided. Language should be added to the planning and zoning laws of the Nevada Revised Statutes which would identify hazardous materials and safety considerations as valid planning concerns.

Section 278.160 should be amended by adding a "safety" plan to the list of suggested plan elements for a city or county's master plan. A safety plan could identify hazardous material situations and establish standards and principles regarding the manufacturing and storage of such materials, in addition to other public safety considerations.

Section 278.250 should be amended by creating an additional basis for local zoning regulations. This additional basis for zoning would be the promotion of public safety from the adverse impacts of the manufacturing, storage, and handling of hazardous materials, explosives, chemicals and toxins.

**22. City, county, and regional planning commissions must maintain safe distances between residential areas and hazardous industries.**

Haphazard planning often places residences too close to industrial areas. This type of encroachment creates unnecessary dangers. Planning commissions can prevent this from happening by consulting Local Emergency Planning Commissions when zoning and re-zoning decisions are being made.

**23. Hazardous businesses should not be located dangerously close to residential areas. Local governments should review existing zoning relationships to determine if these conditions exist.**

Not enough attention has been given to the potential threat that hazardous industry can pose to its surrounding community. Businesses must be brought up to proper safety standards or be forced to relocate.

**24. Hazardous businesses that are located dangerously close to residential or public facilities must prepare a plan showing how they will remove the potential risk.**

Part of a business' responsibility to its community is to make sure that its operations are safe. If an unsafe situation exists that could endanger nearby residences, the business has an obligation to bring the problem to light and offer acceptable remedies.

**25. Legislation should be developed to ease the phasing out or relocation of businesses that pose a public safety threat.**

If a business is shown to present a threat to surrounding life or property, local governments need a law that will allow them to impose immediate safety restraints while attempting to correct the problem, and failing that, to begin phasing out or relocating the business within a reasonable time frame.

The state should develop some form of relocation bonds so that businesses do not incur any undue hardship and/or financial burden.

**26. The state needs to develop a model zoning ordinance which addresses the manufacturing, storage, and handling of hazardous materials.**

A model ordinance would serve as an example for local governments without expertise in this area. A model ordinance should contain definitions and suggested regulations and standards dealing with the land use aspects of hazardous materials.

**27. The Nevada Division of State Lands needs to work closely with local jurisdictions of populations less than 15,000 when these governments are addressing hazardous industry developments.**

Local governments of small size are often in the position of not needing a full time planning commission. As a result, they may not have the expertise to consider all of the safety issues involved with hazardous materials industry. The Division of State Lands can make this expertise available.

**28. Public safety requires that adjacent jurisdictions adopt interlocal agreements calling for mutual review of projects with regional impact.**

Projects and industries which include highly hazardous or explosive materials tend to have regional significance. Metropolitan areas should be required to develop a regional review and comment process to involve neighboring fire and planning agencies in the site review, development, expansion and annual inspection of these types of industries.

**29. The required issuance of a Hazardous Industries Conditional Use Permit to operators of hazardous industries will increase public safety.**

This type of permit gives local governments the means to adopt stricter land use provisions, and at the same time, it provides for greater accountability from the businesses. These permit requirements should include buffers to residential zones, special use permits, and safety plans for industrial operations. This permit should require safety studies and right to know reporting at the time of land use decision making, rather than later during the building permit issuance stage.

**30. Existing laws must be modified to facilitate the annexation of islands zoned for industrial use that pose a danger to public health and safety.**

The process of annexation can be effective in reducing potential health and safety threats to surrounding communities. Local governments wanting to annex industrial areas that contain hazardous industry need to have an expeditious way to accomplish it.

The Commission recognizes that an excellent balance currently exists in the annexation statutes in Nevada. The utmost attention must be given to preserving that balance while developing this recommendation.



## **Recommendations concerning**

### **INSURANCE**

**31. Financial responsibility requirements must be established for industries that manufacture, store, or transport hazardous materials.**

High risk industries should be financially prepared to compensate any losses individuals and businesses incur as a result of an accident at their facilities. This financial responsibility could be met most logically by an insurance policy, but additional resources could be considered such as cash deposits, performance bonds, letters of credit, pledges of stocks and bonds, and "self funding" through a showing of net worth.

**32. The legislature should pursue the creation of a catastrophic risk pool to provide low-cost loans for uninsured individuals and small businesses that suffer losses due to a catastrophe or disaster involving hazardous materials.**

The losses incurred by the Henderson community from the PEPCON explosions identified a shortcoming in our emergency response capabilities. Many people without insurance were unable to obtain assistance in the form of low-cost loans to rebuild their homes and businesses.

The Commission would like to see a catastrophic risk pool created for Nevada. Revenue sources for the pool might be drawn from assessments upon manufacturers, storers, and transporters of hazardous materials or by applying a surcharge upon certain insurance policies.

**Recommendations concerning**  
**COMMUNITY PLANNING AND RESPONSE**

**33. The full implementation of the Superfund Amendments and Re-authorization Act of 1986 (SARA), Title III has to be accomplished as quickly as possible. Additional funding must be requested from the federal government for this purpose.**

Most of the provisions of SARA Title III directly concern and approach the overall goals of the Commission. Nevada has already implemented important parts of the Act by establishing a State Emergency Response Commission (SERC) and Local Emergency Planning Commissions (LEPCs). The next step, development and implementation of local emergency response plans for hazardous chemical incidents, will go far in providing the information necessary for the optimum protection of our citizenry.

Such response plans must include:

- Identification of facilities that manufacture, store, or use hazardous materials.
- Identification of routes over which hazardous chemicals are transported.
- Emergency procedures, both on-site and off-site, for facilities handling hazardous materials.
- Designation of an overall community coordinator and a coordinator from each hazardous chemical facility to implement the plan.
- Emergency notification procedures.
- Methods for determining the occurrence of a release and the probable affected area and population.
- Description of community and industrial emergency equipment and facilities.
- Evacuation plans.
- Details for a training program for emergency response to hazardous chemical incidents.
- Details for exercises to practice implementation of the emergency plan.

The entire SARA Title III program is vitally important to creating a safe environment for hazardous materials industry in Nevada. Adequate funding for the implementation of SARA Title III was not included in the federal program. A request for additional federal funding should be made. Additional sources of revenue through fees and assessments need to be explored, as well.

**34. LEPC's must require facilities within their districts to report hazardous chemical inventory information under the "Tier II" provision of SARA Title III, Section 312.**

LEPC's have the authority to require Tier II reporting, rather than the less informative Tier I reporting. Tier II information will allow a more accurate determination of the potential hazards posed by an accidental chemical release or reaction.

Tier I reporting is required to contain:

- The maximum amount of chemicals in each class present at the facility at any one time during the previous year.
- The average amount (daily basis) of chemicals in each class present at the facility during the previous year.
- The general location of hazardous chemicals at the facility.

Tier II reporting is required for each individual chemical and must contain:

- The chemical identity.
- The maximum amount of the chemical present at the facility at any time during the previous year.
- A description of the manner of storage of the chemical.
- The specific location of the chemical at the facility.

**35. Facilities handling hazardous chemicals need to be required to develop Emergency Response Planning Guidelines (ERPGs), for use in risk analysis and emergency planning.**

During an actual emergency, ERPGs can be used to give responders an accurate estimate of "safety zones" around the site of a chemical release. ERPG information can help to determine zones inside which people are subject to damaging health effects.

**36. The Integrated Emergency Management System (IEMS) must be adopted by counties to facilitate cooperative planning between emergency responders.**

The IEMS promotes inter-agency cooperation and improves the efficiency of emergency response procedures. The LEPC should be included as an active part of the IEMS.

**37. All buildings that contain hazardous chemicals must be required to be clearly labelled.**

Responders to emergencies are placed into additional and unnecessary risk situations when proper labelling is not in place. Labels should be of sufficient size that they can easily be read from a safe distance.

**38. Action should be taken to have Ammonium Perchlorate (AP) reclassified as an "explosive/combustible."**

In light of the PEPCON disaster, the improper classification of this material should be readily apparent.

**39. All emergency response programs in Nevada must include mental health services that address the issues of community recovery through debriefing of responders and victims.**

Insufficient attention is given to the mental health needs that arise following disasters and emergencies. All local governments need to explore the establishment of crisis intervention teams made up of mental health professionals with training in emergency response debriefing.

## **Recommendations concerning**

### **TRANSPORTATION**

**40. Nevada needs to develop a better system of regulating the transportation of hazardous materials on its highways. Assessment fees on hazardous material motor transports should be increased and applied to expand the motor carrier division of the Nevada Highway Patrol.**

The Nevada Highway Patrol (NHP) is responsible for monitoring the transportation of hazardous materials by motor vehicles. Current laws require these transports to inform the state what they are carrying, but enforcement resources are not adequate to insure compliance. The expansion of the NHP motor carrier division would provide for more frequent, random inspections of hazardous material motor carriers. This would give the state a better understanding of the degree of non-compliance and possibly provide the state with an adequate funding source to eventually establish port-of-entry check stations.

**41. All motor vehicles transporting hazardous materials must be clearly labelled.**

Emergency responders are placed in additional risk situations when hazardous materials are not clearly identified. Labels should be large enough to be read from a safe distance.

**42. Local governments need to designate safe areas where vehicles transporting hazardous materials can rest or park.**

There are no minimum standards for "safe havens" where these vehicles can park without endangering public safety. Areas must be designated for this purpose.

**43. The state must prohibit any railroad from operating in Nevada unless the company files an annual report with traversed counties that includes the identities, chemical classes, and amounts of each hazardous material transported by that company during the previous year.**

Local governments must know what materials are being transported through their areas in order to prepare for emergency response to rail accidents. If the volume of transport is found or projected to greatly increase from the previous year, the railroad should be required to notify the affected counties as soon as the increase becomes apparent.

## APPENDICES

- I. Executive Order of Governor Richard H. Bryan, Page 14.
- II. Types of manufacturers, wholesalers, distributors and services who produce, use, sell or transport hazardous or highly combustible materials, Page 15.
- III. Hazards levels set by the National Fire Protection Association, Page 21.
- IV. Hazardous materials definitions set by the U.S. Department of Transportation, Page 23.
- V. SARA Title III hazardous materials reporting fact sheet, Page 25.
- VI. SARA Title III Tier One, Tier Two hazardous materials reporting criteria, Page 34.
- VII. CAMEO II hazardous materials reporting computerized program, Page 44.
- VIII. Hazardous Materials Management Plan and Hazardous Materials Inventory Statement, Uniform Fire Code 1988 Edition, Appendix II-E, Page 51.
- IX. Hazardous industry fire protection impact statement, Page 61.
- X. Matrix of fire protection codes and regulations adopted by Nevada cities and counties, Page 63.
- XI. Toxicology and emergency planning, U.S. Environmental Protection Agency, Page 64.
- XII. Emergency Response Planning Guidelines (ERPG), American Industrial Hygiene Association, Page 72.
- XIII. Integrated emergency management system (IEMS), Page 80.
- XIV. Incident command system (ICS), Page 82.
- XV. Transportation of Hazardous Materials, a report of the Congress of the United States, Page 85.
- XVI. Transportation of Hazardous Materials: State and Local Activities, a report of the Congress of the United States, Page 89.
- XVII. Initial report of the investigation into the Pacific Engineering (PEPCON) explosion of May 4, 1988, at Henderson, Nevada, Clark County Fire Department, Page 93.
- XVIII. Witnesses appearing before the Henderson Commission, Page 96.

APPENDIX I

EXECUTIVE ORDER  
OF  
GOVERNOR RICHARD H. BRYAN

STATE OF NEVADA  
OFFICE OF THE GOVERNOR  
EXECUTIVE ORDER

WHEREAS, a major explosion and fire occurred in the Henderson Industrial Plant area on May 4, 1988, causing major damage to industrial facilities, and

WHEREAS, this explosion has resulted in enormous personal hardship to the citizens of Henderson, with estimates of public and private damages reaching \$73 million, and

WHEREAS, the State of Nevada is charged with promulgating fire, safety, health, insurance and industrial regulations in order to ensure that such disasters cannot recur,

NOW, THEREFORE, I RICHARD H. BRYAN, DO HEREBY ESTABLISH

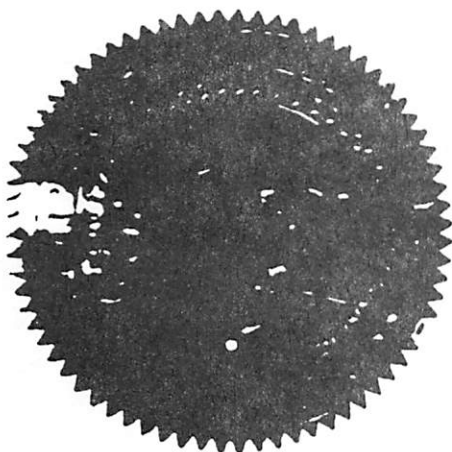
THE GOVERNOR'S BLUE RIBBON COMMISSION  
TO EXAMINE THE ADEQUACY OF EXISTING REGULATIONS PERTAINING  
TO THE MANUFACTURE AND STORAGE OF  
HIGHLY COMBUSTIBLE MATERIALS  
(The Henderson Commission)

CHARGE:

The Commission is charged with reviewing the adequacy of current health, fire, safety, insurance, industrial and zoning regulations pertaining to plants which manufacture, store or transport highly combustible materials in Nevada. The Commission is further ordered and directed to examine all evidence developed as to the cause of the May 4, 1988, explosion at the Pacific Engineering plant in Henderson, Nevada.


The Commission shall submit its report and recommendations to the Governor within 90 days of this date. The Commission is also ordered and directed to work closely with all existing organizations at the local levels which can assist in achieving the purposes of this Order.

All state departments, boards, commissions, offices and employees are directed to cooperate with and assist the Commission in its work, within the limitations of staffing and other available resources.



IN WITNESS WHEREOF, I have hereunto  
set my hand and caused the Great  
Seal of the State of Nevada to be  
affixed at the State Capitol in  
Carson City, this 12th day of May,  
in the year of Our Lord, One  
Thousand Nine Hundred and Eighty  
Eight.

  
Governor

  
Secretary of State

By   
Deputy



## **APPENDIX II**

**MANUFACTURERS, WHOLESALERS, DISTRIBUTORS  
AND SERVICES WHO PRODUCE, USE, SELL OR  
TRANSPORT HAZARDOUS OR HIGHLY COMBUSTIBLE  
MATERIALS**



STATE OF NEVADA  
**DIVISION OF EMERGENCY MANAGEMENT**

Capitol Complex, 2525 S. Carson Street  
Carson City, Nevada 89710  
(702) 885-4240

RICHARD H. BRYAN  
Governor

ROBERT R. KING  
Director

List of Types of manufacturers, wholesalers, distributors and services industries who might produce, use, sell or transport materials that fall under the criteria set forth.

All manufacturing industries listed under SIC codes 20-39 (see attached #1)

From National Industrial Index

All Biological Material Treatment Facilities  
All Incineration/Thermal Treatment Facilities  
All Physical Treatment Facilities  
All Recovery/Reuse Facilities  
All Solidification/Stabilization Facilities  
All Chemical Treatment Facilities  
Most of SIC Code Group 50 which includes: Wholesale Trade of durable goods  
Most of SIC Code Group 51 which includes: Wholesale Trade of nondurable goods  
All fuel: recovery, refining, processing, distributing and Retailing Facilities including all petroleum products  
All the Transportation Industry: Road, rail, air, water, pipeline  
The Electronics Industry  
All Industries that manufacture, distribute, transport, use or sell explosives  
All Industries that manufacture, distribute, transport, use or sell agricultural products  
All Plastics manufacturers, distributors, processors, transporters, or sellers  
All Military Installations  
All Gas Facilities including pipelines for processing, distributing or transporting natural gas and LPG products  
All Industries (including media) that use, process, stock, distribute, transport or manufacture printing ink and related products in large quantity

**TABLE I**  
**SIC CODES 20-39**

**20 Food and Kindred Products**

2011 Meat packing plants  
 2013 Sausages and other prepared meat products  
 2016 Poultry dressing plants  
 2017 Poultry and egg processing  
 2021 Creamery butter  
 2022 Cheese, natural and processed  
 2023 Condensed and evaporated milk  
 2024 Ice cream and frozen desserts  
 2026 Fluid milk  
 2032 Canned specialties  
 2033 Canned fruits, vegetables, preserves, jams and jellies  
 2034 Dried and dehydrated fruits, vegetables, and soup mixes  
 2035 Pickled fruits and vegetables, vegetable sauces and seasonings, and salad dressings  
 2037 Frozen fruits, fruit juices and vegetables  
 2038 Frozen specialties  
 2041 Flour and other grain mill products  
 2043 Cereal breakfast foods  
 2044 Rice milling  
 2045 Blended and prepared flour  
 2046 Wet corn milling  
 2047 Dog, cat and other pet food  
 2048 Prepared feeds and feed ingredients for animals and fowls, n.e.c.\*  
 2051 Bread and other bakery products, except cookies and crackers  
 2052 Cookies and crackers  
 2061 Cane sugar, except refining only  
 2062 Cane sugar refining  
 2063 Beet sugar  
 2065 Candy and other confectionery products  
 2066 Chocolate and cocoa products  
 2067 Chewing gum  
 2074 Cottonseed oil mills  
 2075 Soybean oil mills  
 2076 Vegetable oil mills, except corn, cottonseed, and soybean  
 2077 Animal and marine fats and oils  
 2079 Shortening, table oils, margarine and other edible fats and oils, n.e.c.\*  
 2082 Malt beverages  
 2083 Malt  
 2084 Wines, brandy, and brandy spirits  
 2085 Distilled, rectified, and blended liquors  
 2086 Bottled and canned soft drinks and carbonated waters  
 2087 Flavoring extracts and flavoring syrups, n.e.c.\*  
 2091 Canned and cured fish and seafoods  
 2092 Fresh or frozen packaged fish and seafoods  
 2095 Roasted coffee  
 2097 Manufactured ice  
 2098 Macaroni, spaghetti, vermicelli and noodles  
 2099 Food preparations, n.e.c.\*

**21 Tobacco Manufacturers**

2111 Cigarettes  
 2121 Cigars  
 2131 Tobacco (chewing and smoking) and snuff  
 2141 Tobacco stemming and redrying

**22 Textile Mill Products**

2211 Broad woven fabric mills, cotton  
 2221 Broad woven fabric mills, man-made fiber and silk  
 2231 Broad woven fabric mills, wool (including dyeing and finishing)  
 2241 Narrow fabrics and other smallwares mills: cotton, wool, silk, and man-made  
 2251 Women's full length and knee length hosiery  
 2252 Hosiery, except women's full length and knee length hosiery  
 2253 Knit outerwear mills  
 2254 Knit underwear mills  
 2257 Circular knit fabric mills  
 2258 Wrap knit fabric mills  
 2259 Knitting mills, n.e.c.\*  
 2261 Finishers of broad woven fabrics of cotton  
 2262 Finishers of broad woven fabrics of man-made fiber and silk  
 2269 Finishers of textiles, n.e.c.\*  
 2271 Woven carpets and rugs  
 2272 Tufted carpets and rugs  
 2279 Carpets and rugs, n.e.c.\*  
 2281 Yarn spinning mills; cotton, man-made fibers and silks  
 2282 Yarn texturizing, throwing, twisting, and winding mills; cotton, man-made fibers and silk  
 2283 Yarn mills, wool, including carpet and rug yarn  
 2284 Thread mills  
 2291 Felt goods, except woven felts and hats  
 2292 Lace goods  
 2293 Paddings and upholstery filling  
 2294 Processed waste and recovered fibers and flock  
 2295 Coated fabrics, not rubberized  
 2296 Tire cord and fabric  
 2297 Nonwoven fabrics  
 2298 Cordage and twine  
 2299 Textile goods, n.e.c.\*

**23 Apparel and Other Finished Products made from Fabrics and Other Similar Materials**

2311 Men's, youths', and boys' suits, coats and overcoats  
 2321 Men's, youth's, and boys' shirts (except work shirts), and nightwear  
 2322 Men's, youth's, and boys' underwear  
 2323 Men's, youth's, and boys' neckwear  
 2327 Men's, youth's, and boys' separate trousers  
 2328 Men's, youth's, and boys' work clothing  
 2329 Men's, youth's, and boys' clothing, n.e.c.\*  
 2331 Women's, misses', and juniors' blouses, waists, and shirts  
 2335 Women's, misses', and juniors' dresses  
 2337 Women's, misses', and juniors' suits, skirts, and coats  
 2339 Women's, misses', and juniors', outerwear, n.e.c.\*  
 2341 Women's, misses', children's, and infants' underwear and nightwear  
 2342 Corsets and allied garments  
 2351 Millinery  
 2352 Hats and caps, except millinery

- 2361 Girls', children's and infants' dresses, blouses, waists and shirts
- 2363 Girls', children's and infants' coats and suits
- 2369 Girls', children's and infants' outerwear, n.e.c.\*
- 2371 Fur goods
- 2381 Dress and work gloves, except knit and all leather
- 2384 Robes and dressing gowns
- 2385 Raincoats and other waterproof outer garments
- 2386 Leather and sheep lined clothing
- 2387 Apparel belts
- 2389 Apparel and accessories, n.e.c.\*
- 2391 Curtains and draperies
- 2393 Housefurnishings, except curtains and draperies
- 2393 Textile bags
- 2394 Canvas and related products
- 2395 Pleating, decorative and novelty stitching, and tucking for the trade
- 2396 Automotive trimmings, apparel findings, and related products
- 2397 Schiffli machine embroideries
- 2399 Fabricated textile products, n.e.c.\*

## 24 Lumber and Wood Products, Except Furniture

- 2411 Logging camps and logging contractors
- 2421 Sawmills and planing mills, general
- 2426 Hardwood dimension and flooring mills
- 2429 Special products sawmills, n.e.c.\*
- 2431 Millwork
- 2434 Wood kitchen cabinets
- 2435 Hardwood veneer and plywood
- 2436 Softwood veneer and plywood
- 2439 Structural wood members, n.e.c.\*
- 2441 Nailed and lock corner wood boxes and shook
- 2448 Wood pallets and skids
- 2449 Wood containers, n.e.c.\*
- 2451 Mobile homes
- 2452 Prefabricated wood buildings and components
- 2491 Wood preserving
- 2492 Particleboard
- 2499 Wood products, n.e.c.\*

## 25 Furniture and Fixtures

- 2511 Wood household furniture, except upholstered
- 2512 Wood household furniture, upholstered
- 2514 Metal household furniture
- 2515 Mattresses and bedsprings
- 2517 Wood television, radio, phonograph, and sewing machine cabinets
- 2519 Household furniture, n.e.c.\*
- 2521 Wood office furniture
- 2522 Metal office furniture
- 2531 Public building and related furniture
- 2541 Wood partitions, shelving, lockers, and office and store fixtures
- 2542 Metal partitions, shelving, lockers and office and store fixtures
- 2591 Drapery hardware and window blinds and shades
- 2599 Furniture and fixtures, n.e.c.\*

## 26 Paper and Allied Products

- 2611 Pulp mills
- 2621 Paper mills, except building paper mills
- 2631 Paperboard mills
- 2641 Paper coating and glazing
- 2642 Envelopes

- 2643 Bags, except textile bags
- 2645 Die cut paper and paperboard and cardboard
- 2646 Pressed and molded pulp goods
- 2647 Sanitary paper products
- 2648 Stationary, tablets and related products
- 2649 Converted paper and paperboard products, n.e.c.\*
- 2651 Folding paperboard boxes
- 2652 Set-up paperboard boxes
- 2653 Corrugated and solid fiber boxes
- 2654 Sanitary food containers
- 2655 Fiber cans, tubes, drums, and similar products
- 2661 Building paper and building board mills

## 27 Printing, Publishing, and Allied Industries

- 2711 Newspapers: publishing, publishing and printing
- 2721 Periodicals: publishing, publishing and printing
- 2731 Books: publishing, publishing and printing
- 2732 Book printing
- 2741 Miscellaneous publishing
- 2751 Commercial printing, letterpress, and screen
- 2752 Commercial printing, lithographic
- 2753 Engraving and plate printing
- 2754 Commercial printing, gravure
- 2761 Manifold business forms
- 2771 Greeting card publishing
- 2782 Blankbooks, looseleaf binders and devices
- 2789 Bookbinding and related work
- 2791 Typesetting
- 2793 Photoengraving
- 2794 Electrotyping and stereotyping
- 2795 Lithographic plate-making and related services

## 28 Chemicals and Allied Products

- 2812 Alkalies and chlorine
- 2813 Industrial gases
- 2816 Inorganic pigments
- 2819 Industrial inorganic chemicals, n.e.c.\*
- 2821 Plastics materials, synthetic resins, and non-vulcanisable elastomers
- 2822 Synthetic rubber (vulcanisable elastomers)
- 2823 Cellulosic man-made fibers
- 2824 Synthetic organic fibers, except cellulosic
- 2831 Biological products
- 2833 Medicinal chemicals and botanical products
- 2834 Pharmaceutical preparations
- 2841 Soap and other detergents except specialty cleaners
- 2842 Specialty cleaning, polishing, and sanitation preparations
- 2843 Surface active agents, finishing agents, sulfonated oils and assistants
- 2844 Perfumes, cosmetics, and other toilet preparations
- 2851 Paints, varnishes, lacquers, enamels, and allied products
- 2861 Gum and wood chemicals
- 2865 Cyclic (coal tar) crudes, and cyclic intermediates, dyes, and organic pigments (lakes and toners)
- 2869 Industrial organic chemicals, n.e.c.\*
- 2873 Nitrogenous fertilizers
- 2874 Phosphatic fertilizers
- 2875 Fertilizers, mixing only
- 2879 Pesticides, and agricultural chemicals, n.e.c.\*
- 2891 Adhesives and sealants
- 2892 Explosives
- 2893 Printing ink
- 2895 Carbon black
- 2899 Chemical and chemical preparations, n.e.c.\*

## **29 Petroleum Refining and Related Industries**

- 2911 Petroleum refining
- 2951 Paving mixtures and blocks
- 2952 Asphalt felts and coatings
- 2992 Lubricating oils and greases
- 2999 Products of petroleum and coal, n.e.c.\*

## **30 Rubber and Miscellaneous Plastics Products**

- 3011 Tires and inner tubes
- 3021 Rubber and plastic footwear
- 3031 Reclaimed rubber
- 3041 Rubber and plastic hose and belting
- 3069 Fabricated rubber products, n.e.c.\*
- 3079 Miscellaneous plastics products

## **31 Leather and Leather Products**

- 3111 Leather tanning and finishing
- 3131 Boot and shoe cut stock and findings
- 3142 House slippers
- 3143 Men's footwear, except athletic
- 3144 Women's footwear, except athletic
- 3149 Footwear, except rubber, n.e.c.\*
- 3151 Leather gloves and mittens
- 3161 Luggage
- 3171 Women's handbags and purses
- 3172 Personal leather goods, except women's handbags and purses
- 3199 Leather goods, n.e.c.\*

## **32 Stone, Clay, Glass and Concrete Products**

- 3211 Flat glass
- 3221 Glass containers
- 3229 Pressed and blown glass and glassware, n.e.c.\*
- 3231 Glass products, made of purchased glass
- 3241 Cement, hydraulic
- 3251 Brick and structural clay tile
- 3253 Ceramic wall and floor tile
- 3255 Clay refractories
- 3259 Structural clay products, n.e.c.\*
- 3261 Vitreous china plumbing fixtures and china, and earthenware fittings and bathroom accessories
- 3262 Vitreous china table and kitchen articles
- 3263 Fine earthenware (whiteware) table and kitchen articles
- 3264 Porcelain electrical supplies
- 3269 Pottery products, n.e.c.\*
- 3271 Concrete block and brick
- 3272 Concrete products, except block and brick
- 3273 Ready mixed concrete
- 3274 Lime
- 3275 Gypsum products
- 3281 Cut stone and stone products
- 3291 Abrasive products
- 3292 Asbestos products
- 3293 Gaskets, packing and sealing devices
- 3295 Minerals and earths, ground or otherwise treated
- 3296 Mineral wool
- 3297 Nonclay refractories
- 3299 Nonmetallic mineral products, n.e.c.\*

## **33 Primary Metal Industries**

- 3312 Blast furnaces (including coke ovens), steel works, and rolling mills
- 3313 Electrometallurgical products

- 3315 Steel wire drawing and steel nails and spikes
- 3316 Cold rolled steel sheet, strip and bars
- 3317 Steel pipe and tubes
- 3321 Gray iron foundries
- 3322 Malleable iron foundries
- 3324 Steel investment foundries
- 3325 Steel foundries, n.e.c.\*
- 3331 Primary smelting and refining of copper
- 3332 Primary smelting and refining of lead
- 3333 Primary smelting and refining of zinc
- 3334 Primary production of aluminum
- 3339 Primary smelting and refining of nonferrous metals, n.e.c.\*
- 3341 Secondary smelting and refining of nonferrous metals
- 3351 Rolling, drawing, and extruding of copper
- 3353 Aluminum sheet, plate, and foil
- 3354 Aluminum extruded products
- 3355 Aluminum rolling and drawing, n.e.c.\*
- 3356 Rolling, drawing, and extruding of nonferrous metals, except copper and aluminum
- 3357 Drawing and insulating of nonferrous wire
- 3361 Aluminum foundries (castings)
- 3362 Brass, bronze, copper, copper base alloy foundries (castings)
- 3369 Nonferrous foundries (castings), n.e.c.\*
- 3398 Metal heat treating
- 3399 Primary metal products, n.e.c.\*

## **34 Fabricated Metal Products, except Machinery and Transportation Equipment**

- 3411 Metal cans
- 3412 Metal shipping barrels, drums, kegs, pails
- 3421 Cutlery
- 3423 Hand and edge tools, except machine tools and hand saws
- 3425 Hand saws and saw blades
- 3429 Hardware, n.e.c.\*
- 3431 Enameled iron and metal sanitary ware
- 3432 Plumbing fixture fittings and trim (brass goods)
- 3433 Heating equipment, except electric and warm air furnaces
- 3441 Fabricated structural metal
- 3442 Metal doors, sash, frames, molding and trim
- 3443 Fabricated plate work (boiler shops)
- 3444 Sheet metal work
- 3446 Architectural and ornamental metal work
- 3448 Prefabricated metal buildings and components
- 3449 Miscellaneous metal work
- 3451 Screw machine products
- 3452 Bolts, nuts, screws, rivets and washers
- 3462 Iron and steel forgings
- 3463 Nonferrous forgings
- 3465 Automotive stampings
- 3468 Crowns and closures
- 3469 Metal stampings, n.e.c.\*
- 3471 Electroplating, plating, polishing, anodizing and coloring
- 3479 Coating, engraving and allied services, n.e.c.\*
- 3482 Small arms ammunition
- 3483 Ammunition, except for small arms, n.e.c.\*
- 3484 Small arms
- 3489 Ordnance and accessories, n.e.c.\*
- 3493 Steel springs, except wire
- 3494 Valves and pipe fittings, except plumbers' brass goods
- 3495 Wire springs
- 3496 Miscellaneous fabricated wire products
- 3497 Metal foil and leaf
- 3498 Fabricated pipe and fabricated pipe fittings
- 3499 Fabricated metal products, n.e.c.\*

### **35 Machinery, except Electrical**

- 3511 Steam, gas and hydraulic turbines and turbine generator set units
- 3519 Internal combustion engines, n.e.c.\*
- 3523 Farm machinery and equipment
- 3524 Garden tractors and lawn and garden equipment
- 3531 Construction machinery and equipment
- 3532 Mining machinery and equipment, except oil field machinery and equipment
- 3533 Oil field machinery and equipment
- 3534 Elevators and moving stairways
- 3535 Conveyors and conveying equipment
- 3536 Hoists, industrial cranes and monorail systems
- 3537 Industrial trucks, tractors, trailers and stackers
- 3541 Machine tools, metal cutting types
- 3542 Machine tools, metal forming types
- 3544 Special dies and tools, die sets, jigs and fixtures and industrial molds
- 3545 Machine tool accessories and measuring devices
- 3546 Power driven hand tools
- 3547 Rolling mill machinery and equipment
- 3549 Metalworking machinery, n.e.c.\*
- 3551 Food products machinery
- 3552 Textile machinery
- 3553 Woodworking machinery
- 3554 Paper industries machinery
- 3555 Printing trades machinery and equipment
- 3559 Special industry machinery, n.e.c.\*
- 3561 Pumps and pumping equipment
- 3562 Ball and roller bearings
- 3563 Air and gas compressors
- 3564 Blowers and exhaust and ventilation fans
- 3565 Industrial patterns
- 3566 Speed changers, industrial high speed drives and gears
- 3567 Industrial process furnaces and ovens
- 3568 Mechanical power transmission equipment, n.e.c.\*
- 3569 General industrial machinery and equipment, n.e.c.\*
- 3572 Typewriters
- 3573 Electronic computing equipment
- 3574 Calculating and accounting machines, except electronic computing equipment
- 3576 Scales and balances, except laboratory
- 3579 Office machines, n.e.c.\*
- 3581 Automatic merchandising machines
- 3582 Commercial laundry, dry cleaning and pressing machines
- 3585 Air conditioning and warm air heating equipment and commercial and industrial refrigeration equipment
- 3588 Measuring and dispensing pumps
- 3589 Service industry machines, n.e.c.\*
- 3592 Carburetors, pistons, piston rings and valves
- 3599 Machinery, except electrical, n.e.c.\*

### **36 Electrical and Electronic Machinery, Equipment and Supplies**

- 3612 Power, distribution and specialty transformers
- 3613 Switchgear and switchboard apparatus
- 3621 Motor and generators
- 3622 Industrial controls
- 3623 Welding apparatus, electric
- 3624 Carbon and graphite products
- 3629 Electrical industrial appliances, n.e.c.\*
- 3631 Household cooking equipment
- 3632 Household refrigerators and home and farm freezers

- 3633 Household laundry equipment
- 3634 Electrical housewares and fans
- 3635 Household vacuum cleaners
- 3636 Sewing machines
- 3639 Household appliances, n.e.c.\*
- 3641 Electric lamps
- 3643 Current carrying wiring devices
- 3644 Noncurrent carrying wiring devices
- 3645 Residential electric lighting fixtures
- 3646 Commercial, industrial and institutional electric lighting fixtures
- 3647 Vehicular lighting equipment
- 3648 Lighting equipment, n.e.c.\*
- 3651 Radio and television receiving sets, except communication types
- 3652 Phonograph records and pre-recorded magnetic tape
- 3661 Telephone and telegraph apparatus
- 3662 Radio and television transmitting, signaling and detection equipment and apparatus
- 3671 Radio and television receiving type electron tubes, except cathode ray
- 3672 Cathode ray television picture tubes
- 3673 Transmitting, industrial and special purpose electron tubes
- 3674 Semiconductors and related devices
- 3675 Electronic capacitors
- 3676 Resistors, for electronic applications
- 3677 Electronic coils, transformers and other inductors
- 3678 Connectors, for electronic applications
- 3679 Electronic components, n.e.c.\*
- 3691 Storage batteries
- 3692 Primary batteries, dry and wet
- 3693 Radiographic X-ray, fluoroscopic X-ray, therapeutic X-ray and other X-ray apparatus and tubes; electromedical and electrotherapeutic apparatus
- 3694 Electric equipment for internal combustion engines
- 3699 Electric machinery, equipment and supplies, n.e.c.\*

### **37 Transportation Equipment**

- 3711 Motor vehicles and passenger car bodies
- 3713 Truck and bus bodies
- 3714 Motor vehicle parts and accessories
- 3715 Truck trailers
- 3716 Motor homes
- 3721 Aircraft
- 3724 Aircraft engines and engine parts
- 3728 Aircraft parts and auxiliary equipment, n.e.c.\*
- 3731 Ship building and repairing
- 3732 Boat building and repairing
- 3743 Railroad equipment
- 3751 Motorcycles, bicycles and parts
- 3761 Guided missiles and space vehicles
- 3764 Guided missile and space vehicle propulsion units and propulsion unit parts
- 3769 Guided missile and space vehicle parts and auxiliary equipment, n.e.c.\*
- 3792 Travel trailers and campers
- 3795 Tanks and tank components
- 3799 Transportation equipment, n.e.c.\*

### **38 Measuring, Analyzing and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks**

- 3811 Engineering, laboratory, scientific and research instruments and associated equipment

3822 Automatic controls for regulating residential and commercial environments and appliances  
 3823 Industrial instruments for measurement, display and control of process variables; and related products  
 3824 Totalizing fluid meters and counting devices  
 3825 Instruments for measuring and testing of electricity and electrical signals  
 3829 Measuring and controlling devices, n.e.c.\*  
 3832 Optical instruments and lenses  
 3841 Surgical and medical instruments and apparatus  
 3842 Orthopedic, prosthetic and surgical appliances and supplies  
 3843 Dental equipment and supplies  
 3851 Ophthalmic goods  
 3861 Photographic equipment and supplies  
 3873 Watches, clocks, clockwork, operated devices and parts

### **39 Miscellaneous Manufacturing Industries**

3911 Jewelry, precious metal  
 3914 Silverware, platedware and stainless steelware  
 3915 Jewelers' findings and materials and lapidary work  
 3931 Musical instruments

3942 Dolls  
 3944 Games, toys and children's vehicles; except dolls and bicycles  
 3949 Sporting and athletic goods, n.e.c.\*  
 3951 Pens, mechanical pencils and parts  
 3952 Lead pencils, crayons and artists' materials  
 3953 Marking devices  
 3955 Carbon paper and inked ribbons  
 3961 Costume jewelry and costume novelties, except precious metal  
 3962 Feathers, plumes and artificial trees and flowers  
 3963 Buttons  
 3964 Needles, pins, hooks and eyes and similar notions  
 3991 Brooms and brushes  
 3993 Signs and advertising displays  
 3995 Burial caskets  
 3996 Linoleum, asphalted-felt-base and other hard surface floor coverings, n.e.c.\*  
 3999 Manufacturing industries, n.e.c.\*

\*"Not elsewhere classified" indicated by "n.e.c."

## APPENDIX III

HAZARDS LEVELS AS SET BY THE  
NATIONAL FIRE PROTECTION ASSOCIATION



## REFERENCE:

"FIRE PROTECTION HANDBOOK-SIXTEENTH EDITION," National Fire Protection Association, 1986; Section 6/Chapter 2, "Identification of the Hazards of Materials," Page 6-9.

### "HAZARD LEVELS"

Hazard information systems recognize four classes, or levels of hazardous materials:

1. Extremely Dangerous Materials. These materials can cause death or disabling injury on brief exposure, or they are extremely volatile flammable liquids or flammable gases, or detonable materials. A further breakdown is:
  - (a) Explosives and explosively unstable materials.
  - (b) High-level radioactive materials.
  - (c) Highly-flammable gases and materials which give off extremely flammable vapors.
  - (d) Extremely toxic materials, such as parathion and hydrogen cyanide, which are so poisonous that no bodily exposure should occur.
  - (e) Materials which are extremely corrosive to living tissue, such as bromine, which can injure almost instantaneously, or hydrofluoric acid, which can penetrate through the skin to the tissues beneath and cause deep, slow healing burns. Also included are materials that could cause severe eye injury.
  - (f) Materials whose combustion products or products of decomposition fit the descriptions given in (a) through (e) above.
2. Dangerous Materials. These are materials that could cause injury from exposure to the detrimental effects of highly flammable or highly self-reactive materials such as:
  - (a) Flammable liquids and solids.
  - (b) Highly toxic materials which are likely to cause some injury or illness, but not death, from a moderate exposure.
  - (c) Materials which could cause destruction of tissue.
  - (d) Moderately radioactive materials.

Dangerous materials may, at an extreme, cause some permanent but not disabling injury on exposure.
3. Hazardous Materials. These are materials that could cause temporary disability or injury which presumably would heal without permanent effects. They are moderately combustible or self-reactive, and they include:

(Hazardous Materials continued)

- (a) Tear gases.
  - (b) Severe irritants.
  - (c) Toxic (but not highly or extremely toxic) materials.
  - (d) Combustible materials which must be heated before they can be ignited.
4. Nuisance Hazards. These could cause temporary irritation or discomfort that would clear up when the exposure is ended, or they could be materials which are only slightly combustible.

## APPENDIX IV

U.S. DEPARTMENT OF TRANSPORTATION  
HAZARDOUS MATERIALS DEFINITIIONS

# **HAZARDOUS MATERIALS DEFINITIONS**

## **DEPARTMENT OF TRANSPORTATION DEFINITIONS**

Hazardous materials are regulated by the U.S. Department of Transportation (DOT). DOT specifically identifies the hazardous materials and publishes regulations that deal with their transportation, placarding, and handling, and with recommended emergency response procedures. The regulations include specifications for tank construction. The DOT categorizes hazardous materials into the same classifications used by the United Nations Committee of Experts on the Transport of Dangerous Goods. These classifications are as follows (see Title 49 of the Code of Federal Regulations for complete definitions):

### **Compressed Gas:**

Any material or mixture having in the container an absolute pressure exceeding 40 psi at 70°F or, regardless of the pressure at 70°F, having an absolute pressure exceeding 104 psi at 130°F, or any liquid flammable material having a vapor pressure exceeding 40 psi absolute at 100°F as determined by ASTM Text 0-323.

**Corrosives:**

Substances that cause visible destruction or irreversible alterations in human skin tissue at the site of contact, or, in the case of leakage from its packaging, a liquid that has a severe corrosion rate on steel.

**Explosive:**

Any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion, i.e., with substantially instantaneous release of gas and heat.

**Flammable Liquid:**

Any liquid having a flash point below 100°F.

**Flammable Solid:**

Any solid material, other than one classed as an explosive, which, under conditions normally incident to transportation, is liable to cause fires through friction or retained heat from manufacturing or processing, or which can be ignited readily and, when ignited, burns so vigorously and persistently as to create a serious transportation hazard. Included in this class are spontaneously combustible and water-reactive materials.

**Oxidizer:**

A substance, such as chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of organic matter.

**Poisons:**

These are divided into three groups, A, B, and Irritating Material, according to the degree of hazard in transportation. Class A poisons are such that a very small amount mixed with air is dangerous to life. Class B poisons are those known to be so toxic to humans as to afford a hazard to health during transportation. Irritating Materials are those substances which, upon contact with fire or when exposed to air, give off dangerous or intensely irritating fumes, but not including any poisonous Class A material.

**Radioactive Materials:**

See 173.389 of Title 49 for the extensive list of definitions of radioactive materials.

**Miscellaneous:**

These include Other Regulated Material (ORM) specified in Subpart J of Title 49 of the Code of Federal Regulations.

## APPENDIX V

### SARA TITLE III HAZARDOUS MATERIALS REPORTING FACT SHEET

# TITLE III- FACT SHEET



## EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW

April 1988  
(Revised)

U.S. Environmental Protection Agency

### INTRODUCTION

*The Emergency Planning and Community Right-to-Know Act of 1986 establishes requirements for federal, state, and local governments and industry regarding emergency planning and "community right-to-know" reporting on hazardous and toxic chemicals. This legislation builds upon EPA's Chemical Emergency Preparedness Program (CEPP) and numerous state and local programs aimed at helping communities to better meet their responsibilities in regard to potential chemical emergencies. The community right-to-know provisions will help to increase the public's knowledge and access to information on the presence of hazardous chemicals in their communities and releases of these chemicals into the environment.*

*Nothing in this document should be construed to indicate that EPA has determined states have Title III authority over Indian reservations. For purposes of this document, definition of the terms "State" and "Governor" includes "Indian tribe" and "Tribal Chairman." EPA has issued a draft policy for comment regarding the application of the emergency planning and community right-to-know law to Indian lands.*

*The emergency planning and community right-to-know (also known as Title III) provisions have four major sections: emergency planning (Section 301-303), emergency release notification (Section 304), community right-to-know reporting requirements (Sections 311, 312) and toxic chemical release reporting emissions inventory (Section 313).*

### SECTION 301-303: Emergency Planning

*The emergency planning sections are designed to develop state and local governments emergency response and preparedness capabilities through better coordination and planning, especially within the local community.*

*The Emergency Planning and Community Right-to-Know Law required the Governor of each state to designate a state emergency response commission. The governors have designated existing state organizations to be the state emergency response commissions including public agencies and departments concerned with issues relating to environment, natural resources, emergency services, public health, occupational safety, and transportation. Also, interested public and private sector groups and*

*associations with experience in Emergency Planning and Community Right-to-Know issues may be included in the state commission. At this time, all state emergency-response commissions have been appointed and are in place.*

*The state commission must also have designated local emergency planning districts and appointed local emergency planning committees for each district. The state commission is responsible for supervising and coordinating the activities of the local emergency planning committees, for establishing procedures for receiving and processing public requests for information collected under other sections of Title III, and for reviewing local emergency plans.*

*This local emergency planning committee must include, at a minimum, elected State and local officials, police, fire, civil defense, public health professionals, environmental, hospital, and transportation officials as well as representatives of facilities subject to the emergency planning requirements, community groups, and the media. As soon as facilities are subject to the emergency planning requirements, they must designate a representative to participate in the planning process. The local committee must establish rules, give public notice of its activities*

## KEY DATES TO REMEMBER

November 17, 1986	EPA published Interim List of Extremely Hazardous Substances and Threshold Planning Quantities in Federal Register (Section 302, 303, 304)
November 17, 1986	EPA initiated comprehensive review of emergency systems (Section 305 (b))
January 27, 1987	Proposed format for Emergency Inventory Forms and reporting requirements published in Federal Register (Section 311 & 312)
March 17, 1987	National Response Team published guidance for preparation and implementation of emergency plans (Section 303(f))
April 17, 1987	State governors appoint State emergency response commissions (Section 301(a))
April 22, 1987	EPA published Final List of Extremely Hazardous Substance and Threshold Planning Quantities in Federal Register (Section 302, 303, 304)
May 17, 1987	Facilities subject to Section 302 planning requirements notify State emergency response commission (Section 302(c)). Interim report on emergency system review submitted to Congress (Section 305(b))
June 4, 1987	EPA published proposed toxic chemical release (i.e., emissions inventory) form (Section 313(g))
July 17, 1987	State emergency response commission designates emergency planning districts (Section 301 (b))
August 17, 1987 (or 30 days after designation of districts, whichever is sooner)	State emergency response commission appoints members of local emergency planning committees (Section 301 (c))
September 17, 1987 (or 30 days after local committee is formed, whichever is earlier)	Facility notifies local planning committee of selection of a facility representative (Section 303(d)(1))

(Continued on Page 4)

and establish procedures for handling public requests for information

The local committee's primary responsibility is to develop an emergency response plan by October 17, 1988. In developing this plan, the local committee will evaluate available resources for preparing for and responding to a potential chemical accident. The plan must:

- identify facilities and extremely hazardous substances transportation routes;
- describe emergency response procedures, on-site and off-site;
- designate a community coordinator and facility coordinator(s) to implement the plan;
- outline emergency notification procedures;
- describe methods for determining the occurrence of a release and the probable affected area and population;
- describe community and industry emergency equipment and facilities and the identity of persons responsible for them;
- outline evacuation plans;
- describe a training program for emergency response personnel (including schedules); and
- present methods and schedules for exercising emergency response plans.

In order to assist the local committees in preparing and



reviewing plans, Congress required the National Response Team (NRT), composed of 14 Federal agencies with emergency response responsibilities, to publish guidance on emergency response planning. This guidance, the "Hazardous Material Emergency Planning Guide," was published by the NRT in March 1987 and incorporated the emergency planning aspects of the CEPP Interim Guidance. It also replaced the "Federal Emergency Management Agency's Planning Guide and Checklist for Hazardous Materials Contingency Plans" (popularly known as "FEMA 107"). See Federal Register dated March 17, 1987.

The emergency response plan must be initially reviewed by the state commission and annually by the local committee. Regional Response Teams, composed of federal regional officials and state representatives, may review the plans and provide assistance to the local committees upon request.

Planning activities of local committees and facilities should be focused on, but not limited to, the 366 extremely hazardous substances published in the Federal Register. The list includes the threshold planning quantities (minimum limits) for each substance. Through rule-making, EPA can revise the list and threshold planning quantities based on the toxicity, reactivity, volatility, dispersability, combustibility or flammability of a substance.

Any facility that produces, uses, or stores any of the listed chemicals in a quantity greater than its threshold planning quantity is subject to the emergency planning requirements.

In addition, the state commission or the Governor can designate additional facilities, after public comment, to be subject to these requirements. Covered facilities must notify the state commission and local committee that they are subject to these requirements within 60 days after they begin, to produce, use, or store any of the extremely hazardous substances in threshold planning quantities.

Each state commission must notify EPA of all facilities subject to the emergency planning requirements, including facilities designated by the state commission or the Governor.

## **SECTION 304: Emergency Notification**

Facilities must immediately notify the local emergency planning committees and the state emergency response commissions likely to be affected if there is a release of a listed hazardous substance that exceeds the reportable quantity for that substance. Substances subject to this requirement are the list of 366 extremely hazardous substances as published in Federal Register (40 CFR 355) and substances subject to the emergency notification requirements under CERCLA Section 103(a) (40 CFR 302.4).

Initial notification can be made by telephone, radio, or in person. Emergency notification requirements involving transportation incidents can be met by dialing 911, or in the absence of a 911 emergency number, calling the operator.

This emergency notification needs to include:

- the chemical name;
- an indication of whether the substance is extremely hazardous;
- an estimate of the quantity released into the environment;
- the time and duration of the release;
- whether the release occurred into air, water, and/or land;
- any known or anticipated acute or chronic health risks associated with the emergency, and where necessary, advice regarding medical attention for exposed individuals;
- proper precautions, such as evacuation; and
- name and telephone number of contact person.

Section 304 also requires a follow-up "written" emergency notice after the release. The follow-up notice or notices must:

- update information included in the initial notice, and
- provide information on
  - actual response actions taken; and
  - advice regarding medical attention necessary for exposed individuals.

If local committees are not yet formed, releases should be reported to appropriate local response officials.

## KEY DATES TO REMEMBER (Continued)

October 15, 1987	Final format for Emergency Inventory forms and reporting requirements published in the Federal Register (Section 311 and 312)
	EPA published proposed regulation governing trade secret claims (Section 322 & 323)
October 17, 1987	Manufacturing facilities submit MSDS's or list of MSDS chemicals to State commission, local committee and local fire department (Section 311 (d))
December 17, 1987	EPA published a final rule delisting four chemicals from the Extremely Hazardous Substance List (Section 302)
February 16, 1988	EPA published final toxic chemical release regulations, form and instructions (Section 313 (g))
February 25, 1988	EPA published a final rule delisting 36 chemicals from the Extremely Hazardous substance list (Section 302)
March 1, 1988	Manufacturing facilities submit their hazardous chemical inventory forms to State commission, local committee and local fire department (Section 312(a)(2))
April 17, 1988	Final Report on emergency systems study due to Congress (Section 305(b))
July 1, 1988 (and annually thereafter)	Covered facilities submit initial toxic chemical forms to EPA and designated State officials (Section 313 (a))
August 23, 1988	Non-manufacturing facilities covered under the new OSHA expansion submit MSDSs or a list of chemicals over the first year threshold to the State commission, local committee, and local fire department (Section 311)
October 17, 1988	Local emergency planning committees complete preparation of an emergency plan (Section 303(a))
March 1, 1989 (and annually thereafter)	Covered facilities submit their emergency inventory forms to State commission, local committee, and local fire department (Section 312 (a)(2) )

(Continued on Page 6)

## SECTION 311-312: Community Right-To-Know Requirements

There are two community right-to-know reporting requirements within the Emergency Planning and Community Right-to-Know law. Section 311 requires that facilities which must prepare material safety data sheets (MSDS) under the Occupational Safety and Health Administration (OSHA) regulations submit either copies of its MSDSs or a list of MSDS chemicals to:

- the local emergency planning committee;
- the state emergency response commission; and
- the local fire department.

If the facility owner or operator chooses to submit a list of MSDS chemicals, the list must include the chemical or common name of each substance and must identify the applicable hazard categories. These hazard categories are:

- immediate (acute) hazard;
- delayed (chronic) health hazard;
- fire hazard;
- sudden release of pressure hazard; and
- reactive hazard.

If a list is submitted, the facility must submit a copy of the MSDS for any chemical on the list upon the request of

the local emergency planning committee or state commission. Also, EPA has established threshold quantities for hazardous chemicals below which no facility must report. The current thresholds are:

- for extremely hazardous substances: 500 pounds or the threshold planning quantity whichever is lower.
- for all other hazardous chemicals: before October 17, 1989: 10,000 pounds; on or after October 17, 1989: Zero pounds (Note: The zero threshold will be revised pending further study).

The initial submission of the MSDSs or a list of MSDS chemicals was due on October 17, 1987, or 3 months after the facility is required to prepare or have available an MSDS under OSHA regulations. Currently, OSHA regulations require only manufacturers and importers in Standard Industrial Classification (SIC) codes 20-39 to have or prepare MSDS for their chemicals. But, as of May 23, 1988, those OSHA regulations will expand to include all non-manufacturers (i.e., SIC codes 1-89). Thus, under the statute, facilities newly covered by the expanded OSHA regulations must submit MSDSs or a list of MSDS chemicals by August 23, 1988 or within three months after they become covered.

An MSDS or list must be provided when new hazardous chemicals become present at a facility in quantities above the established threshold levels.

A revised MSDS must be provided to update original MSDS if significant new information is discovered about chemicals.

Reporting under Section 312 requires a facility to submit an emergency and hazardous chemical inventory form to the local emergency planning committee, the state emergency response commission, and the local fire department. Hazardous chemicals covered by Section 312 are those for which facilities are required to prepare or have available an MSDS under OSHA's Hazard Communication Standard and which were present at the facility at any time during previous calendar year.

EPA has also established threshold quantities for Section 312 for hazardous chemicals below which no facility must report. Currently those thresholds are:

- for extremely hazardous substances: 500 pounds or the threshold planning quantity whichever is lower
- for all other hazardous chemicals:

January to December 1987 or first year of reporting...10,000 pounds.

January to December 1988 or second year of reporting ...10,000 pounds.

January to December 1989 or third year of reporting...zero pounds. (Note: The zero threshold will be revised pending further study.

The inventory form incorporates a "two-tier" approach. Under Tier I, facilities must submit the following aggregate information for each applicable hazard category.

- An estimate (in ranges) of the maximum amount of chemicals for each category present at the facility at any time during the preceding calendar year.
- An estimate (in ranges) of the average daily amount of chemicals in each category.
- The general location of hazardous chemicals in each category.

If requested by a local committee, state commission or local fire department, the facility must provide the following Tier II information for each substance subject to the request...

- The chemical name or the common name as indicated on the MSDS.
- An estimate (in ranges) of the maximum amount of the chemical present at any time during the preceding calendar year.
- A brief description of the manner of storage of the chemical.
- The location of the chemical at the facility.
- An indication of whether the owner elects to withhold location information from disclosure to the public.

EPA published a uniform format for the inventory forms on October 15, 1987. Since many state commissions have additional requirements or have incorporated the federal contents in their own forms, Tier I/II forms should be obtained from the state commission. Tier I information shall be submitted for covered manufacturing facilities on or before

March 1, 1988 and annually thereafter on March 1, for all covered facilities.

The Tier II form may be sent by the facility instead of a Tier I form. The public may also request Tier II information from the state commission and the local committee. The information submitted by facilities under Sections 311 and 312 must generally be made available to the public by local and state governments during normal working hours.

## SECTION 313: Toxic Chemical Release Reporting

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 requires EPA to establish an inventory of routine toxic chemical emissions from certain facilities. Facilities subject to this reporting requirement are required to complete a Toxic Chemical Release Form (Form R) for specified chemicals. The form must be submitted to EPA and those state officials

designated by the Governor, on or before July 1, 1988, and annually thereafter on July 1. These reports should reflect releases during each preceding calendar year.

The purpose of this reporting requirement is to inform the public and government officials about routine releases of toxic chemicals in the environment. It will also assist in research and the development of regulations, guidelines, and standards.

The reporting requirement applies to owners and operators of facilities that have 10 or more full-time employees, that are in Standard Industrial Classification (SIC) codes 20 through 39 (i.e., manufacturing facilities) and that manufacture (including importing), process or otherwise use a listed toxic chemical in excess of specified threshold quantities.

Facilities using listed toxic chemicals in quantities over 10,000 pounds in a calendar year are required to submit toxic chemical release forms by

July 1 of the following year. Facilities manufacturing or processing any of these chemicals in excess of 75,000 pounds in 1987 must report by July 1, 1988. Facilities manufacturing or processing in excess of 50,000 pounds in 1988 must report by July 1, 1989; thereafter, facilities manufacturing or processing more than 25,000 pounds in a year are required to submit the form. EPA can revise these threshold quantities and covered SIC codes.

The list of toxic chemicals subject to reporting consist initially of chemicals listed for similar reporting purposes by the States of New Jersey and Maryland. There are over 300 chemicals and categories on these lists. Through rule-making, EPA can modify this combined list.

The final Toxic Chemical Release Form and regulations were published in the Federal Register on February, 16, 1988. The following information is required:

- The name, location and type of business;
- Off-site locations to which the facility transfers toxic chemicals in waste;
- Whether the chemical is manufactured (including importation), processed, or otherwise used and the general categories of use of the chemical;
- An estimate (in ranges) of the maximum amounts of the toxic chemical present at the facility at any time during the preceding year;
- Quantity of the chemical entering each air, land, and water annually.

### KEY DATES TO REMEMBER (Concluded)

- |                  |  |
|------------------|--|
| October 17, 1989 | Manufacturing facilities submit MSDS or a list of chemicals over the final threshold to the state commission, local committee, and local fire department (Section 311)       |
| August 23, 1990  | Non-manufacturing facilities submit MSDS's or a list of chemicals over the final threshold to the State commission, local committee, and local fire department (Section 311) |
| June 20, 1991    | Comptroller General Report to Congress on toxic chemical release information collection, use and availability (Section 313 (k))  |
| October 17, 1991 | EPA report to Congress on Mass Balance Study (Section 313 (l))   |

- Waste treatment/disposal methods and efficiency of methods for each waste stream;
- Optional information on waste minimization; and
- A certification by a senior facility official that the report is complete and accurate.

Reports are sent to EPA and designated state agencies. EPA must establish and maintain a national toxic chemical inventory based on the data submitted. The public must be able to access this national database, and obtain the data through other means.

In addition to the toxic chemical release reporting requirements, Section 313 authorizes EPA to arrange for a Mass Balance Study to be carried out by the National Academy of Sciences. The study will determine the feasibility, utility, and alternatives to collecting mass balance type information (throughout quantities) as a supplement to the currently required toxic release data. A report of this study must be submitted by EPA to Congress no later than October 17, 1991. An interim report from NAS is due to EPA in early 1989.

## OTHER TITLE III PROVISIONS

### Trade Secrets

Section 322 of the Emergency Planning and Community Right-to-Know law addresses trade secrets as they apply to emergency planning, community right-to-know, and toxic chemical release reporting. Any

facility may withhold the specific chemical identity on these submittals. No trade secrets are allowed to be claimed under Section 304 of the statute. The withholder must show that:

- the information has not been disclosed to any person other than a member of the local planning committee, a government official, an employee of the withholder or someone bound by a confidentiality agreement; measures have been taken to protect the confidentiality; and the withholder intends to continue to take such measures;
- the information is not required to be disclosed to the public under any other Federal or State law;
- the information is likely to cause substantial harm to the competitive position of the withholder; and
- the chemical identity is not readily discoverable through reverse engineering.

However, even if chemical identity information can be legally withheld from the public, Section 323 provides for disclosure of this information to health professionals who need the information for diagnostic and treatment purposes or local health officials who need the information for prevention and treatment activities. In non-emergency cases, the health professional receiving the information must sign a confidentiality agreement with the facility and provide a written statement of need. In medical emergency situations, the health professional must, if requested by the facility, provide these documents as soon as circumstances permit.

Information claimed as a trade secret and substantiation for that claim must be submitted to EPA. More detailed information on the procedure for submitting trade secrecy claims can be found in the proposed trade secrets rule, published on October 15, 1987. Any person may challenge trade secret claims by petitioning EPA. The Agency must then review the claim and rule on its validity.

EPA published proposed regulations governing trade secret claims on October 15, 1987. The regulations covered the process for submission of claims, petitions for disclosure and the review process for petitions.

## Title III Penalties

Section 325 of the Emergency Planning and Community Right-to-Know law addresses the penalties for failure to comply with the requirements of this law. Civil and administrative penalties ranging from up to \$10,000 – \$75,000 per violation or per day per violation can be assessed to facilities that fail to comply with the emergency planning (Section 302), emergency notification (Section 304), community right-to-know (Section 311 and 312), toxic chemical release (Section 313) and trade secret (Section 322 and 323) reporting requirements.

Also, criminal penalties of up to \$50,000 or 5 years in prison may be given to any person who knowingly and willfully fails to provide emergency release notification. As well, penalties of not more than \$20,000 and/or up to one year in prison may be given to any person who knowingly and willfully discloses



any information entitled to protection as a trade secret. In addition, Section 326 allows citizens to initiate civil actions against EPA, state emergency response commissions, and/or the owner or operator of a facility, for failure to meet the requirements of the Emergency Planning and Community Right-to-Know provisions.

## Training Grants

Section 305 of the Emergency Planning and Community Right-to-Know law authorizes the Federal Emergency Management Agency to provide \$5 million for each of fiscal years 1987, 1988, 1989, and 1990 for training grants to support State and local governments. These training grants are designed to improve emergency planning, preparedness, mitigation, response, and recovery capabilities. Such programs must provide special emphasis to hazardous chemical emergencies. The training grants may not exceed 80 percent of the cost of any such programs. The remaining 20 percent must come from non-Federal sources.

## Emergency Systems Study

Under Section 305, EPA is required to review emergency systems for monitoring, detecting, preventing and warning of accidental releases of extremely hazardous substances at representative facilities that produce, use, or store these substances.

EPA reported interim findings to Congress in May 1987 and is required to issue a final report of findings and recommendations to Congress. The report will include EPA's findings regarding each of the following:

- status of current technological capabilities to (1) monitor, detect, and prevent significant releases of extremely hazardous substances; (2) determine the magnitude and direction of the hazard posed by each release; (3) identify specific substances; (4) provide data on specific chemical composition of such releases; and (5) determine relative concentration of the constituent substances;
- status of public emergency alert devices or systems for effective public warning of accidental releases of extremely hazardous substances into any media; and
- technical and economic feasibility of establishing, maintaining, and operating alert systems for detecting releases.

The report must also include EPA's recommendations for:

- initiatives to support development of new or improved technologies or systems that would assist the timely monitoring, detection, and prevention of releases of extremely hazardous substances.

- improving devices or systems for effectively alerting the public in the event of an accidental release.

## Public Access

Section 324 of the Emergency Planning and Community Right-to-Know law provides for public access to information gathered under this law. Under this section, all material safety data sheets, hazardous chemical inventory forms, toxic chemical release form follow-up emergency notices, and the emergency response plan must be made available during normal working hours. In order to inform the public of the availability and location of the information provided to the local emergency planning committee, the local committee must publish a notice annually in the local newspaper.

For more information, contact the Emergency Planning & Community Right-to-Know Information Hotline:

Hotline: 1-800-535-0202 (in Washington, D.C. (202) 479-2449)

Hours: 8:30 am - 4:30 pm  
(Eastern Time) Monday - Friday

This is NOT an emergency number.

# CHEMICAL LISTS ASSOCIATED WITH EMERGENCY PLANNING/COMMUNITY RIGHT-TO-KNOW

LIST	SECTION	PURPOSE
<u>List of Extremely Hazardous Substances</u> (366 Substances) (40 CFR 355)	§302: Emergency Planning §304: Emergency Notification	<ul style="list-style-type: none"> <li>Facilities with more than estimated planning quantities of these substances must notify the State commission.</li> <li>Initial focus for preparation of emergency plans by local emergency planning committees.</li> <li>Certain releases of these substances trigger Section 304 notification to State commission and local committees.</li> </ul>
Substances requiring notification under Section 103(a) of CERCLA (717 substances) (40 CFR 302.4)	§304: Emergency Notification	<ul style="list-style-type: none"> <li>Certain releases of these trigger Section 304 notification to State commission and local communities as well as Section 104(a) requirement for National Response Center notification.</li> </ul>
Hazardous Chemicals considered physical or health hazards under OSHA's Hazard Communication Standard (29 CFR 1910.1200) [This is performance standard; there is no specific list of chemicals.]	§304: Emergency Notification  §311: Material Safety Data Sheets §312: Emergency Inventory	<ul style="list-style-type: none"> <li>Identifies facilities subject to emergency notification requirements.</li> <li>MSDS or list of MSDS chemicals provided by covered facilities to state commissions, local committees and local fire departments.</li> </ul>
<u>Toxic Chemicals</u> (329 chemical/chemical categories) (40 CFR 372)	§313: Toxic Chemical Release Reporting	<ul style="list-style-type: none"> <li>These chemicals are reported on an emissions inventory to inform government officials and the public about the release of toxic chemicals into the environment.</li> </ul>

## APPENDIX VI

### SARA TITLE III TIER ONE, TIER TWO REPORTING CRITERIA



## Tier One

EMERGENCY AND HAZARDOUS  
CHEMICAL INVENTORY

Aggregate Information by Hazard Type

FOR  
OFFICIAL  
USE  
ONLY

ID # \_\_\_\_\_

Date Received \_\_\_\_\_

Important: Read instructions before completing form

Reporting Period From January 1 to December 31, 19\_\_\_\_

## Facility Identification

Name \_\_\_\_\_

Street Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

SIC Code     Dun & Bradstreet Number   -      

## Owner/Operator

Name \_\_\_\_\_

Mail Address \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_

## Emergency Contacts

Name \_\_\_\_\_

Title \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_

24 Hour/Day  
Phone Number (\_\_\_\_) \_\_\_\_\_

Physical Hazard

Hazard Type	Max Amount*	Average Daily Amount*	General Location	<input type="checkbox"/> Check if site plan is attached
Combustible Liquid	<input type="text"/>	<input type="text"/>	_____	
Compressed Gas	<input type="text"/>	<input type="text"/>	_____	
Corrosive	<input type="text"/>	<input type="text"/>	_____	
Explosive	<input type="text"/>	<input type="text"/>	_____	
Flammable	<input type="text"/>	<input type="text"/>	_____	
Organic Peroxide	<input type="text"/>	<input type="text"/>	_____	
Oxidizer	<input type="text"/>	<input type="text"/>	_____	
Pyrophoric	<input type="text"/>	<input type="text"/>	_____	
Unstable/Reactive	<input type="text"/>	<input type="text"/>	_____	
Water Reactive	<input type="text"/>	<input type="text"/>	_____	

Health Hazard

Carcinogen	<input type="text"/>	<input type="text"/>	_____
Highly Toxic	<input type="text"/>	<input type="text"/>	_____
Irritant	<input type="text"/>	<input type="text"/>	_____
Sensitizer	<input type="text"/>	<input type="text"/>	_____
Toxic	<input type="text"/>	<input type="text"/>	_____
Blood Toxin	<input type="text"/>	<input type="text"/>	_____
Eye Hazard	<input type="text"/>	<input type="text"/>	_____
Kidney Toxin	<input type="text"/>	<input type="text"/>	_____
Liver Toxin	<input type="text"/>	<input type="text"/>	_____
Lung Toxin	<input type="text"/>	<input type="text"/>	_____
Nerv. Sys. Toxin	<input type="text"/>	<input type="text"/>	_____
Reproductive Toxin	<input type="text"/>	<input type="text"/>	_____
Skin Hazard	<input type="text"/>	<input type="text"/>	_____

## Certification (Read and sign after completing all sections)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete.

Name and official title of owner/operator OR owner/operator's authorized representative

Signature \_\_\_\_\_

Date Signed \_\_\_\_\_

* Reporting Ranges	Range Value	Weight Range In Pounds From... To...
00	0	99
01	100	999
02	1000	9,999
03	10,000	99,999
04	100,000	999,999
05	1,000,000	9,999,999
06	10,000,000	49,999,999
07	50,000,000	99,999,999
08	100,000,000	499,999,999
09	500,000,000	999,999,999
10	1 billion	higher than 1 billion

## TIER ONE INSTRUCTIONS

### GENERAL INFORMATION

Submission of this form is required by Title III of the Superfund Amendments and Reauthorization Act of 1986, Section 312, Public Law 99-499.

The purpose of this form is to provide State and local officials and the public with information on the general types and locations of hazardous chemicals present at your facility during the past year.

#### YOU MUST PROVIDE ALL INFORMATION REQUESTED ON THIS FORM.

You may substitute the Tier Two form for this Tier One form. (The Tier Two form provides detailed information and must be submitted in response to a specific request from State or local officials.)

#### WHO MUST SUBMIT THIS FORM

Section 312 of Title III requires that the owner or operator of a facility submit this form if, under regulations implementing the Occupational Safety and Health Act of 1970, the owner or operator is required to prepare or have available Material Safety Data Sheets (MSDS) for hazardous chemicals present at the facility. MSDS requirements are specified in the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, found in Title 29 of the Code of Federal Regulations, Section 1910.1200.

#### WHAT CHEMICALS ARE INCLUDED

You must report the information required on this form for every hazardous chemical for which you are required to prepare or have available an MSDS under the Hazard Communication Standard.

OSHA regulations and Title III exempt some chemicals from reporting. The combined list of exceptions includes:

1. Any food, food additive, color additive, drug, or cosmetic regulated by the Food and Drug Administration.
2. Any substance to the extent it is used for personal, family, or household purposes, or is present in the same form and concentration as a product packaged for distribution and use by the general public.
3. Any substance to the extent it is used in a research laboratory or a hospital or other medical facility under direct supervision of a technically qualified individual.
4. Any substance to the extent it is used in routine agricultural operations or is a fertilizer held for sale by a retailer to the ultimate customer.

5. Any hazardous waste such as defined by the Solid Waste Disposal Act as amended (42 U.S.C. 6901 et seq.).

6. Tobacco or tobacco products.

7. Wood or wood products.

8. Articles which are manufactured items:

- Formed to a specific shape of design during manufacture;
- With end use functions dependent in whole or in part upon the shape or design during end use; and
- Which do not release, or otherwise result in exposure to a hazardous chemical under normal conditions of use.

Also, minimum reporting thresholds have been established under Title III, Section 311. You do not need to report any hazardous chemical which has not been present at your facility at any time during the year at or above the levels listed below:

- on or before October 17, 1987....10,000 lbs.
- on or before October 17, 1988....500 lbs.
- on or before October 17, 1989....0 lbs.

#### WHEN TO SUBMIT THIS FORM

Beginning March 1, 1988, owners or operators must submit the Tier One form (or substitute the Tier Two form) on or before March 1, of every year.

#### WHERE TO SUBMIT THIS FORM

One completed inventory form must be sent to each of the following:

1. Your State emergency planning commission.
2. Your local emergency planning committee.
3. The fire departments with jurisdiction over your facility.

#### PENALTIES

Any owner or operator of a facility who fails to submit or supplies false Tier One information shall be liable to the United States for a civil penalty of up to \$25,000 for each such violation. Each day a violation continues shall constitute a separate violation. In addition, any citizen may commence a civil action on his or her own behalf against any owner or operator who fails to submit Tier One information.

## INSTRUCTIONS

Please read these instructions carefully. Print or type all responses.

You may use the Tier Two form as a worksheet for completing Tier One. Filling in the Tier Two "Chemical Information" section should help you assemble your Tier One responses.

If your responses require more than one page, fill in the "Page Number" information at the top of the form.

### REPORTING PERIOD

Enter the appropriate calendar year, beginning January 1 and ending December 31.

### FACILITY IDENTIFICATION

Enter the complete name of your facility (and company identifier where appropriate).

Enter the full street address, state road, or other appropriate identifiers which describe the physical location of your facility (e.g. longitude and latitude). Include city, state, and zip code.

Enter the primary Standard Industrial Classification (SIC) Code, and the Dun and Bradstreet Number for your facility.

### OWNER/OPERATOR

Enter the owner's or operator's full name, mailing address and phone number.

### EMERGENCY CONTACT

Enter the name, title and work phone number of at least one person who can provide emergency information on locations and types of chemical hazards at your facility.

Provide an emergency phone number where such emergency chemical information will be available 24 hours per day, every day.

### PHYSICAL AND HEALTH HAZARDS...

#### Descriptions, Amounts and Locations

This section requires aggregate information on chemicals by hazard categories as defined in the OSHA Hazard Communication Standard, 29 CFR 1910.1200. For each hazard type, indicate the total amounts and general locations of all applicable chemicals present at your facility during the past year.

#### • What units should I use?

Calculate all amounts as *weight in pounds*. To convert gas or liquid volume to weight in pounds, multiply by an appropriate density factor.

#### • What about mixtures?

If a chemical is part of a mixture, you have the option of reporting either the weight of the entire mixture or only the portion of the mixture which is a particular hazardous chemical. (e.g. if a hazardous solution weighs 100 lbs, but is composed only 5% of a particular hazardous chemical, you can indicate either 100 lbs or 5 lbs of the substance).

The option selected should be consistent with your reporting of the chemical on the MSDS, or list of MSDS chemicals under Section 311.

#### • Where do I count a chemical which is 'Explosive', 'Corrosive,' and a 'Carcinogen'?

Add the chemical's weight to your totals for all three hazard categories, and include its location in all three categories as well. Many chemicals fall into more than one hazard category, which results in double-counting.

### MAXIMUM AMOUNT

The amounts of chemicals you have on hand may vary throughout the year. The peak weights -- greatest single day weights during the year -- are added together in this column to determine the "maximum weight" for each hazard type. Since the peaks for different chemicals often occur on different days, this "maximum amount" will seem artificially high.

To complete this and the following sections, you may choose to use the Tier Two form as a worksheet.

To determine the "Maximum Amount:"

1. List all of your hazardous chemicals individually.
2. For each chemical...
  - a. Indicate all physical and health hazards that the chemical presents. Include all chemicals even if they are present only for short periods of time during the year.
  - b. Estimate the maximum weight in pounds that was present at your facility on any single day of the reporting period.

3. For each hazard type -- beginning with "combustible liquids" and repeating for all physical and health hazard types...

- a. Add the maximum weights of all chemicals you indicated as the particular hazard type.
- b. Look at the Reporting Ranges at the bottom of the Tier One form. Find the appropriate "range value" code.
- c. Enter this "range value" in the boxes labelled "Maximum Amount."

#### EXAMPLE:

You are using the Tier Two as a worksheet and have listed raw weights in pounds for each of your hazardous chemicals. You have marked an X in the Corrosive hazard column for phenol and sulfuric acid. The "Maximum Amount" raw weights you listed were 10,000 lbs and 50 lbs, respectively. You add these together to reach a total of 10,050 lbs. Then you look at the "Reporting Ranges" at the bottom of your Tier One form and find that the value 03 corresponds to 10,050 lbs. Enter 03 as your "Maximum Amount" for Corrosives.

You also marked an X in the Combustible and Highly Toxic hazard boxes for phenol. When you calculate your "Maximum Amount" totals for these additional hazards, add the 10,000 lb. weight again:

#### AVERAGE DAILY AMOUNT

This column should represent the average daily amount of chemicals of each hazard type that were present at your facility at any point during the year.

To determine this amount:

1. List all of your hazardous chemicals individually (same as for Maximum Amount).
2. For each chemical...

- a. Indicate all physical and health hazards that the chemical presents (same as for Maximum Amount).

Since some chemicals may be present only for short periods of time, the average for the year may seem artificially low.

- b. Estimate the average weight in pounds that was present at your facility throughout the year. To do this, total all daily weights and divide by 365, or total all monthly weights and divide by 12 -- or use other calculations which reflect an average for the entire year.

3. For each hazard type -- beginning with Combustible Liquids and repeating for all physical and health hazards...

- a. Add the average weights of all chemicals you indicated for the particular hazard type.

b. Look at the Reporting Ranges at the bottom of the Tier One form. Find the appropriate "range value" code.

- c. Enter this "range value" in the boxes labelled "Average Daily Amount."

#### EXAMPLE:

You are using the Tier Two form, you have marked an X in the Highly Toxic hazard column for nicotine and phenol. The average daily weights you listed were 1,000 lbs. and 200 lbs., respectively. You add these together to reach a total of 1,200 lbs. Then you look at the Reporting Ranges on your Tier One form and find that the value 02 in corresponds to 1,200 lbs. Enter 02 as your "Average Daily Amount" for Highly Toxic Substances.

You also marked an X in the Combustible and Corrosive hazard columns for phenol. When you calculate your "Average Daily Amount" for these additional hazards, use the 200 lb. weight again.

#### GENERAL LOCATION

Enter the general location within your facility where each hazard may be found. "General" locations should include the names or identifications of buildings, tank fields, lots, sheds, or other such areas.

For each hazard type, list the locations of all applicable chemicals. As an alternative you may also attach a site plan and list the site coordinates related to the appropriate locations. If you do so, check the "site plan" box at the top of Column D.

#### EXAMPLE:

On your worksheet you have marked an X in the Flammable hazard column for acetone and butane. You noted that these are kept in steel drums in Room C of the Main Building, and in pressurized cylinders in Storage Shed 13, respectively. You could enter "Main Building and Storage Shed 13" as the "General Locations" of your Flammable Hazards. However, you choose to attach a site plan and list coordinates. Check the "site plan" box at the top of the column, and enter site coordinates for the Main Building and Storage Shed 13 under "General Locations."

If you need more space to list locations, attach an additional Tier One form and continue your list on the proper line.

#### CERTIFICATION

This must be completed by the owner or operator, or the officially designated representative of the owner or operator. Enter your full name and official title. Sign your name and enter the current date.

<b>Tier Two</b> <b>EMERGENCY AND HAZARDOUS CHEMICAL INVENTORY</b> <i>Specific Information by Chemical</i>	<b>Facility Identification</b> Name _____ Street Address _____ City _____ State _____ Zip _____ SIC <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Dun & Bradstreet # <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		<b>Owner/Operator</b> Name _____ Mail Address _____ _____ Phone ( _____ ) _____	<b>Emergency Contacts</b> Name _____ Title _____ Phone ( _____ ) _____ 24 Hour/Day Phone Number ( _____ ) _____
---	--	--	---	---

Important: Read all instructions before completing form

Reporting Period From January 1 to December 31, 19\_\_\_\_

## Confidential Location Information Sheet

**Location:**  
**Confidential**

Site Location      Storage Codes

Chem. Name CAS # <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		[_____] (_____) (_____)
Chem. Name CAS # <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		[_____] (_____) (_____)
Chem. Name CAS # <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		[_____] (_____) (_____)
Chem. Name CAS # <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		[_____] (_____) (_____)
Chem. Name CAS # <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		[_____] (_____) (_____)
Chem. Name CAS # <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		[_____] (_____) (_____)
Chem. Name CAS # <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		[_____] (_____) (_____)
Chem. Name CAS # <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		[_____] (_____) (_____)
Chem. Name CAS # <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		[_____] (_____) (_____)

**Certification (Read and sign after completing all sections)**

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and official title of owner/operator OR owner/operator's authorized representative \_\_\_\_\_

Signature \_\_\_\_\_

Date Signed \_\_\_\_\_

**Attachments (Check one)**

- ☐ I have attached a site plan
- ☐ I have attached a list of site coordinate abbreviations

## EMERGENCY AND HAZARDOUS CHEMICAL INVENTORY

**Specific  
Information  
by Chemical**

**Facility Identification**

Name \_\_\_\_\_

**Street Address** \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

SIC [ ] [ ] [ ] [ ] Dun &amp; Bradstreet # [ ] [ ] - [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ]

**Owner/Operator**

Name \_\_\_\_\_

Mail Address \_\_\_\_\_

Phone ( )

### Emergency Contacts

Name \_\_\_\_\_

**Title** \_\_\_\_\_

Phone ( ) \_\_\_\_\_

24 Hour/Day  
Phone Number ( )

**Important: Read all instructions before completing form**

Reporting Period From January 1 to December 31, 19\_\_

[illegible]

**Certification** *(Read and sign after completing all sections)*

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and official title of owner/operator OR owner/operator's authorized representative

**Signature**

Date Signed \_\_\_\_\_

**Attachments (Check one)**

- ☐ I have attached a site plan
- ☐ I have attached a list of site coordinate abbreviations

## TIER TWO INSTRUCTIONS

### GENERAL INFORMATION

Submission of this Tier Two form (when requested) is required by Title III of the Superfund Amendments and Reauthorization Act of 1986, Section 312, Public Law 99-499. The purpose of this Tier Two form is to provide State and local officials and the public with specific information on hazardous chemicals present at your facility during the past year.

#### YOU MUST PROVIDE ALL INFORMATION REQUESTED ON THIS FORM TO FULFILL TIER TWO REPORTING REQUIREMENTS.

This form may also be used as a worksheet for completing the Tier One form, or may be submitted in place of the Tier One form.

#### WHO MUST SUBMIT THIS FORM

Section 312 of Title III requires that the owner or operator of a facility submit this Tier Two form if so requested by a State emergency planning commission, a local emergency planning committee, or a fire department with jurisdiction over the facility.

This request may apply to the owner or operator of any facility that is required, under regulations implementing the Occupational Safety and Health Act of 1970, to prepare or have available a Material Safety Data Sheet (MSDS) for a hazardous chemical present at the facility. MSDS requirements are specified in the Occupational Safety and Health Administration (OSHA) Hazard Communications Standard, found in Title 29 of the Code of Federal Regulations at Section 1910.1200.

#### WHAT CHEMICALS ARE INCLUDED

You must report the information required on this form for each hazardous chemical for which a request for Tier II information is made.

The OSHA regulations and Title III exempt some chemicals from reporting. The combined list of exceptions include:

1. Any food, food additive, color additive, drug, or cosmetic regulated by the Food and Drug Administration.
2. Any substance to the extent it is used for personal, family, or household purposes, or is present in the same form and concentration as a product packaged for distribution and use by the general public.
3. Any substance to the extent it is used in a research laboratory or a hospital or other medical facility under direct supervision of a technically qualified individual.

4. Any substance to the extent it is used in routine agricultural operations or is a fertilizer held for sale by a retailer to the ultimate customer.

5. Any hazardous waste such as defined by the Solid Waste Disposal Act as amended (42 U.S.C. 6901, et seq.).

6. Tobacco or tobacco products.

7. Wood or wood products.

8. Articles which are manufactured items:

- Formed to a specific shape of design during manufacture;
- With end use functions dependent in whole or in part upon the shape or design during end use; and
- Which do not release, or otherwise result in exposure to a hazardous chemical under normal conditions of use.

A requesting official may limit the responses required under Tier Two, by specifying particular chemicals or groups of chemicals.

#### WHEN TO SUBMIT THIS FORM

Owners or operators must submit the Tier Two form to the requesting agency within 30 days of a written request from an authorized official.

#### WHERE TO SUBMIT THIS FORM

A completed Tier Two form must be sent to the requesting agency.

#### PENALTIES

Any owner or operator who violates any Tier Two reporting requirements shall be liable to the United States for a civil penalty of up to \$25,000 for each such violation. Each day a violation continues shall constitute a separate violation.

## INSTRUCTIONS

Please read these instructions carefully. Print or type all responses.

You may use the Tier Two form as a worksheet for completing the Tier One form. Filling in the Tier Two "Chemical Information" section should help you assemble your Tier One Responses.

If your responses require more than one page, fill in the "Page Number" information at the top of the form.

### REPORTING PERIOD

Enter the appropriate calendar year, beginning January 1 and ending December 31.

### FACILITY IDENTIFICATION

Enter the full name of your facility (and company identifier where appropriate).

Enter the full street address, state road, or other appropriate identifiers which describe the physical location of your facility (e.g. longitude and latitude). Include city, state, and zip code.

Enter the primary Standard Industrial Classification (SIC) Code, and the Dun and Bradstreet Number for your facility.

### OWNER/OPERATOR

Enter the owner's or operator's full name, mailing address and phone number.

### EMERGENCY CONTACT

Enter the name, title and work phone number of at least one person who can provide emergency information on locations and types of chemical hazards at your facility.

Provide an emergency phone number where such emergency chemical information will be available 24 hours per day, every day.

### CHEMICAL INFORMATION...Description, Amounts, Hazards, and Locations

The main section of the Tier Two form requires specific information on amounts and locations of hazardous chemicals, as defined in the OSHA Hazard Communications Standard.

#### • What units should I use?

Calculate all amounts as *weight in pounds*. To convert gas or liquid volume to weight in pounds, multiply by an appropriate density factor.

#### • What about mixtures?

If a chemical is part of a mixture, you have the option of reporting either the weight of the entire mixture or only the portion of the mixture which is a particular hazardous chemical. (e.g. If a hazardous solution weighs 100 lbs. but is composed only 5% of a particular hazardous chemical, you can indicate either 100 lbs or 5 lbs of the chemical).

The option selected should be consistent with your reporting of the chemical on the MSDS, a list of MSDS chemical under Section 3II.

### CHEMICAL DESCRIPTION

1. Enter the chemical name or common name of each hazardous chemical.
2. Enter the Chemical Abstract Service Number (CAS#).

If you are withholding the name of a chemical in accordance with criteria specified in Title III, Section 322, enter the generic chemical class (e.g., list toluene diisocyanate as organic isocyanate.)

3. Circle ALL applicable descriptors: pure or mixture, and solid, liquid or gas.

#### EXAMPLE:

You have pure chlorine gas on hand, as well as having two mixtures which contain liquid chlorine. You write "chlorine" and enter the CAS#, then you circle "pure" and "mix" -- as well as liq. and gas.

### MAXIMUM AMOUNT

1. For each hazardous chemical, estimate the greatest amount present at your facility on any day during the reporting period.
2. Find the appropriate "range value" code in Table I.
3. Enter this value as the "Maximum Amount."



**Table 1**  
**"REPORTING RANGES"**

Range Value	Weight Range in Pounds	
	From...	To...
00	0	99
01	100	999
02	1000	9,999
03	10,000	99,999
04	100,000	999,999
05	1,000,000	9,999,999
06	10,000,000	49,999,999
07	50,000,000	99,999,999
08	100,000,000	499,999,999
09	500,000,000	999,999,999
10	1 billion	higher than 1 billion

If you are using this form as a worksheet for completing Tier One, enter the actual weight in pounds in the shaded space below the response blocks. Do this for both "Maximum Amount" and "Average Daily Amount."

**EXAMPLE:**

You received one large shipment of a solvent mixture last year. The shipment filled your 5,000 gallon storage tank. You know that the solvent contains 10% benzene, which is a hazardous chemical.

You figure that 10% of 5,000 gallons is 500 gallons. You also know that the density of benzene is 7.29 pounds per gallon, so you multiply 500 by 7.29 to get a weight of 3,645 pounds.

Then you look at Table 1 and find that the "range value" 02 corresponds to 3,645. You enter 02 as the "Maximum Amount".

(If you were using the form as a worksheet for completing a Tier One form, you would have written 3,645 in the shaded area.)

**AVERAGE DAILY AMOUNT**

1. For each hazardous chemical, estimate the average weight in pounds that was present at your facility during the year.

To do this, total all daily weights and divide by 365, or total all monthly weights and divide by 12 -- or use other calculations which reflect an average for the entire year.

(Since some chemicals may be present only for short periods of time, the average for the year may seem artificially low).

2. Find the appropriate "range value" in Table 1.
3. Enter this value as the "Average Daily Amount."

**EXAMPLE:**

The 5,000 gallon shipment of solvent you received was gradually used up during the year. You measured the level each month and recorded 12 monthly levels: 5000, 4500, 4200, 3900, 3500, 3200, 2800, 2300, 2100, 1900, 1200, and 800 gallons.

When you add all 12 measurements, you reach a total of 35,400 gallons. You divide the total by the number of measurements (12) to get an average of 2,950 gallons.

You already know that the solvent contains 10% benzene, which is a hazardous chemical. Since 10% of 2,950 is 295, you figure that you had an average of 295 gallons of benzene. You also know that the density of benzene is 7.29 pounds per gallon, so you multiply 295 by 7.29 to get a weight of 2,150 pounds.

Then you look at Table 1 and find that the "range value" 02 corresponds to 2,150. You enter 02 as the "Maximum Amount".

(If you were using the form as a worksheet for completing a Tier One form, you would have written 2,150 in the shaded area.)

**PHYSICAL AND HEALTH HAZARDS**

For each chemical you have listed, check all the physical and health hazard boxes that apply. These hazard categories are defined in the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**LOCATION**

List all non-confidential chemical locations in this column, along with storage types/conditions associated with each location.

1. Attachments: Attach one of the following, and check the appropriate "Attachments" box at the bottom of the Tier Two form.
  - a. A Site Plan with "site coordinates" indicated for buildings, lots, areas, etc. throughout your facility.
  - b. A List of "Site Coordinate" Abbreviations which correspond to buildings, lots, areas, etc. throughout your facility. Use abbreviations that are three letters or less.
2. Site Location: For each chemical...
  - a. Main location-- Enter appropriate "site coordinates" or abbreviations in front of the brackets.
  - b. Sub-location-- Enter the room, or area (within the building or lot, etc.) within the brackets.

If you have more than one building, lot, or area location, continue your responses down the page as needed.

### EXAMPLE:

You have benzene in the main room of the main building, in tank 2 in tank field 10, and in the back corner of the warehouse. You attach a site plan with coordinates as follows: main building = B-6, and warehouse = R-16. You fill in the "Site Location" as follows:

G-2 [Main Room]  
B-6 [ Tank 2 ]

Since you need more room for the warehouse location, use the next line down on the form (rather than using that line for a different chemical) and enter:

( )  
R-16 (rear)

3. Storage: Next to each location you have listed (building and room, etc.) indicate the types and conditions of storage present...

- Look at Table II. For each location, find the appropriate "Storage Type(s)." Enter the corresponding code(s) in front of the parentheses.
- Look at Table III. For each storage type, find the "Temperature and Pressure Conditions". Enter the corresponding code within the parentheses.

**Table II**  
**"STORAGE TYPES"**

CODES	Types of Storage
A	Above ground tank
B	Below ground tank
C	Tank inside building
D	Steel drum
E	Plastic or non-metallic drum
F	Can
G	Carboy
H	Silo
I	Fiber drum
J	Bag
K	Box
L	Cylinder
M	Glass bottles or jugs
N	Plastic bottles or jugs
O	Tote bin
P	Tank wagon
Q	Rail car
R	Other

**Table III**  
**"TEMPERATURE AND PRESSURE CONDITIONS"**

CODES	Storage Conditions
	(PRESSURE)
1	Ambient pressure
2	Greater than ambient pressure
3	Less than ambient pressure
	(TEMPERATURE)
4	Ambient temperature
5	Greater than ambient temperature
6	Less than ambient temperature
7	Cryogenic conditions

### EXAMPLE:

The benzene in the main building is kept in a tank inside the building, at ambient pressure and less than ambient temperature.

Table II shows you that the code for a tank inside a building is C. Table III shows you that code for ambient pressure is 1, and the code for less than ambient temperature is 6.

Next to the "Site Location" you enter:

C (1,6) ( )  
( ) ( )

Your complete Location response for the Main Building storage location looks like this:

G-2 [Main Room] C (1,6) ( )  
[ ] ( ) ( )

Under Title III, Section 324, you may elect to withhold location information on a specific chemical from disclosure to the public. If you choose to do so:

- Leave the Non-Confidential Location section blank for each confidential location you claim.
- Attach a Tier Two Confidential Location Information Sheet. (This sheet is designed to separate confidential locations from the disclosure of other information to the public).
- Enter the name and CAS# of each "confidential" chemical.
- Enter the appropriate location and storage information, (as described for non-confidential locations, above).

### CERTIFICATION.

This must be completed by the owner or operator, or the officially designated representative of the owner or operator. Enter your full name and official title. Sign your name and enter the current date.

## APPENDIX VII

### CAMEO II HAZARDOUS MATERIALS COMPUTERIZED PROGRAM

Advance Copy

## The CAMEO<sup>TM</sup> II Manual

*Prepared by:*



Hazardous Materials Response Branch  
Ocean Assessments Division  
National Oceanic and Atmospheric Administration  
Seattle, Washington

*In collaboration with:*



Preparedness Staff  
Office of Solid Waste and Emergency Response  
U.S. Environmental Protection Agency  
Washington, D.C.

May 1988

# About CAMEO II™—An Overview

The Computer-Aided Management of Emergency Operations (CAMEO™ II) program is designed to help emergency planners and first responders both plan for, and safely handle, chemical accidents. CAMEO II contains response information and recommendations for 2,629 commonly transported chemicals; an air dispersion model to assist in evaluating release scenarios and evacuation options; and several easily adaptable databases and computational programs that address the emergency planning provisions of Title III, the Emergency Planning and Community Right-to-Know Act of 1986.

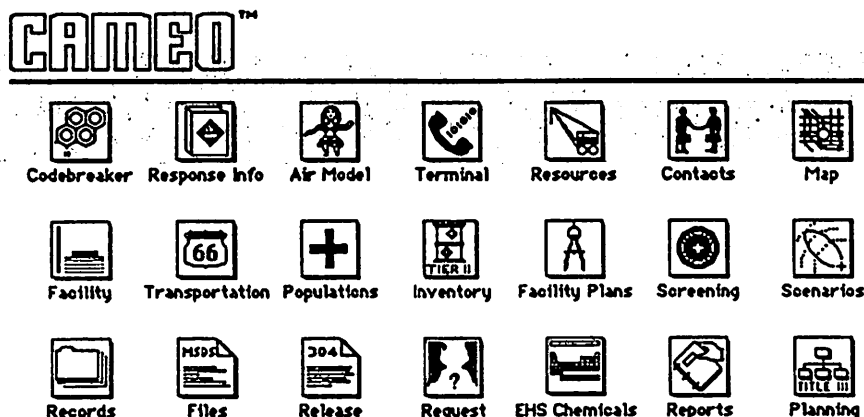


Figure 1.  
The Navigator, CAMEO II's  
main screen

CAMEO can include such diverse information as facility floor plans with chemical storage locations; contacts lists; locations of schools, hospitals, and other population concentrations; response resources; Material Safety Data Sheets; and digitized maps of the planning area, overlaid with plumes calculated by the air model.

CAMEO II requires a Macintosh Plus, SE, or II with a hard disk; Apple Computer's HyperCard 1.1; and drawing and communications software applications.

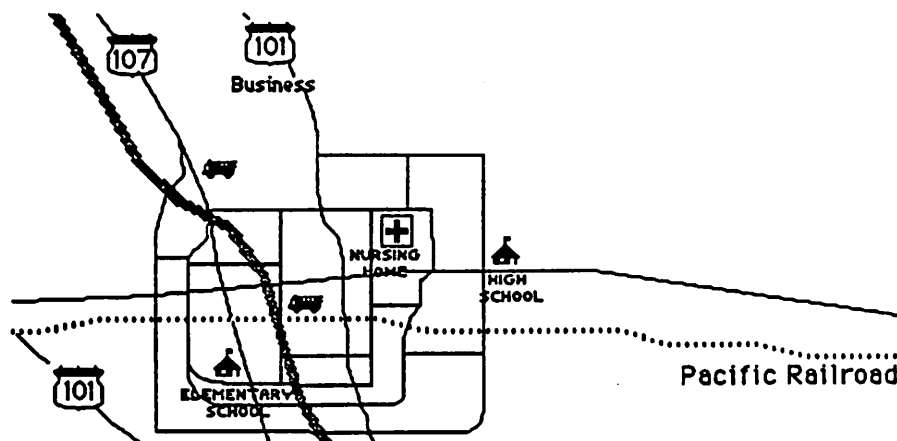
The CAMEO chemical database of 2,629 chemicals is also available from NOAA in MS-DOS format that may be used in a stand-alone application that does not include graphics, the CAMEO air model, or Title III functions.

## CAMEO Maps

You can enter CAMEO maps using one of several conventional Macintosh drawing programs.

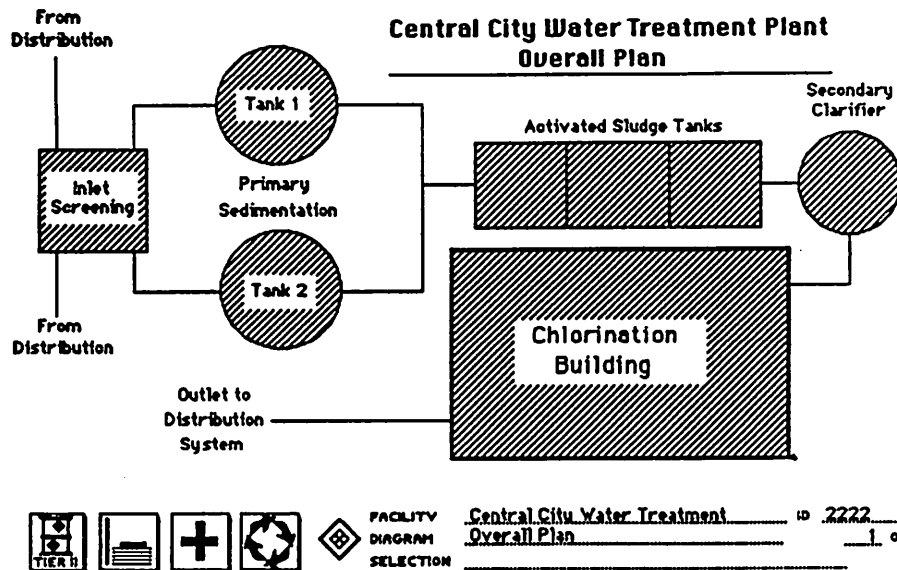
The sample map section below was digitized using a stylus and digitizing tablet. The map contains city boundaries, street names, parks, and major landmarks (Figure 2).

**Figure 2.**  
**Example of map detail**



Drawings of chemical facilities provide a close-up view of buildings, street access, and information on chemical inventories for selected locations. You may also show the interior floor plans of selected buildings (Figure 3).

**Figure 3.**  
**Sample building drawing**



There are several primary methods of entering a map into CAMEO, including sketching the map with the mouse, tracing it from an original drawing using a digitizing tablet, scanning the image with a desktop scanner, or transferring an existing electronic file from another Macintosh or a mainframe computer.

## CAMEO Maps, cont.

All maps may be linked within the computer's memory so that a first responder may quickly "zoom in" on a location of interest. Symbols on the maps provide additional detail on the facility or chemical being represented. For example, clicking on a chemical symbol from a facility floor plan shows you a card containing specific information on the facility's chemical inventory (Figure 4).

**Tier Two**

NAME Central City Water Treatment OWNER/OPERATOR City of Central City  
STREET 15437 Interstate 101 PHONE 345-7897  
CITY Central City STATE CL ZIP 87678 ADDRESS 123 Main St.  
SIC CODE \_\_\_\_\_ ID NO. 2222 CITY Central City STATE CL ZIP 87999

CAS NUMBER 7782505 ☐ FIRE  
TRADE SECRET ☐ ☒ PRESSURE  
CHEMICAL NAME: Chlorine ☒ REACTIVE  
☒ IMMEDIATE ☒ DELAYED  
PURE ☒ MIX ☐ SOLID ☐ LIQUID ☒ GAS

MAX DAILY AMOUNT (CODE) 01 DAYS ON SITE 365  
AVE DAILY AMOUNT (CODE) 01

FOR EMS CHEMICALS ONLY:  
MAX QUANTITY IN 1 VESSEL (POUNDS) 800  
CONCENTRATION (WEIGHT PERCENT) 100  
DIKED AREA (SQ FT) \_\_\_\_\_  
STORED NEAR BOILING POINT? \_\_\_\_\_  
SOLID FORM (POWDER, SOLUTION, MOLTEN) \_\_\_\_\_

EMERGENCY CONTACTS:  
NAME Smith, John TITLE Manager  
PHONE 345-7897 24 HR 345-5000  
NAME Jones, Joe TITLE Safety Mgr.  
PHONE 345-7898 24 HR 345-5000

STORAGE LOCATIONS:  
CODE LOCATION CONFIDENTIAL  
1 ☒ 124 Chlorination Building ☐  
2 ☐ \_\_\_\_\_ ☐  
3 ☐ \_\_\_\_\_ ☐  
4 ☐ \_\_\_\_\_ ☐  
5 ☐ \_\_\_\_\_ ☐  
6 ☐ \_\_\_\_\_ ☐

4/6/88 REPORTING PERIOD  
JAN. 1 TO DEC. 31, 1988.

Figure 4.  
Sample chemical facility  
information screen

## CAMEO Codebreaker

Codebreaker (Figure 5) is a chemical identification database containing 50,000 synonyms, identification numbers, and labeling conventions for 2,629 chemicals, each cross-referenced with standard names and numbers used in the transportation industry. The result is a simple and rapid way to converge on the identity of a specific chemical.

Codebreaker addresses several problems that are well-known to the first responder. Using several different references on-scene is time-consuming and awkward; confusion about the true identity of a product can lead to the use of improper guidelines and protocols. CAMEO helps to solve this problem through its compilation of synonyms and other identification data, minimizing reliance upon library references at the scene of an emergency.

Codebreaker may be activated by having the computer search its identification files for one or more characteristics, such as a chemical's label or trade name. Codebreaker can not only conduct searches based on fragments of information, such as the first four digits of a CAS number, but also can conduct multiple searches on two search criteria simultaneously (Figure 6).

Figure 5.  
Sample Codebreaker  
record

The screenshot shows the CAMEO Codebreaker interface for the chemical 1,1,1-TRICHLOROETHANE. At the top, the title 'CAMEO™ Codebreaker' is displayed next to 'FIND', 'FIND NEXT', and 'NEXT' buttons. Below the title, the chemical name '1,1,1-TRICHLOROETHANE' is shown. The record is organized into two columns of data: UN 2831, CAS 71556, FORMULA C2H3Cl3, RTECS KJ2975000, STEC 4941176, and NOAA 1629. Below this, the label 'ORM-A' is listed. A section titled 'SYNONYMS' contains a list of synonyms: 'ETHANE, 1,1,1-TRICHLORO-', 'AEROTHENE TT', and 'CF 2'. To the right of this list are up, down, and search icons. At the bottom left, it says 'PORTIONS ©CAS, 1987'.

UN	2831	CAS	71556
FORMULA	C2H3Cl3	RTECS	KJ2975000
		STEC	4941176
		NOAA	1629
LABEL ORM-A			
SYNONYMS			
ETHANE, 1,1,1-TRICHLORO-			
AEROTHENE TT			
CF 2			

Figure 6.  
Sample chemical  
search

The screenshot displays the CAMEO chemical search interface with two side-by-side search panels. Each panel has a 'Find:' section with options: '(...) Words', '(...@) Words starting with', and '(@...@) Characters'. The left panel has 'chlorine' entered in the search box and 'Name' in the 'In Field:' box. The right panel has 'gas' entered in the search box and 'Label' in the 'In Field:' box. Between the panels are buttons for 'And' (selected), 'Or', 'Find First', 'Find All' (with a mouse cursor), and 'Quit'.

<b>Find:</b> (...) Words (...@) Words starting with (@...@) Characters	<input checked="" type="radio"/> And <input type="radio"/> Or Find First Find All Quit	<b>Find:</b> (...) Words (...@) Words starting with (@...@) Characters
chlorine		gas
In Field: Name		In Field: Label

### **CAMEO Chemical Database**

The chemical database contained in CAMEO streamlines the transfer of information from expert sources to the on-scene responder. The CAMEO chemical database contains text from the most commonly used reference sources. Subjects most critical to first responders are emphasized, including personal protective measures, fire and explosion hazards, firefighting techniques, human health threats, and spill cleanup procedures.

References familiar to first responders were selected; these include the EPA *Chemical Profiles*, the U.S. Department of Transportation's *Emergency Response Guidebook*, the Association of American Railroads' *Emergency Handling of Hazardous Materials in Surface Transportation*, the U.S. Coast Guard's *Chemical Hazards Response Information System (CHRIS)*, as well as a number of other chemical references. Supplementary information, where necessary, was developed by NOAA.

### **CAMEO Air Model**

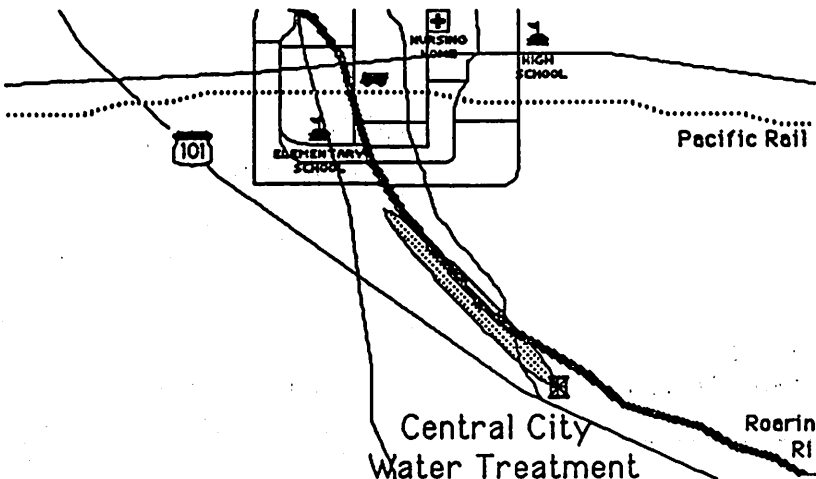
CAMEO can also help estimate downwind chemical concentrations resulting from an accident, drawing on information from a radio-controlled atmospheric station linked to the computer and its chemical database. You may also enter atmospheric information directly from the keyboard to create accident scenarios. The system uses a dispersion model based on the U.S. Environmental Protection Agency's *Workbook of Atmospheric Dispersion Estimates*.



### CAMEO Air Model *cont*

CAMEO allows a first responder to quickly estimate the extent of a plume downwind from a chemical spill. The first responder sets several "switches" on the computer screen to indicate the name of the chemical involved, the roughness of the terrain, the size or nature of the spill, etc. The "footprint" of the chemical plume is then drawn by the computer from the defined location on a CAMEO map (Figure 7).

Figure 7.  
Sample chemical plume  
"footprint"



### Using CAMEO to Comply With SARA Title III

Recent additions to the original CAMEO program allow it to be used for contingency planning and to facilitate the hazards analysis process outlined in EPA's technical guidance document for SARA Title III (Figure 8). CAMEO can be used to help define high risk areas through identification of possible accident locations and their proximity to highly sensitive areas (schools, hospitals, areas of high population density, etc.). Using data specific to a community, contingency planning efforts can focus on realistic accident simulations.

Figure 8.  
Sample hazards  
analysis card

Vulnerability/Risk Screening		SELECT CARD	NEW CARD	FIND	FIND NEXT	NEXT
FACILITY ID	2222	NAME		Central City Water Treatment		
SELECT CHEMICAL	Chlorine	CAS NUMBER		7782505		
AVERAGE DAILY QUANTITY ON-SITE (POUNDS)	2400	INITIAL SCREENING ZONE BASED ON CREDIBLE WORST CASE ASSUMPTIONS RADIUS= 9.9 MILES				
MAXIMUM DAILY QUANTITY ON-SITE (POUNDS)	3200					
MAXIMUM QUANTITY IN ONE VESSEL (POUNDS)	800					
CONCENTRATION IN WEIGHT PERCENT	100	SCREENING RISK ANALYSIS:				
PHYSICAL STATE:	Gas	LIKELIHOOD OF RELEASE: LOW MED HIGH				
		CONSEQUENCES OF RELEASE: <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>				
		OVERALL RISK: <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>				
Screening case considers release of one cylinder of chlorine. There have been no such releases in the history of the plant, and safety measures in place would indicate likelihood of release of a full chlorine cylinder to be low. Total population within potential affected area is 125,000; the consequences of such a release would be high.						
5/2/88						

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For further information on CAMEO II, call (206)526-6317 or write the CAMEO Database Manager at

NOAA/Hazardous Materials Response Branch  
7600 Sand Point Way N.E.  
Seattle, Washington 98115

## APPENDIX VIII

HAZARDOUS MATERIALS MANAGEMENT PLAN AND  
HAZARDOUS MATERIALS INVENTORY STATEMENT,  
UNIFORM FIRE CODE 1988 EDITION,  
APPENDIX II-E

# UNIFORM FIRE CODE™

1988 Edition



## APPENDIX II-E

### HAZARDOUS MATERIALS MANAGEMENT PLAN AND HAZARDOUS MATERIALS INVENTORY STATEMENT

#### 1. INTENT

This appendix contains requirements for Hazardous Materials Inventory Statements (HMIS) and for Hazardous Materials Management Plans (HMMP) which may be required by the chief pursuant to Article 80, Subsections 80.103 (d) and (e). Proprietary and trade secret information shall be protected under the laws of the state or jurisdiction having authority.

#### 2. HAZARDOUS MATERIALS INVENTORY STATEMENT (HMIS) REQUIREMENTS

(a) **When Required:** A separate HMIS shall be provided for each building including its appurtenant structures and each exterior facility in which hazardous materials are stored. The HMIS shall list by hazard class all hazardous materials stored. The HMIS shall include the following information for each hazardous material listed.

1. Generic chemical name
2. Common/trade name
3. Formula or major constituents
4. Manufacturer
5. UN (United Nations) or NA (North American) ID number
6. Manufacturer's Safety Data Sheet or equivalent
7. Maximum quantity stored at any one time. The quantity may be aggregated and reported by quantity range according to the following:

QUANTITY RANGE NUMBER	RANGE AMOUNTS
1	Up to and including 500 pounds for solids, 55 gallons for liquids and 200 cubic feet at NTP for compressed gases.
2	Between 500 and 5,000 pounds for solids, 55 and 550 gallons for liquids and 200 to 2,000 cubic feet at NTP for compressed gases.
3	Between 5,000 and 25,000 pounds for solids, 550 and 2,750 gallons for liquids and 2,000 to 10,000 cubic feet at NTP for compressed gases.
4	Between 25,000 and 50,000 pounds for solids, 2,750 and 5,500 gallons for liquids and 10,000 to 20,000 cubic feet at NTP for compressed gases.
5	More than 50,000 pounds for solids, 5,500 gallons for liquids and 20,000 cubic feet at NTP for compressed gases.

**EXCEPTIONS:** 1. The following elemental metals need not be considered hazardous materials for the purposes of this appendix unless they are stored in a friable, powdered or finely divided state: chromium, copper, lead, nickel and silver.

2. Consumer products packaged for distribution to, and use by, the general public and commercial products used for janitorial or minor maintenance purposes (such as paint thinner or wax strippers).

3. The chief may exempt materials from the requirements of this article when it has been satisfactorily demonstrated that the material in quantity or condition in which it is stored does not present a potential danger to the public health, safety or welfare.

(b) **Changes to HMIS.** An amended HMIS shall be provided within 30 days of the storage of any hazardous materials which changes or adds a hazard class or which is sufficient in quantity to cause an increase in the quantity which exceeds 5 percent for any hazard class.

### **3. HAZARDOUS MATERIALS MANAGEMENT PLAN (HMMP) REQUIREMENTS**

(a) **General.** Any person, firm or corporation applying for a permit to store hazardous materials shall submit an HMMP standard form or short form in accordance with this section and provide a narrative description of the operations and processes taking place at the facility.

(b) **Information Required.** The HMMP standard form shall include the following:

- A. **General site plan.** A general site plan drawn at a legible scale which shall include, but not be limited to, the location of all buildings, exterior storage facilities, permanent access ways, evacuation routes, parking lots, internal roads, chemical loading areas, equipment cleaning areas, storm and sanitary sewer accesses, emergency equipment and adjacent property uses. The exterior storage areas shall be identified with the hazard class and the maximum quantities per hazard class of hazardous materials stored. The chief may also require information regarding the location of wells, flood plains, earthquake faults, surface water bodies and general land uses within one mile of the facility boundaries.
- B. **Building floor plan.** A building floor plan drawn to a legible scale which shall include, but not be limited to, all hazardous materials storage facilities within the building and shall indicate rooms, doorways, corridors, exits and evacuation routes. Each hazardous materials storage facility shall be identified on the plan with the hazard class and quantity range per hazard class of the hazardous materials stored.
- C. **Hazardous materials handling.** Information showing that all activities involving the handling of hazardous materials between the storage areas and manufacturing processes on site are conducted in a manner to prevent the accidental release of such materials.
- D. **Chemical compatibility and separation.** Information showing procedures, controls, signs or other methods used to ensure separation and

protection of stored materials from factors which may cause accidental ignition or reaction of ignitable or reactive materials.

**E. Monitoring program.** Information including, but not limited to, the location, type, manufacturer's specifications (if applicable) and suitability of monitoring methods for each storage facility when required.

**F. Security precautions.** A security program for preventing unauthorized entry of persons or animals into the storage facilities and reducing the potential for theft, sabotage or accidental discharge.

**G. Hazard labeling and warning signs.** A description of warning markings on containers, storage areas, storage structures, surrounding fences, gates and access ways acceptable to the chief.

**H. Inspection and record keeping.** Schedules and procedures for inspecting all monitoring equipment, safety and emergency equipment. The permittee shall develop and follow a written inspection procedure acceptable to the chief for inspecting the facility for malfunctions and deterioration, operator's error, poor housekeeping practices and discharges which may be causing, or may lead to, unauthorized discharges of hazardous materials. These inspections must be at a frequency appropriate to the possible deterioration of equipment and facilities and to the probability of human error and of sufficient frequency to detect problems prior to a discharge. An inspection check sheet shall be developed to be used in conjunction with routine inspections. The check sheet shall provide for the date, time and location of inspection, note any problems, dates and times of any corrective actions taken, name of inspector and the countersignature of the designated safety manager for the facility.

**I. Employee training.** A training program appropriate to the types and quantities of materials stored or used shall be conducted to prepare employees to safely handle hazardous materials on a daily basis and during emergencies. The training program shall include:

- (i) Instruction in safe storage and handling of hazardous materials including maintenance of monitoring records.
- (ii) Instruction in emergency procedures for leaks, spills, fires or explosions, including shutdown of operations and evacuation procedures.
- (iii) Record-keeping procedures for documenting training given to employees.

**J. Emergency equipment.** A description of emergency equipment and testing and maintenance procedures used to assure operation and availability.

**(c) HMMP Short Form—(Minimal Storage Site).** A facility shall qualify as a minimal storage site if the quantity of each hazardous material stored in one or more facilities in an aggregate quantity for the facility is 500 pounds or less for solids, 55 gallons or less for liquids, or 200 cubic feet or less at STP for compressed gases. The applicant for a permit for a facility which qualifies as a minimal storage site may opt to file the short form HMMP. Such plan shall include the following components:

- A. General facility information.
- B. A simple line drawing of the facility showing the location of storage facilities and indicating the hazard class or classes and physical state of the hazardous materials being stored.
- C. Information describing that the hazardous materials will be stored and handled in a safe manner and will be appropriately contained, separated and monitored.
- D. Assurance that security precautions have been taken, employees have been appropriately trained to handle the hazardous materials and react to emergency situations, adequate labeling and warning signs are posted, adequate emergency equipment is maintained, and the disposal of any hazardous materials will be in an appropriate manner.

#### **4. MAINTENANCE OF RECORDS**

All records required by this appendix shall be maintained by the permittee for a period not less than three years. Said records shall be made available to the chief upon request.



**(STANDARD FORM—SAMPLE FORMAT)**  
**HAZARDOUS MATERIALS MANAGEMENT PLAN**

**INSTRUCTIONS:** Type or print legibly. Provide complete responses for each section. Incomplete HMMP's will be returned.

**SECTION I: FACILITY DESCRIPTION**

**PART A—GENERAL INFORMATION**

1. Business Name: \_\_\_\_\_  
 Address: \_\_\_\_\_ Phone: \_\_\_\_\_
2. Executive Officer: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Title: \_\_\_\_\_ Phone: \_\_\_\_\_
3. Principal Contact: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Title: \_\_\_\_\_ Phone: \_\_\_\_\_
4. Emergency Contact: \_\_\_\_\_  
 Day Phone: \_\_\_\_\_ Night Phone: \_\_\_\_\_
5. Property Owner: \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_
6. Principal Business Activity: \_\_\_\_\_
7. Occupancy Class: (per U.B.C.; Example, B-2 or H-2) \_\_\_\_\_
8. Number of employees: \_\_\_\_\_ 9. Number of shifts: \_\_\_\_\_
10. Hours of Operation: \_\_\_\_\_
11. Other hazardous-materials-related permits: (Example: Permits from Department of Health, Regional Water Quality Control Board, Water Pollution Control Plant, etc.)  
 List permit, agency and permit number: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
12. General land uses within one mile:      North      South      East      West  
 13. Adjacent property use:                      North      South      East      West
14. Special land uses within one mile: \_\_\_\_\_  
 \_\_\_\_\_
15. Declaration (Must be signed by executive officer or his authorized representative listed above) I certify that the information above and on the following parts is true and correct to the best of my knowledge.  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Title: \_\_\_\_\_ Print name: \_\_\_\_\_  
 \_\_\_\_\_

**PART B—GENERAL FACILITY DESCRIPTION (Site Plan)**

Provide a site plan on 8 1/2- by 11-inch paper showing the location of all buildings and structures, chemical loading areas, parking lots, internal roads, storm and sanitary sewers, and wells. Indicate the appropriate scale, northern direction and date the drawing was completed.

**PART C—FACILITY STORAGE MAP (Confidential Information)**

1. Provide a floor plan of each building on 8 1/2- by 11-inch paper with appropriate scale and northern direction, showing the location of each storage facility (see definition on page 1). Mark map clearly "Confidential—Do Not Disclose."
2. Identify each storage facility with an ID number, letter, name or symbol.
3. Show the following:
  - a. Accesses to each storage facility.
  - b. Location of emergency equipment.
  - c. Identify the general purpose of other areas within the facility.
  - d. Location of all tanks.

## APPENDIX II-E

## UNIFORM FIRE CODE

4. Provide the following on the map or in a map key or legend:
- a. The requested permit quantity for each storage facility by hazard class.
  - b. A list of hazardous materials for each storage facility including chemical name, common or trade name, and hazard class. (Hazard Class is defined in Article 80, Division II.)
  - c. A list of waste hazardous materials for each storage facility identified as wastes (ex. "waste oil"). Include the hazard class.
  - d. List the contents and capacity limit of all tanks at each facility and indicate whether they are above ground.
  - e. List separately any radioactives, cryogenics, and compressed gases.
  - f. If you are claiming any hazardous materials to be trade secrets, you must provide that information in a coded manner (together with its key).

### SECTION II: HAZARDOUS MATERIALS INVENTORY STATEMENT (HMIS)

Although the HMIS is a part of the Hazardous Materials Management Plan, it may be a separate document. This section (Section II), when completed will satisfy the HMIS requirement.

**(SAMPLE FORMAT)**  
**HAZARDOUS MATERIALS INVENTORY**  
**STATEMENT**  
**(HMIS) (Public Document)**

(Complete a separate form for each facility).

1. Page \_\_\_\_\_ of \_\_\_\_\_ Pages

2. Business Name: \_\_\_\_\_

3. Date: \_\_\_\_\_

4. Facility Address: \_\_\_\_\_

5. Facility ID: \_\_\_\_\_

(As indicated on your facility storage map.)

\_\_\_\_\_  
(location of this storage facility)

6. Type of Storage ☐ Aboveground ☐ Waste Materials  
(Check all that apply for this facility.) ☐ Underground ☐ Waste Treatment System

- |     | Yes  | No                       |   |
|-----|--|--------------------------|---|
| 7.  | <input type="checkbox"/>   | <input type="checkbox"/> | Do you store any carcinogens? (If yes, attach a list of all carcinogens, the quantity range and a copy of the Carcinogen Registration Form for each)  |
| 8.  | <input type="checkbox"/>   | <input type="checkbox"/> | Do you claim any hazardous materials to be trade secrets? You must also provide on this form the number of materials claimed to be trade secrets, their hazard class, and quantity range for each hazard class. |
| 9.  | Use the table on the following page to alphabetically list hazardous materials stored at each storage facility. List all wastes separately and precede the chemical name with "waste", e.g. "waste oil." (DOT hazard class UN or NA number can be obtained from Code of Federal Regulations, Title 49, Part 172.101, Hazardous Materials Table, or shipping papers for your chemical and wastes. |                          |   |
| 10. | Declaration (Must be signed by executive officer or his authorized representative )<br>Under penalty of perjury, I declare that the information provided as part of this hazardous materials inventory statement is true and correct.  |                          |   |

Print Name: \_\_\_\_\_ Signature: \_\_\_\_\_

Print Title: \_\_\_\_\_ Date Signed: \_\_\_\_\_

**NOTE: Provide Material Safety Data Sheets for all materials listed.**  
(Use additional sheets if necessary.)

[illegible]

1. For each storage facility described the method used to separate and protect noncompatible material (Example: 20-foot distance, one-hour separation, approved storage cabinets, etc.). This listing may be clarified with a simple diagram where appropriate. See specific requirements in Article 80, Division III.
2. List the materials used for the primary and secondary containment of any stored chemicals (Example: Teflon for corrosives). Verify that they are adequate and impervious to the chemicals stored by attaching chemical resistance charts and/or other technical data.

1. Provide a copy of your written procedures for reporting discharges. This is to include your internal notification plan and decision-making criteria.  
**NOTE:** The chief should be notified of all *reportable* discharge occurrences immediately, in accordance with Section 80.104 (c).
2. For each storage facility provide the following:
  - a. Describe the location (reference facility map if appropriate).
  - b. Describe monitoring methods used to detect leaks or spills.
  - c. Type and manufacturer of any monitoring equipment.
  - d. Monitoring frequency for that storage facility.
  - e. Maintenance frequency of monitoring equipment.

1 Provide examples of your routine inspections check list or log. The log should include: date and time of inspection, date and time of corrective action, corrective action taken, name of inspector and countersignature of responsible official.

2. Provide examples of your unauthorized discharge log. Include: date and time of any discharge, type of material discharged, amount of material discharged identify if incident was a reportable (or recordable discharge, cause of discharge, corrective actions taken, time and date of corrective action, methods of disposal of discharged material, and signature and title of responsible official.

#### SECTION VI: EMERGENCY EQUIPMENT

The following information must be provided for each storage facility:

1. Indicate the type of emergency equipment available and its location (access and distance from the storage facility, etc.).

**NOTE:** This section may be coded with the facility storage map—Section I, Part C, for large facilities.

2. Provide a brief description of any testing or maintenance programs for the available emergency equipment.
3. Indicate that U.F.C. Standard No. 79-3 hazard identification placarding is provided for each storage area.
4. Indicate that substances in any storage containers are adequately identified.
5. Indicate that emergency responses procedures are posted in a conspicuous location near each storage facility.

#### SECTION VII: WASTE-HANDLING PROCEDURES

List all procedures used at each facility for the proper disposal of all hazardous wastes. Provide a brief explanation of the method used, when appropriate. Examples of waste-handling procedures include: disposal at an approved hazardous waste-disposal facility, direct discharge to sanitary sewer, recycle, pretreatment discharge to sanitary sewer, etc.

**NOTE:** A permit may be required from one or more agencies before implementing certain disposal methods. Contact the appropriate agency for more information.

APPENDIX IX

HAZARDOUS INDUSTRY  
FIRE PROTECTION IMPACT STATEMENT

# DRAFT

## HAZARDOUS INDUSTRY FIRE PROTECTION IMPACT STATEMENT

Name of company: \_\_\_\_\_

Name of parent company or subsidiaries: \_\_\_\_\_

\_\_\_\_\_

Specific project address/location: \_\_\_\_\_

\_\_\_\_\_

Type of industry: \_\_\_\_\_

Defense contractor subject to DoD safety guidelines? \_\_\_\_\_

Specific names of materials/chemicals used in processes: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(Attach SARA Title III, Tier II reports) \_\_\_\_\_

Natural gas or LPG service to facility? \_\_\_\_\_ Type of Installation: \_\_\_\_\_

\_\_\_\_\_

Motor fuel storage/dispensing system on site: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Storage capacity for each fuel type: \_\_\_\_\_

\_\_\_\_\_

Square footage and use of each building on premises (please include site map clearly identifying each building): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Identify those structures which feature (1) automatic fire extinguishing systems; (2) fire alarm systems; (3) smoke detectors and clearly identify each type of system: (are alarms transmitted to local F.D.?) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Number of hydrants at facility: \_\_\_\_\_

Flow test data for each hydrant (please include hydrant location map)

Which buildings include hose cabinets with standpipes? \_\_\_\_\_

Industrial fire brigade? \_\_\_\_\_ Type of response equipment: \_\_\_\_\_

Number of personnel: \_\_\_\_\_

LOCAL FIRE DEPARTMENT PROFILE: Type of dispatch system: \_\_\_\_\_

Number of (a) full time personnel \_\_\_\_\_ (b) part-time personnel \_\_\_\_\_

(c) volunteer personnel \_\_\_\_\_ Average personnel response to alarms

\_\_\_\_\_. Number of engines \_\_\_\_\_ ladder/truck companies \_\_\_\_\_

heavy rescue \_\_\_\_\_ light rescue \_\_\_\_\_ pumper/brush trucks \_\_\_\_\_

hazardous materials response equipment \_\_\_\_\_ Number of personnel

trained in hazardous materials response (include level of training for each grouping) \_\_\_\_\_

Average response time to this location: \_\_\_\_\_

Distance from nearest fire station to this location: \_\_\_\_\_

Average response time to this location for 2nd alarm \_\_\_\_\_

Nearest mutual aid department: \_\_\_\_\_ Response time \_\_\_\_\_

Type of equipment available through mutual aid department(s) \_\_\_\_\_

ENVIRONMENTAL CONSIDERATIONS: Identify potentials for introduction of materials into (a) sewer systems (b) rivers/streams/drainage ditches or groundwater (c) predominant winds to consider in event of plume \_\_\_\_\_



## APPENDIX X

FIRE PROTECTION CODES AND REGULATIONS  
ADOPTED BY NEVADA CITIES AND COUNTIES

JUNE 6, 1988

**FIRE PREVENTION CODES  
NEVADA CITIES & COUNTIES**

	Uniform Fire Code	National Fire Codes (NFPA)	Municipal or County Code	Transportation in Local Code	Manufacture in Local Code	Storage in Local Code
Boulder City	X	X	X			X
Callente			X			X
Carlin	X		X	X		X
Carson City	X		X		X	X
Churchill County	X	X				
Clark County	X		X	X		X
Douglas County	X		X			X
Elko	X		X	X	X	X
Elko County	X		X		X	
Ely	X		X			
Esmeralda County			NOT AVAILABLE			
Eureka County			NOT AVAILABLE			
Fallon	X		X	X		X
Henderson	X	X	X	X		X
Humboldt County			NOT AVAILABLE			
Lander County			NOT AVAILABLE			
Las Vegas	X	X	X	X	X	X
Lincoln County			X			X
Lovelock	X		X			
Lyon County	X					
Mineral County	X	X	X		X	
North Las Vegas	X	X	X	X		X
Nye County			NOT AVAILABLE			
Pershing County			NOT AVAILABLE			
Reno	X	X	X	X	X	X
Sparks	X		X	X	X	X
Storey County	X		X			X
Yerington	X		X		X	
Washoe County	X		X		X	X
Wells		X	X	X		X
White Pine County	X		X			X
Winnemucca	X		X			X
Nevada Division of Forestry	X					
Nevada State Fire Marshal	X	X				

\* The above information as provided by local governmental agencies to the Nevada Supreme Court Law Library.

\*\* Some of the above represent only partial adoption of complete codes.

\*\*\*Adoption of codes in some jurisdictions is done through official minutes of meetings and not necessarily codified.

## APPENDIX XI

TOXICOLOGY AND EMERGENCY PLANNING,  
U.S. ENVIRONMENTAL PROTECTION AGENCY

# TOXICOLOGY AND EMERGENCY PLANNING

Gerald F. S. Hiatt, Ph.D.

U.S. EPA, Region IX

## DOSE-RESPONSE RELATIONSHIP

Dose is the most important concept in toxicology, because it determines the extent and severity of any reaction developing from a chemical exposure.

"All things are poisons...the right dose differentiates a poison and a remedy."

Paracelsus (1493-1541)

Dose: how much (amount) of a chemical to which one is exposed. (It is often also important to know over what period of time the exposure occurs.)

- With increasing dose there will be an increase in the severity of response in any one individual or an increase in the number of individuals within a population who respond.
- For most chemicals there is dose below which no effect is produced in most individuals = Threshold Dose.

### Blood Alcohol

(mg/dl)

50 - 150

150 - 300

300 - 500

500+

### Effects

Incoordination,  
Slowed reactions  
Blurred vision

Staggering  
Slurred speech

Stupor  
Convulsions

Coma  
Death

Another way of expressing the concept of dose is that for every chemical there are some exposure conditions under which it is "toxic" and others under which it is "non-toxic".

Chemicals that are more "toxic" produce adverse effects at lower doses (smaller amounts or shorter periods of exposure) than other chemicals.

## ACUTE TOXICITY

**Toxicity:** Ability of a chemical to cause injury in a specific, repeatable manner, usually by interaction with a physiologic process in the body (as opposed to corrosivity or irritancy, which are non-specific direct chemical effects at the site of contact).

- similar effects occur in all individuals exposed to the same chemical.
- some individuals may be more susceptible than others.

Single or very short-term exposures produce acute effects:

- high concentration, short-term exposures.

Humans are much more resistant to the effects of chemicals if the exposure is short, therefore much higher concentrations can be tolerated for acute exposures without experiencing permanent damage. One explanation for this tolerance is the ability of the body to repair minor damage after the exposure has ceased.

Repeated or long-term exposures produce chronic effects:

- low concentration, long-term exposures.

Continual or repeated exposures can produce effects from much lower concentrations than are damaging in acute exposures. It is thought that continuing minor injuries compound over time, especially with no opportunity for repair.

The effects (symptoms) of acute and chronic exposures are often very different from one another. They usually involve different organ systems or different biochemical processes in the body.

- Chlorinated solvents (chloroform, carbon tetrachloride) produce excitability, dizziness and narcosis (similar to drunkenness) upon acute, high level inhalation exposure. Chronic, lower level exposures can produce liver damage without any of the acute symptoms.
- Acute intoxication with arsenic (orally) produces effects on the gastrointestinal tract (GI): vomiting, severe diarrhea, whereas chronic exposure to arsenic produces skin cancer, liver damage and affects formation of blood components.

A chemical may have different potencies regarding its acute and chronic toxicities. Thus a chemical which is acutely very toxic, may have low chronic toxicity and vice-versa.

Industrial accidents usually present a risk from acute exposures because very large amounts of a chemical can be released over a short period of time. Therefore, to compare the toxicity of different chemicals with regard to potential for harm from an industrial accident, one looks at measures of acute toxicity:

- LD<sub>50</sub>: estimated lethal dose for one-half (50%) of an exposed population, usually based on oral dosing in laboratory animals ("oral LD<sub>50</sub>"). The LD<sub>50</sub> provides a means to compare the toxicity potencies of different chemicals.
- LC<sub>50</sub>: estimated lethal airborne concentration for one-half (50%) of an exposed population when the route of exposure is inhalation.

There is an inverse relationship between toxicity and the LD<sub>50</sub> or LC<sub>50</sub>; more highly toxic chemicals have lower LD<sub>50</sub> or LC<sub>50</sub> values. This is because it takes less of a highly toxic chemical to produce an effect.

Other, less reliable, measures of acute toxicity include:

- LD<sub>10</sub>: low lethal dose.
- IDLH: Immediately Dangerous to Life & Health level (NIOSH).

Chemicals with acute LD<sub>50</sub> values less than 50 mg/kg are required to be labelled as "poisonous".

	Acute LD <sub>50</sub> (mg/kg)
Ethyl alcohol	10,000
Sodium Chloride	4,000
Ferrous Sulfate	1,500
Morphine	900
Phenobarbital	150
Strychnine	2
Nicotine	1
Tetrodotoxin	0.1
Dioxin (TCDD)	0.001
Botulinum toxin	0.00001

Acute LD<sub>50</sub> values are the most common toxicity data available on chemicals because the test is quick and inexpensive. It is sometimes difficult to extrapolate to other types of toxicity (i.e., chronic) and other routes of exposure.

## SALT

The importance of dose as it relates to toxicity is probably best illustrated by the case of common table salt (sodium chloride).

- Salt is acutely toxic, with an oral LD<sub>50</sub> = 4000 mg/kg (since it is excluded from the Hazardous Substances Labeling Act it does not require a "Caution: Harmful" label).
- A lethal dose of salt for a small child would be on the order of 2 tablespoons and deaths have occurred in children.
- Chronic high salt intake is toxic to the circulatory system and kidney, producing high blood pressure, which can be lethal.

However, salt is essential for life; without small amounts of salt in our daily diet, we would not be able to live.

## **INHALATION EXPOSURE:**

There are 3 main routes by which a chemical can enter the body to produce a toxic effect:

- inhalation via the lungs.
- penetration across the skin following direct contact.
- oral ingestion.

Most chemicals are not equally toxic by all 3 routes of exposure.

For most chemicals, inhalation presents the greatest hazard potential.

- intact skin is an effective barrier to most chemicals.
- lungs usually offer the least resistance to penetration of chemicals.

Chemicals are readily absorbed by inhalation exposure because the lung is designed to promote absorption from the air into the body (as opposed to the skin which is designed to prevent absorption from the air into the body). It is a delicate structure of large surface area:

- The surface of the lung is only one cell thick in most spots (the skin is many cell layers thick).
- Total lung surface area = 750 square feet (total skin surface area = 20 square feet).

Chemicals that are absorbed by the lungs quickly enter the blood stream and are circulated to the rest of the body.

Most toxic chemical accidents affecting surrounding communities involve inhalation exposures to the released chemical. Inhalation exposures occur to chemicals in three physical states:

- gases, usually released from a pressure vessel.
- vapors that have evaporated from liquid spills.
- particulates, solid particles small enough to become airborne ("dusts, mists, fumes").

Meteorological conditions (temperature, wind, humidity) can greatly affect the dispersion of these airborne chemicals and can produce changes in physical state.



Doses for inhalation exposures are expressed as the concentration of the toxic chemical in the atmosphere. The actual amount of the chemical entering any person's body will depend on factors unique to the individual and the exposure situation:

- respiration rate (dependent on activity level).
- integrity of the respiratory tract (state of health).

Therefore, for accurate emergency planning, one must be able to predict:

- concentration of the released chemical in air.
- duration of exposure (minutes-hours-days).
- physical form of the chemical.

One must then relate these factors to the known toxicology based on:

- toxic dose.
- route of exposure.

## TOXICOLOGICAL DEFINITIONS OF "HAZARDOUS"

Method of Hodge & Sterner:

### ORAL LD50 PROBABLE HUMAN

<u>CATEGORY</u>	<u>(mg/kg)</u>	<u>LETHAL DOSE</u>	<u>EXAMPLE</u>
Extremely Toxic	≤1	Taste	Nicotine
Highly Toxic	1-5	Teaspoon	Parathione
Moderately Toxic	50-500	Ounce	DDT
Slightly Toxic	500-5000	Pint	Salt
Practically Nontoxic	5000-15,000	Quart	Ethanol
Relatively Harmless	>15,000	>1 Quart	Mineral Oil

## UNITS

Many different systems of units are used in toxicology; it is important for regulators and planners to always be aware of the units in which a dose or level of exposure are expressed. Some common dosage units (most are metric):

- Oral exposures:
  - milligrams/kilogram (mg/kg): milligrams of chemical administered per kilogram of body weight.
- Inhalation exposures:
  - milligrams/liter (mg/l) = milligrams of chemical present in one liter of air.
  - milligrams/cubic meter (mg/cm<sup>3</sup>): milligrams of chemical present in one cubic meter of air.
  - parts-per-million (ppm): number of molecules of chemical present in one million molecules of air (approx.).

## REFERENCES:

Ottoboni, M.A.: The Dose Makes the Poison, A Plain-Language Guide to Toxicology. Vincente Books (P.O. Box 7388, Berkeley, CA 94707), 1984.

Klaassen, C. D.; Amdur, M. O.; Doull, J.: Casarett and Doull's Toxicology, The Basic Science of Poisons, 3<sup>rd</sup> Ed. Macmillan, New York, 1986.

FIG. 3 Dose-Response Curve

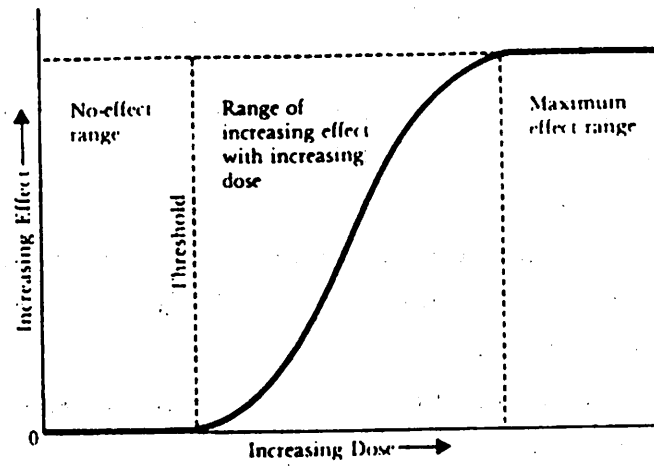
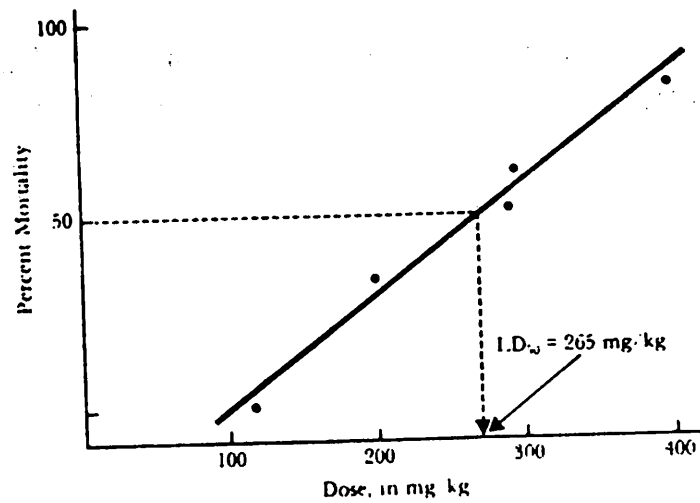


FIG. 1 Acute Dose-Mortality ( $LD_{50}$ ) Curve

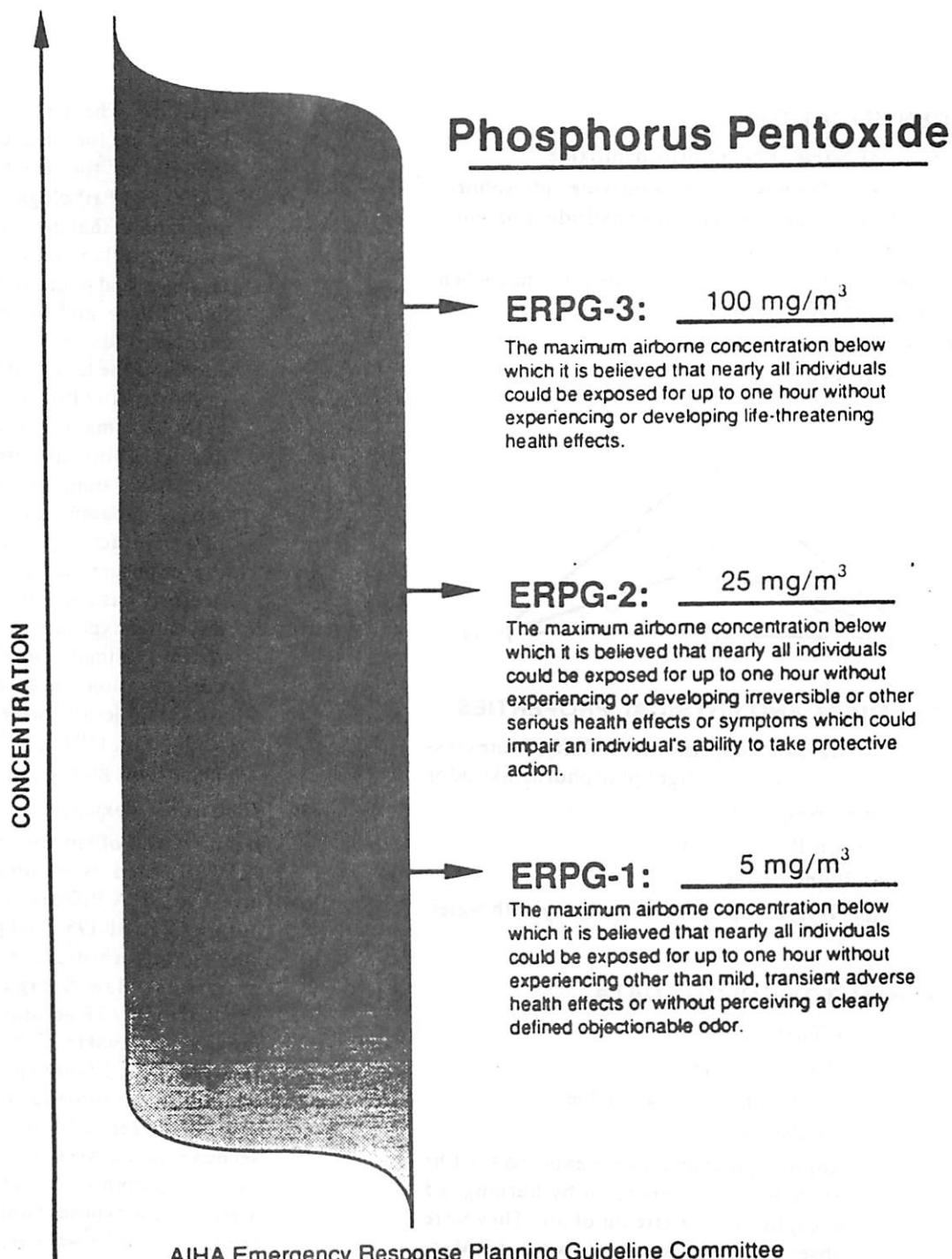


## APPENDIX XII

EMERGENCY RESPONSE PLANNING GUIDELINES,  
AMERICAN INDUSTRIAL HYGIENE ASSOCIATION

# EMERGENCY RESPONSE PLANNING GUIDELINES

AMERICAN  
INDUSTRIAL  
HYGIENE  
ASSOCIATION



AIHA Emergency Response Planning Guideline Committee  
475 Wolf Ledges Parkway, Akron OH 44311-1087

Date: 10/14/87

# EMERGENCY RESPONSE PLANNING GUIDELINE

## PHOSPHORUS PENTOXIDE

(1988)

ERPG-3: 100 mg/m<sup>3</sup>

ERPG-2: 25 mg/m<sup>3</sup>

ERPG-1: 5 mg/m<sup>3</sup>

### I. IDENTIFICATION

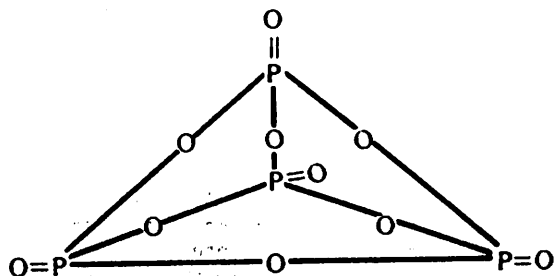
Chemical Name: Phosphorus pentoxide

Synonyms: Diphosphorus pentoxide, phosphoric acid anhydride, phosphoric anhydride, and phosphoric oxide, P<sub>2</sub>O<sub>5</sub>

Formation: Phosphorus pentoxide is formed when phosphorus is burned

CAS Number: 1314-56-3

Chemical Structure:



### II. CHEMICAL AND PHYSICAL PROPERTIES

Physical State and Appearance: A fluffy, white crystalline powder with a slight phosphorus-like odor

Molecular Weight: 142

Sublimation Point: 347°C

Melting Point: 563°C

Stability: Hygroscopic; reacts violently with water

### III. ANIMAL TOXICOLOGY DATA

#### A. Acute Toxicity

##### 1. Oral, Skin, Eye

No information is available.

##### 2. Inhalation

Adult male animals were exposed for 1 hr to P<sub>2</sub>O<sub>5</sub> smoke generated by burning red phosphorus in a stream of air. They were observed for 14 days post-exposure. Most deaths occurred during or within 24 hr of

exposure. The 1-hour LC<sub>50</sub> values were 1220 mg/m<sup>3</sup> for rat, 270 mg/m<sup>3</sup> for mouse, 1690 mg/m<sup>3</sup> for rabbit and 60 mg/m<sup>3</sup> for guinea pig. Pathologic observations of rats and rabbits that died from P<sub>2</sub>O<sub>5</sub> exposure included inflammation and necrosis of the laryngeal and tracheal mucosa; congestion, hemorrhage and edema of the tracheal mucosa; and congestion, hemorrhage and edema of the lungs. Mice that died during or shortly after P<sub>2</sub>O<sub>5</sub> exposure had minimal pathologic manifestations; those that died during the postexposure observation period had lesions similar to those of the rats and rabbits. Inflammation was found in the respiratory tract of guinea pigs that died during exposure. Laryngotracheal epithelial necrosis was noted in guinea pigs killed 14 days after exposure. The author concluded that, in animals killed after 14 days, the concentrations not associated with respiratory tract lesions were 450 mg/m<sup>3</sup> for rat and rabbit, 110 mg/m<sup>3</sup> for mouse and < 35 mg/m<sup>3</sup> for guinea pig.<sup>(1)</sup>

#### B. Subchronic Toxicity

Health effects of red phosphorus/butyl rubber (RP/BR) used as an obscurant smoke were investigated. A P<sub>2</sub>O<sub>5</sub> aerosol was produced by burning RP/BR (95% red phosphorus with 5% butyl rubber) in hydraulic extrusion-combustion generators. Male Sprague-Dawley rats were exposed to RP/BR aerosol mass concentrations ranging from 300 to 1200 mg/m<sup>3</sup>. Initially rats received single 3.5-hr exposures to 1000 mg/m<sup>3</sup> of RP/BR. In subsequent studies the animals inhaled the aerosols for 2.25 hr/day on 4 consecutive days a week for 4 and 13 weeks. Biological endpoints were examined within 1 hr after the last exposure and for selected groups from the 4- or 13-week studies also after 2 or 8 weeks of recovery, respectively. Pulmonary bac-

tericidal activity to inhaled  $^{35}\text{S}$ -K. pneumoniae was depressed after the acute and the 13-week exposures. Pulmonary free cells collected by lavage (96%–99% macrophages) generally showed decreasing trends in total numbers, increased ATP levels, and decreased ectoenzyme activity for 5 nucleotidase. Changes in other ectoenzyme activities were not consistent. In vitro phagocytosis of 51CR-RBCs was decreased following a single exposure only. Terminal broncheolar fibrosis was observed in all rats after 4- and 13-week exposures to  $\geq 0.75 \text{ mg/L}$  of RP/BR. The severity of the lesions increased with the severity of the exposure conditions. Except for the fibrosis most changes were reversible.<sup>(12)</sup>

- C. Carcinogenic and Mutagenic Potential  
No information is available.
- D. Developmental and Reproductive Toxicity  
No information is available.

#### IV. HUMAN EXPERIENCE

Human experience data are anecdotal and seem to be derived from a common source since the data from several references are virtually identical. Phosphorus pentoxide is considered to be extremely irritating to eyes, skin and mucous membranes and corrosive to these surfaces after prolonged exposures at high levels. The phosphoric acid hydrolysis product is reported to be less harmful than sulfuric acid.<sup>(3)</sup> Particles of solid  $\text{P}_2\text{O}_5$  react vigorously upon contact with the eye, and small amounts may cause permanent opacities of the cornea.<sup>(4)</sup>

A United States Public Health Service-sponsored study, performed prior to 1958, indicated that while 50–100  $\text{mg/m}^3$  is intolerable to unacclimated individuals, workers accustomed to  $\text{P}_2\text{O}_5$  exposure reportedly can endure "... perhaps up to 100  $\text{mg/m}^3$  without difficulty."<sup>(5,6)</sup> Concentrations of 3.6 to 11.3  $\text{mg/m}^3$  have caused irritation (coughing) in unacclimated workers but were tolerated. Concentrations of 0.8 to 5.4  $\text{mg/m}^3$  were noticeable but not uncomfortable.<sup>(6,7)</sup>

No human mortality data have been reported in the literature.

#### V. CURRENT OCCUPATIONAL AND EMERGENCY EXPOSURE GUIDELINES

No ACGIH TLV®, AIHA WEEL, or OSHA PEL have been established.

#### VI. RECOMMENDATIONS AND RATIONALE

##### A. ERPG-3: 100 $\text{mg/m}^3$

It is believed that 100  $\text{mg/m}^3$  is the maximum airborne concentration to which nearly all individuals could be exposed for about one hour without experiencing or developing life-threatening health effects. This is based on a report on workplace experience that indicated that exposure to  $\text{P}_2\text{O}_5$  at 100  $\text{mg/m}^3$  has produced intolerable irritation in unacclimated individuals but no reported deaths or life-threatening effects.<sup>(10)</sup>

Reports of deaths in guinea pigs at 52–80  $\text{mg/m}^3$  were not considered relevant to human exposures because of the known high sensitivity of the guinea pig to irritants. The  $\text{LC}_{50}$  in the mouse (271  $\text{mg/m}^3$ ), rat (1217  $\text{mg/m}^3$ ), and rabbit (1689  $\text{mg/m}^3$ ) were considered to be more relevant to man<sup>(11)</sup> as were studies of rats exposed to red phosphorus/butyl rubber combustion products at  $> 750 \text{ mg/m}^3$  for 4 or 13 weeks with no resulting mortality.<sup>(12)</sup>

##### B. ERPG-2: 25 $\text{mg/m}^3$

It is believed that 25  $\text{mg/m}^3$  is the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hr without experiencing or developing irreversible or other serious adverse health effects or symptoms that could impair their ability to take protective action. This is based on a report of workplace experience that suggested that concentrations greater than 25  $\text{mg/m}^3$  would be expected to cause respiratory tract irritation, coughing, and eye irritation.<sup>(6)</sup>

##### C. ERPG-1: 5 $\text{mg/m}^3$

It is believed that 5  $\text{mg/m}^3$  is the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hr without experiencing or developing effects more serious than slight respiratory and eye irritation. This is based on a report of workplace experience that indicated that concentrations of 0.8 to 5.4  $\text{mg/m}^3$  of  $\text{P}_2\text{O}_5$  would be noticeable but not uncomfortable.<sup>(6,7)</sup>

#### VII. REFERENCES

1. Ballantyne, B.: Acute Inhalation Toxicity of Phosphorus Pentoxide Smoke. *Toxicologist* 1:140A (1981).
2. Aranyi, C., J.N. Bradoff and R.L. Sherwood: Effects of Alveolar Macrophages of Rats Inhaling Red Phosphorus Butyl Rubber (RP/BR) Combustion Products. *Toxicologist* 6:66 (1986).

3. **Beliles, R.P.:** Phosphorus, Selenium, and Tellurium. In *Patty's Industrial Hygiene and Toxicology*, Vol. 2A, 3rd ed. New York: Wiley's Interscience, 1981. pp. 2124-2125.
4. **Grant, M.W.:** *Toxicology of the Eye*. Springfield, Ill.: Charles C. Thomas Publisher, 1974. p. 829.
5. Phosphoric Anhydride (Phosphorus Pentoxide). In Hygienic Guide Series. Akron, Ohio: American Industrial Hygiene Association, June 1958.
6. **Stokinger, H.E. (United States Public Health Service):** Letter to E.P. Wheeler (Monsanto), dated 11/12/58.
7. **Rushing, D.E.:** Written communication to TLV Committee member (April 1957) as cited in Documentation of Threshold Limit Values and Biological Exposure Indices, 5th ed. Cincinnati, Ohio: American Conference of Governmental Industrial Hygienists, 1986.

#### **POST-BALLOTING ADDENDUM TO THE PHOSPHORUS PENTOXIDE ERPG DOCUMENT**

Three ballots commented that they had difficulty interpreting the data on page 2 which summarized an abstract of a study by Aranyi (reference 2). As a response to this the entire brief abstract has been quoted on page 2.

One balloter disagreed with the committee's decision to adopt an ERPG on this compound, citing the limited amount of toxicology data available and the fact that the human data appeared to be anecdotal and was old. The committee felt that the data, though sparse, was adequate for this purpose and that the scientist who reported the human data was well known and competent. The committee also felt that even had the balloter attended the meeting at which the ERPG was discussed, the committee's recommendation would not have been different.



<u>CAS</u>	<u>NAME</u>
7783-07-5	Hydrogen selenide
7784-42-1	Arsine
7647-01-0	Hydrogen chloride (Gas Only)
75-44-5	Prosgene*
7803-51-2	Phosphine
7782-50-5	Chlorine*
7664-39-3	Hydrogen flouride*
50-00-0	Formaldehyde*
7783-06-4	Hydrogen sulfide*
7664-41-7	Ammonia*
10294-34-5	Boron trichloride
74-90-8	Hydrocyanic acid
7446-09-5	Sulfur dioxide*
10102-44-0	Nitrogen dioxide*
10102-43-9	Nitric oxide*
74-93-1	Methyl mercaptan*
75-21-8	Ethylene oxide*
74-83-9	Methyl bromide
106-96-7	Propargyl bromide
75-18-3	Dimethyl sulfide*
78-94-4	Methyl vinyl ketone
371-62-0	Ethylene flourohydrin
675-14-9	Cyanuric flouride
110-00-9	Furan
30674-80-7	Methacrylyoyloxyethyl isocyanate
814-68-6	Acrylyl chloride
107-02-8	Acrolein*
624-92-0	Methyl disulfide
19624-22-7	Pentaborane
107-11-9	Allylamine
75-79-6	Methyltrichlorosilane
107-30-2	Chloromethyl methyl ether
542-88-1	Bis(chloromethyl) ether
79-22-1	Methyl chloroformate
1558-25-4	Trichloro(chloromethyl)silane
13463-40-6	Iron pentacrbonyl
126-98-7	Methacrylonitrile
624-83-9	Methyl isocyanate
625-55-8	Isopropyl formate
920-46-7	Methacryloyl chloride
60-34-4	Methyl hydrazine
151-56-4	Ethyleneimine
75-78-5	Dimethyldichlorosilane
107-44-8	Sarin
10025-87-3	Phosphorous oxychloride
79-21-0	Peracetic Acid
57-14-7	1,1-Dimethylhydrazine
107-12-0	Propionitrile
7550-45-0	Titanium tetrachloride*
27137-85-5	Trichloro(dichlorophenyl)silane

\* Chemicals for which ERPGs have been or are being developed.

359-06-8	Flourocetyl chloride
75-74-1	Tetramethyllead
57-57-8	Propiolactone, beta-
7719-12-2	Phosphorous trichloride*
998-30-1	Triethoxysilane
1464-53-5	Diepoxybutane
509-14-8	Tetranitromethane
7783-70-2	Antimony pentafluoride
109-61-5	Propyl chloroformate
80-63-7	Methyl 2-chloroacrylate
108-05-4	Vinyl acetate (monomer)*
75-15-0	Carbon disulfide
327-98-0	Trichloronate
78-82-0	Isobutyronitrile
7697-37-2	Nitric acid
110-89-4	Piperidine
107-07-3	Chloroethanol (Ethylene chlorohydrin)
107-20-0	Chloroacetaldehyde
98-07-7	Benzotrichloride
75-77-4	Trimethylchlorosilane
110-57-6	trans-1,4-Dichlorobutene
594-42-3	Perchloromethylmercaptan
75-55-8	Propyleneimine
75-56-9	Propylene oxide
107-13-1	Acrylonitrile*
7784-34-1	Arsenous trichloride
4170-30-3	Crotonaldehyde*
123-73-9	Crotonaldehyde, (E)-
140-76-1	Pyridine, 2-methyl-5-vinyl-
353-42-4	Boron trifluoride compound
108-98-5	Thiophenol
558-25-8	Methanesulfonyl fluoride
107-18-6	Allyl alcohol
91-08-7	Toluene 2, 6-diisocyanate
7722-84-1	Hydrogen peroxide (conc) 52(%)
108-23-6	Isopropyl chloroformate
77-81-6	Tabun
627-11-2	Chloroethyl chloroformate
98-87-3	Benzal chloride
106-89-8	Epichlorohydrin
62-75-9	Nitrosodimethylamine
77-47-4	Hexachlorocyclopentadiene
115-26-4	Dimefox
646-06-0	Dioxolane
67-66-3	Chloroform
2524-03-0	Dimethyl phosphorochloridothioate
107-16-4	Formaldehyde cyanohydrin
7791-23-2	Seleniun oxychloride
597-64-8	Tetraethyltin
524-76-7	Propionitrile, 3-chloro-

# EMERGENCY RESPONSE PLANNING GUIDELINES

AMERICAN  
INDUSTRIAL  
HYGIENE  
ASSOCIATION

## AIHA ERPGs - 1988

Chemical	ERPG-1	ERPG-2	ERPG-3
Acrolein	0.1 ppm	0.5 ppm	3 ppm
Ammonia	25 ppm	200 ppm	1000 ppm
Chlorine	1 ppm	3 ppm	20 ppm
Chloroacetyl chloride	0.1 ppm	1 ppm	20 ppm
Chloropicrin	NA*	0.2 ppm	3 ppm
Crotonaldehyde	2 ppm	10 ppm	50 ppm
Diketene	1 ppm	5 ppm	50 ppm
Formaldehyde	1 ppm	10 ppm	25 ppm
Hydrogen Fluoride	5 ppm	20 ppm	50 ppm
Monomethylamine	10 ppm	100 ppm	500 ppm
Perfluoroisobutylene	NA <sub>3</sub>	0.1 ppm <sub>3</sub>	0.3 ppm <sub>3</sub>
Phosphorous pentoxide	5 mg/M <sup>3</sup>	25 mg/M <sup>3</sup>	100 mg/M <sup>3</sup>

\*NA = Not appropriate

## ERPGs In Progress

Acrylic acid	Epichlorohydrin	Sulfur dioxide
Butadiene	Hydrochloric acid	Sulfur trioxide (oleum)
Carbon monoxide	Hydrogen cyanide	Tetrafluoroethylene
Carbon tetrachloride	Hydrogen sulfide	Titanium tetrachloride
Dimethyl sulfide	Methyl mercaptan	Trimethylamine
Dimethylamine	Phosgene	

## AIHA ERPG Committee 1988-1989

George M. Rusch, Ph.D., Allied-Signal - Chairman  
 Larry A. Gephart, Ph.D., Eastman Kodak - Vice-Chairman  
 David P. Kelly, DuPont - Secretary  
 John L. Henshaw, C.I.H., Monsanto - AIHA Board Coordinator  
 James W. Barnett, Ph.D., Monsanto  
 Barbara G. Callahan, Ph.D., Chevron  
 James R. Grapenthien, C.I.H., Nalco  
 Keith H. Jacobson, Ph.D., Consultant  
 Stephen D. Paul, C.I.H., Monsanto  
 Michael Makowsky, M.D., ICI Americas  
 Marlene G. Swank, Dow Chemical - ORC/AIHA Liaison  
 Richard Thomas, Ph.D., National Research Council

## Copies

Documentations for completed ERPGs summarize the available toxicology and human experience information. Copies can be ordered from the American Industrial Hygiene Association, 475 Wolf Ledges Pkwy., Akron, OH 44311-1087, for \$5.00 per set of five chemicals.

## Emergency Response Planning Guidelines

The Emergency Response Planning Guideline (ERPG) values are intended to provide estimates of concentration ranges where one might reasonably anticipate observing adverse effects as described in the definitions for ERPG-1, ERPG-2 and ERPG-3, as a consequence of exposure to the specific substance.

The ERPG-1 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor.

The ERPG-2 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action.

The ERPG-3 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.

It is recognized by the committee (and should be remembered by all who make use of these values) that human responses do not occur at precise exposure levels, but can extend over a wide range of concentrations. The values derived for ERPGs should not be expected to protect everyone but should be applicable to most individuals in the general population. In all populations there are hypersensitive individuals who will show adverse responses at exposure concentrations far below levels where most individuals would normally respond. Furthermore, since these values have been derived as planning and emergency response guidelines, not exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead, they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects. The estimates are based on the available data which are summarized in the documentation. In some cases where the data are limited, the uncertainty of these estimates is large. Users of the ERPG values are strongly encouraged to review carefully the documentation before applying these values.

In developing these ERPG's, human experience has been emphasized to the extent data are available. However, since this type of information is rarely available, and when available, usually only for low level exposures, animal exposure data most frequently forms the basis for these values. The most pertinent information is derived from acute inhalation toxicity studies which have included clinical observations and histopathology. The focus is on the highest levels not showing the effects described by the definitions of the ERPG levels. Next, data from repeat inhalation exposure studies with clinical observations and histopathology are considered. Following these in importance are the basic, typically acute, studies where mortality is the major focus. When inhalation toxicity data is either unavailable or limited, data from studies involving other routes of exposure will be considered. More value is given to the more rigorously conducted studies and data from short term studies are considered to be more useful in estimating possible effects from a single one-hour exposure. Finally, if mechanistic or dose response data is available, this is applied, on a case by case basis, as appears appropriate.

It is recognized that there are a range of times that one might consider for these guidelines, however, it was the committee's decision to focus its efforts on only one time period. This decision was based on the availability of toxicology information and a reasonable estimate for an exposure scenario. Users who may choose to extrapolate these values to other time periods are cautioned to review the documentation fully since such extrapolations tend to hold only over very limited time frames, if at all.

## APPENDIX XIII

### INTEGRATED EMERGENCY MANAGEMENT SYSTEM

## THE INTEGRATED EMERGENCY MANAGEMENT SYSTEM (IEMS)

The Integrated Emergency Management System (IEMS) is a long-term, all-hazard concept for improving the program implementation and development of emergency management capabilities at the state and local levels. It is a process for applying comprehensive emergency management concepts to "real world" emergency plans and capabilities. It formally recognizes the roles of the fire service in responding to the full range of emergencies at the local level.

Its specific objectives are to:

1. Save lives and protect property threatened by hazards.
2. Reduce duplication of efforts and resources.
3. Increase jurisdictional flexibility in upgrading the capacity to handle potential hazards.
4. Integrate Federal Emergency Management Administration support and objectives with those state and local operational requirements.

Viewed in this manner, it becomes clear that existing fire service programs such as the Incident Command System (ICS) are part of the broader concept of IEMS. ICS-IEMS identifies the need for "baseline" fireground command systems to provide for a predictable, coordinated, effective and acceptable response to emergencies of all types by the fire services of this country.

The IEMS approach recognizes that there are certain characteristics and requirements which are common across the full spectrum of emergencies--evacuation, sheltering, provision of food and medical supplies, etc. Each of the aforementioned functions requires an operational procedure. ICS is such a procedure to ensure all areas of concern are addressed. FEMA'S programs are using the IEMS approach to assist state and local officials in building capability in these areas as a basic foundation for planning, response, recovery, and mitigation of hazards--whether they are related to natural or technological disasters, resource shortages, or war-related national security situations.

IEMS is being introduced to a nationwide network of emergency management organizations representing thousands of jurisdictions, not all confronted by the same hazards, and not all having or

requiring the same capabilities. Going through the IEMS process, therefore, will require different levels of effort by each jurisdiction and will result in the identification of different functional areas requiring attention. The process, however, is logical and applicable to all jurisdictions regardless of their size, level of sophistication, potential hazards or current capabilities.

The goal of the system is to develop and maintain a credible emergency management capability nationwide by integrating activities along functional lines at all levels of government, and, to the fullest extent possible, across all hazards. It should be kept in mind that the IEMS process is a means of improving capability and is not an end in itself. The various steps in the IEMS process are intended to serve management at each level of government by providing basis information upon which reasonable and justifiable plans can be made and effective action taken to increase emergency management capability nationwide.

*NATIONAL FIRE ACADEMY • NATIONAL EMERGENCY TRAINING CENTER*

## APPENDIX XIV

### INCIDENT COMMAND SYSTEM



## THE INCIDENT COMMAND SYSTEM (ICS)

Although many systems exist throughout the nation for the command and control of resources at emergency incidents, the National Fire Academy has adopted the Incident Command System (ICS) as its base for teaching the concepts of incident command.

The ICS is recognized by the Academy as a system that is documented and has been successfully used in managing available resources at emergency operations. All procedures will not perfectly fit all departments nor will the system necessarily need to be fully implemented for all situations the fire service will encounter.

The ICS was developed as a consequence of fires that consumed large portions of wildland, including structures, in southern California in 1970. As a result of those fires, agencies could work together toward a common goal in an effective and efficient manner. The material contained in this manual was developed by a multi-agency task force. The California Department of Forestry, through the United States Forest Service and the Federal Emergency Management Agency, developed the materials in cooperation with the California State Fire Marshal's Office, the California Office of Emergency Services, and the FIREScope task force.

The system consists of procedures for controlling personnel, facilities, equipment, and communications.

It is designed to begin developing from the time an incident occurs until the requirement for management and operations no longer exists. The "Incident Commander" is a title which can apply equally to an engine company captain, or to the chief of a department, depending upon the situation. The structure of the ICS can be established and expanded depending upon the changing conditions of the incident. It is intended to be staffed and operated by qualified personnel from any emergency services agency and may involve personnel from a variety of agencies.

As such, the system can be utilized for any type or size of emergency, ranging from a minor incident involving a single unit, to a major emergency involving several agencies. The ICS allows agencies to communicate using common terminology and operating procedures. It also allows for the timely combining of resources during an emergency.

The ICS is designed to be used in response to emergencies caused by fires, floods, earthquakes, hurricanes, tornadoes, tidal waves, riots, hazardous materials, or other natural or human-caused incidents.

### **OPERATING REQUIREMENTS**

The design requirements for the ICS are the following:

- Can provide for the following kinds of operations: (a) single jurisdiction/ single agency involvement, (b) single jurisdiction with multi-agency involvement, (c) multi-jurisdiction/multi-agency involvement.
- Organizational structure can adapt to any emergency or incident to which fire protection agencies would be expected to respond.
- Can be applicable and acceptable to users throughout the country.
- Should be readily adaptable to new technology.
- Must be able to expand in a logical manner from an initial attack situation.
- Must have basic common elements in organization, terminology, and procedures. This allows for the maximum application and use of already developed qualifications and standards, and ensures continuation of a total mobility concept.
- Implementation should have the least possible disruption to existing systems.
- Must be effective in fulfilling all of the above requirements and yet be simple enough to ensure low operational maintenance costs.

### **COMPONENTS OF THE ICS**

The ICS has a number of components. These components working together interactively provide the basis for an effective ICS concept of operation:

- Common terminology
  - Modular organization
  - Integrated communications
  - Unified command structure
  - Consolidated action plans
  - Manageable span-of-control
-

## **COMMANDING THE INITIAL RESPONSE**

---

- Predesignated incident facilities
- Comprehensive resource management

### **ORGANIZATION AND OPERATIONS**

The ICS has five major functional areas:

- Command
- Operations
- Planning
- Logistics
- Finance

## APPENDIX XV

TRANSPORTATION OF HAZARDOUS MATERIALS,  
CONGRESS OF THE UNITED STATES

# Transportation of Hazardous Materials



CONGRESS OF THE UNITED STATES  
Office of Technology Assessment  
WASHINGTON, D. C. 20510

**Recommended Citation:**

U.S. Congress, Office of Technology Assessment, *Transportation of Hazardous Materials*, OTA-SET-304 (Washington, DC: U.S. Government Printing Office, July 1986).

Library of Congress Catalog Card Number 86-600542

For sale by the Superintendent of Documents  
U.S. Government Printing Office, Washington, DC 20402

Few jurisdictions have used sophisticated mathematical techniques of risk analysis to estimate the probability of an incident and its severity. Most communities find it adequate to map the areas where the risk of a hazardous materials incident is highest or where there would be the greatest public danger or the most damage. Data for this type of study can be assembled either from a fixed facility inventory or a transportation study. Much useful information is also available from public records routinely kept for other purposes by State and local public works, transportation, environmental, and planning departments. Normally, a hazard assessment requires the following kinds of information:

- transportation network maps and descriptions;
- highways and streets used by hazardous materials carriers;
- tunnels, bridges, and rail crossings;
- railroad yards and truck terminals;
- highway, rail, air, and water accident data;
- locations of past hazardous materials incidents and materials involved;
- concentrations of hazardous materials manufacturing or storage sites;
- areas of high population density and environmental sensitivity;
- location of schools, hospitals, and other especially vulnerable sites; and
- water supply and sewer facilities.

A risk assessment could also include special analyses of the types and quantities of hazardous materials transported through the community and the location of emergency response teams and equipment.

## Conclusions

OTA finds that Federal data-collection activities provide modal transportation data of varying completeness. OTA experience in analyzing many Federal databases for this report establishes that data integration is not a technical problem; with careful analysis, comparative data on commodity flow can be developed. However, the quality of the data is not outstanding, and the data are incomplete in numerous areas, particularly for truck and air transport. These shortcomings mean that current policy decisions must be based on inadequate information, a separate concern that warrants

further study.<sup>59</sup> OTA concludes that if RSPA were to conduct analyses of existing data similar to that undertaken for this study, it would benefit by having aggregate commodity flow information to use as a denominator in analyzing its spill and accident records. Such data might not completely satisfy State or local needs for information about shipments, but they can show State-to-State and regional transportation patterns.

Furthermore, OTA concludes that State and local data collection has enormous value in and of itself. The information gathered is only part of that value; the communication, cooperation, and coordination between the public and private sectors that are an inevitable result of the effort are extremely important. Community right-to-know laws are useful tools for State and local governments in obtaining data, and national right-to-know legislation would bolster implementation of such laws, where industry resistance remains.

Some city officials and planning personnel have continued to express a need for a national commodity flow data resource. An annual printed summary provided by DOT is most frequently mentioned, and OTA concludes that annual DOT summaries of shipments would provide useful national, regional, and State flow pattern information. Although some desire for real-time notification of especially high-hazard shipments has been voiced, emergency response officials consulted by OTA generally prefer to do local inventories and transportation surveys and to prepare their personnel for any eventuality. They point out that detailed real-time information would be overwhelming to track and useless for planning and preparedness.<sup>60</sup> As one fire chief said: "What am I supposed to do? Follow the truck around waiting for an accident to happen?"<sup>61</sup>

However, some local officials who want real-time tracking of hazardous materials, have called for DOT to develop a publicly accessible database to

<sup>59</sup>Martin Cruminger, "U.S. Statistical Problems Seen," *Washington Post*, Mar. 18, 1986, p. E1.

<sup>60</sup>U.S. Congress, Office of Technology Assessment, *Transportation of Hazardous Materials: State and Local Activities*, op. cit., ch. 4.

<sup>61</sup>Thomas Hawkins, Jr., Chief, Arlington County Fire Department, Arlington, VA, personal communication, January 1986.

provide information on shipments.<sup>62</sup> Such real-time data are probably the only way to keep current on shipments if that is the goal, since many hazardous materials orders are for truck delivery within 36 hours or less. Other shipments are seasonal, related to agricultural or manufacturing cycles. Finally, customers may suddenly change supply sources for economic reasons, rendering periodic data collection instantly obsolete. The technological groundwork for a real-time system to track hazardous waste shipments, which represent less than 1 percent of hazardous materials shipments, has been developed by a private firm, although the system has not been tested in operation.

However, even if the technical difficulties for implementing such a system for all hazardous materials could be resolved, the cost has been estimated to be more than \$100 million.<sup>63</sup> OTA finds that while development of a real-time database limited to tracking only certain highly hazardous shipments is technically feasible, its utility for emergency response is questionable. Furthermore, development of online telephone access to real-time information on all hazardous materials shipments is not feasible, nor would it be cost-effective.

If Congress chooses to provide support for data gathering, several options are available. DOT could

be required to exercise its authority under 49 U.S.C., Section 1805(b) and develop a registration program for hazardous materials shippers, transporters, and container manufacturers. OTA finds that a registration program would provide DOT with essential information about the community it regulates and with some commodity shipment information that could be made available to State and local jurisdictions. DOT could make use of the information for setting priorities for rulemaking, research, and for enforcement actions. A modest registration fee could be imposed to cover costs of administering the program.

In addition, Congress could require DOT to integrate, analyze, and report annually on trends from relevant Federal databases kept by the modal administrations and the Bureau of the Census. For this effort to be effective:

- The collection of data on truck movements must be improved.
- Conversion or bridge tables for the commodity codes used by different agencies and in 49 CFR, Section 172, must be created. Alternatively, each agency might be required to use a common code for commodities.
- Sufficient funds must be allocated to support the effort. OTA estimates that the equivalent of one man-year of effort, between \$45,000 and \$75,000, would provide a modest start.

Finally OTA finds that a summary of commodity flow data in comparison with DOT accident data in the required annual report to Congress would be useful.

<sup>62</sup>The National League of Cities (NLC) has retained in its transportation position paper a request for a U.S. Department of Transportation report on commodity flow. Barbara Harshe, NLC transportation staff, personal communication, January 1986.

<sup>63</sup>John Mülholland, Source Data Network, personal communication, November 1985.



## APPENDIX XVI

TRANSPORTATION OF HAZARDOUS MATERIALS:  
STATE AND LOCAL ACTIVITIES,  
CONGRESS OF THE UNITED STATES

# **Transportation of Hazardous Materials: State and Local Activities**

**A Special Report**



**CONGRESS OF THE UNITED STATES  
Office of Technology Assessment  
Washington, D. C. 20510**

**Recommended Citation:**

U.S. Congress, Office of Technology Assessment, *Transportation of Hazardous Materials: State and Local Activities*, OTA-SET-301 (Washington, DC: U.S. Government Printing Office, March 1986).

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the response team funded by the fee requirement replicated Federal emergency response programs.<sup>34</sup>

The trucking industry has made Congress aware of its concerns, and BMCS has begun, at congressional request, a 5-year program that will lead to greater uniformity in some areas. BMCS is surveying State motor carrier laws to determine those that are more or less stringent than Federal requirements in the areas of driver qualifications and training, hours of service, and equipment maintenance. When completed, the survey will be reviewed by a panel convened by the Secretary of Transportation, and if warranted, DOT will consider rulemaking to preempt State laws that do not ensure greater safety than their Federal counterparts.

However, many State and local enforcement officers as well as industry representatives feel strongly that national, uniform standards should be established in areas related to hazardous materials as well. Carrier associations and insurance industry representatives have voiced strong support for a national hazardous materials driver's license requiring special training.

In addition, this Federal review will leave untouched problems of varying State and local special permits and registration fees. The transport industry views these requirements primarily as State and local funding devices for enforcement or emergency response activities. Carriers find them annoyingly inconsistent and financially burdensome. Preemption by the Federal Government may not be the only appropriate way to achieve uniformity of requirements—a goal that many see as the most important need in hazardous materials regulation. National guidelines for permits and registrations could provide uniformity, and consensus building would ensure at least some measure of agreement between concerned public and private sector groups.

## Notification

Notification requirements are used by State and local governments, and by transportation facilities (e.g., bridge and tunnel authorities) to obtain information on shipments of hazardous materials into or through their jurisdictions. The data are used for

inventory purposes, to arrange escorts, for emergency response planning, and in support of enforcement activities. Figure 2-3 indicates which States have enacted notification laws and the types of hazardous materials covered.

Knowing which hazardous materials are present or pass through a community is important to many State and local agencies. However, the use of notification provisions may not be the most efficient or effective method of data collection available (chapter 4 discusses data collection in more detail). Recent studies conducted for DOT indicate that notification requirements targeted at a limited number of extremely hazardous substances (e.g., high-level nuclear waste) have provided useful information. However, most local governments do not have the resources or the expertise to implement and enforce requirements that encompass a broader range of hazardous materials.<sup>35</sup> In addition, transporters are concerned that a multiplicity of State and local notification regulations would create scheduling difficulties and substantial increases in paperwork.

At the Federal level, the U.S. Coast Guard and NRC have established notification requirements. The Coast Guard requires all vessels carrying certain dangerous cargo to notify appropriate port authorities up to 24 hours in advance before entering or leaving U.S. ports and waterways.<sup>36</sup> Dangerous cargo includes Class A explosives, oxidizing materials or blasting agents, large quantities of radioactive material or certain fissile radioactive material, and bulk shipments of other specified materials.<sup>37</sup> The NRC regulation requires licensees to notify States in advance regarding shipments of certain radioactive materials.<sup>38</sup> Recognizing the difficulties faced by carriers confronted with varying State notification rules, DOT has taken the position that this is an area warranting uniform national requirements. DOT has not issued Federal guidelines. It has, however, preempted a number of non-Federal requirements, either because they differed from the NRC

<sup>34</sup>See Battelle Memorial Research Laboratories, Battelle Human Affairs Research Center, *Assessment of State and Local Notification Requirements for Transportation of Radioactive and Other Hazardous Materials* (Columbus, OH: Jan. 11, 1985).

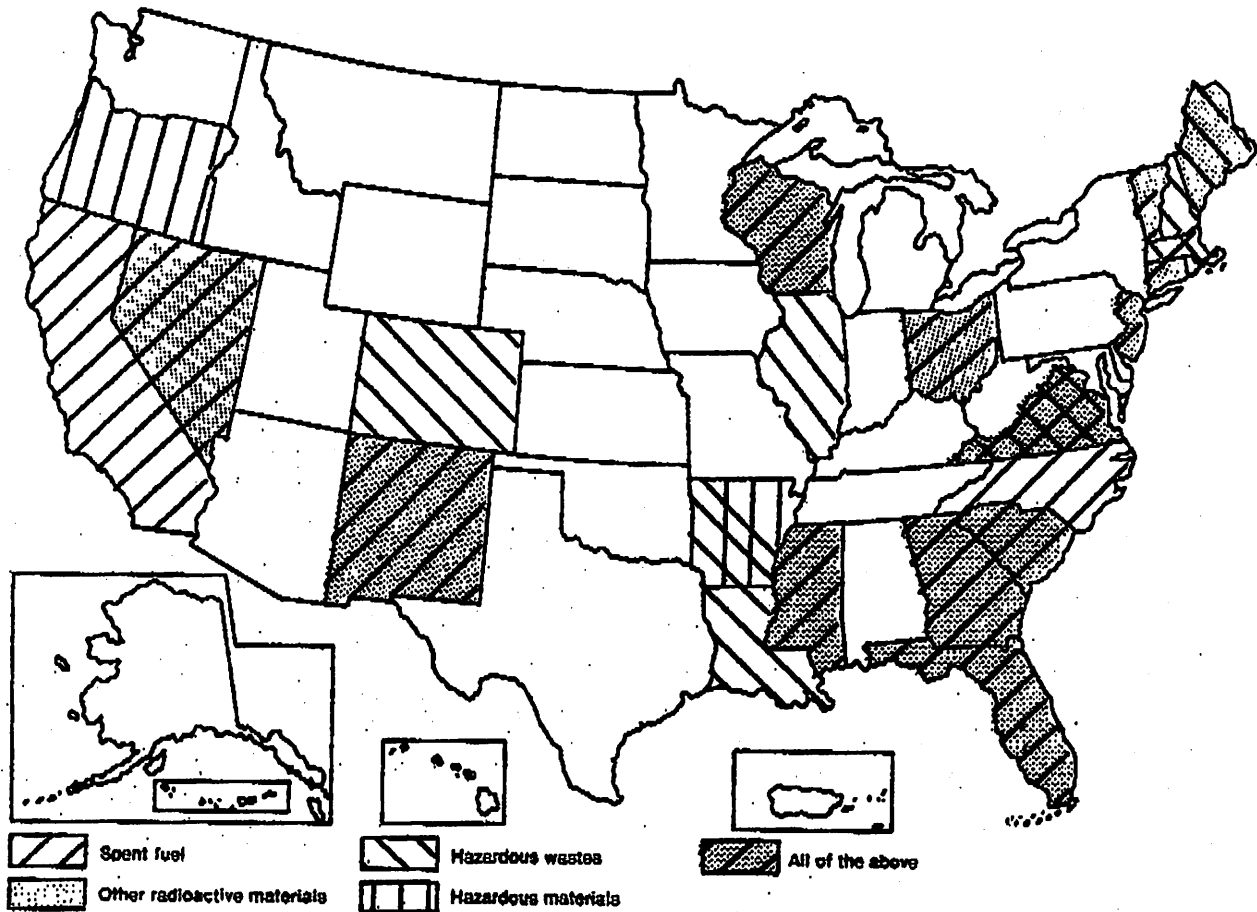
<sup>35</sup>33 CFR 160.211 and 160.213. Additional requirements for vessels on voyages of 24 hours or more and vessels bound for the Great Lakes are specified in 33 CFR 160.20 and 160.209.

<sup>37</sup>33 CFR 160.203 and 46 CFR 153 (table).

<sup>38</sup>10 CFR 71.97.

<sup>34</sup>Department of Transportation Inconsistency Ruling 15, 49 F.R. 46660, Nov. 27, 1984.

Figure 2-3.—States With Hazardous Materials Notification Requirements by Type of Material, 1985



SOURCE: Office of Technology Assessment.

regulation or had the potential to cause transportation delays or traffic diversions.<sup>39</sup>

### Routing

Routing is an important tool for local governments to use in preventing or reducing the consequences of hazardous materials accidents, and increasing numbers of cities, counties, and townships are adopting ordinances requiring hazardous materials carriers to use designated routes. Careful routing decisions mean that hazardous materials shipments are restricted to the safest routes, often interstate highways and beltways, thus reducing the overall risk of an accident as well as risks on local streets and highways. In addition, routing is a low-cost preven-

tion measure that local police can enforce without additional equipment or training. On the other hand, routing requirements may lengthen and complicate trips for truckers, and sometimes bring local governments into conflict with each other or with Federal regulations protecting interstate commerce.

The only Federal requirement pertaining to routing of nonradioactive hazardous materials is general:<sup>40</sup>

Unless there is no practicable alternative, a motor vehicle which contains hazardous materials must be operated over routes which do not go through or near heavily populated areas, places where crowds are assembled, tunnels, narrow streets, or alleys.

<sup>39</sup>See for example IR-16, 50 F.R. 20871, May 20, 1985. DOT has adopted the NRC notification requirements.

<sup>40</sup>49 CFR 397.9(a).

## APPENDIX XVII

INITIAL REPORT OF THE INVESTIGATION,  
PACIFIC ENGINEERING EXPLOSION OF MAY 4, 1988,  
AT HENDERSON, NEVADA,  
CLARK COUNTY FIRE DEPARTMENT



# Clark County

## Office of the County Manager

**DONALD L. "PAT" SHALMY**  
COUNTY MANAGER

**DALE W. ASKEW, CPA**  
ASSISTANT COUNTY MANAGER

**MICHAEL P. COOL**  
ASSISTANT COUNTY MANAGER

CLARK COUNTY BRIDGER BUILDING  
225 BRIDGER AVENUE  
LAS VEGAS, NEVADA 89155  
(702) 455-3530

July 14, 1988

### GOVERNOR'S OFFICE

LAS VEGAS, NV

88-2196  
JUL 15 1988

## RECEIVED

The Honorable Richard Bryan  
Governor of Nevada  
2501 E. Sahara Ave.  
Las Vegas, Nv 89158

Dear Governor Bryan:

The Clark County Fire Department has released its initial report of the cause and origin of the Pepcon incident which I have enclosed for your information. A more detailed, final report will be filed in approximately two months. We will forward it to you as soon as it is available.

If you have any questions please contact Chief Roy Parrish, Clark County Fire Department.

Sincerely,

DONALD L. SHALMY

DLS/jp

Enc.



## Clark County Fire Department

707 EAST DESERT INN ROAD  
LAS VEGAS, NEVADA 89109  
(702) 732-1916 — (702) 455-7311

ROY L. PARRISH  
FIRE CHIEF

JOHN PAPPAGEORGE  
DEPUTY FIRE CHIEF

ROBERT ATKINSON  
ASSISTANT FIRE CHIEF

JAMES BARRETT  
ASSISTANT FIRE CHIEF

ROBERT KEATING  
ASSISTANT FIRE CHIEF

July 14, 1988

### Factors Contributing To Fire Ignition, Spread And Detonation

1. Welders cutting in hazardous area with no fire watch
2. Structural components consisting of highly combustible fiberglass reinforced plastic.
3. A highly flammable and detonable material being stored.
  - (a) Combustible poly drums, over 8,000
  - (b) Near and around buildings where previous fires occurred
  - (c) High density storage practices
  - (d) Housekeeping concerns
  - (e) Weather

At approximately 11:30 a.m. on May 4, 1988, two (2) employees of Pepcon were working on the west end of the batch house building with the use of an oxy acetylene torch. One (1) workman was on the lift cutting holes in the support beam of the building in preparation for hanging new siding. Iron slag was being sprayed out into the batch house building igniting a combination of combustible construction components, product process equipment and residual product in and around the batch house. Fire immediately spread along available fuel surfaces and by thermal exposure and wind velocity spread to the adjacent storage of high density combustible containers of potentially detonable material. The rate and intensity of the fire spread was consistent with fire performance characteristics of the material involved.

Several low order explosions occurred causing structural damage to the plant, further alerting employees of impending disaster and continuing the spread of fire via thermal radiation and flying fire debris.

The fire spread from the batch house area propagated a flame front through the storage area of combustible containers of products.



Page 2  
July 14, 1988  
Contributing Factors

The high volume of product storage in aluminum tote bins being exposed to intense temperatures and direct flame impingement resulted in two (2) major detonations.

The exact mechanism of detonation, while not precisely known at this time, probably can be determined through science and industry evaluation and continued study of the facts and data obtained here and from ongoing analysis.

Tests this department has called for will provide more data on the behavior of materials involved.

APPENDIX XVIII

WITNESSES APPEARING  
BEFORE THE  
HENDERSON COMMISSION

WITNESSES APPEARING BEFORE THE HENDERSON COMMISSION

1. Dennis W. Alm  
Special Agent-Hazardous Materials  
Union Pacific Railroad  
500 Parr Boulevard  
Reno, Nevada 89512
2. Ray Bacon  
Nevada Manufacturer's Association  
780 Pawnee  
Carson City, Nevada 89701
3. James Barnes, Director  
Nevada Department of Industrial Relations  
Capitol Complex  
Carson City, Nevada 89710
4. Jerold H. Barnes, Director  
Salt Lake County Planning Division  
Salt Lake County Government Center  
North Building  
2001 South State Street #N3700  
Salt Lake City, Utah
5. Clifford H. Barr, Plant Manager  
Stauffer Chemical Company  
P.O. Box 86  
Henderson, Nevada 89015
6. Gary Bloomquist, City Manager  
City of Henderson  
243 South Water Street  
Henderson, Nevada 89512
7. Bob Broadbent, Co-Chairman  
Nevada State Emergency Response Commission  
Director of Aviation  
McCarran International Airport  
P.O. Box 1005  
Las Vegas, Nevada 89111
8. Capt. Mike Brown  
Reno Fire Department  
Truckee Meadows Regional Hazardous Materials Team  
P.O. Box 1900  
Reno, Nevada 89501

9. Dr. Barbara Callahan  
Chevron Environmental Health Center  
P.O. Box 4054  
Richmond, California 94804
10. Arturo Cambeiro, Member  
Nevada Board of Fire Services  
Arturo Cambeiro & Associates  
4795 South Sandhill Road, Suite #6  
Las Vegas, Nevada 89121-6029
11. Steve Chapman, Fire Marshal  
Sparks Fire Department  
1605 "B" Street  
Sparks, Nevada 89431
12. Capt. Mike Coppel  
Truckee Meadows Fire Protection District  
Truckee Meadows Regional Hazardous Materials Team  
10 Kirman Avenue  
Reno, Nevada 89502
13. Bill Davis  
U.S. Environmental Protection Agency  
215 Fremont Street  
San Francisco, California 94015
14. Mike DelGrasso  
Nevada Division of State Lands  
505 East King Street  
Capitol Complex  
Carson City, Nevada 89710
15. Lou Dodgion, Administrator  
Nevada Division of Environmental Protection  
201 South Fall Street  
Capitol Complex  
Carson City, Nevada 89710
16. Capt. Les Ede  
Sparks Fire Department  
Truckee Meadows Regional Hazardous Materials Team  
1605 "B" Street  
Sparks, Nevada 89431
17. Greg Evangelatos, Planning Director  
City of Sparks  
P.O. Box 857  
Sparks, Nevada 89432

18. Claude "Blackie" Evans, Executive Secretary-Treasurer  
Nevada State AFL-CIO  
P.O. Box 2115  
Carson City, Nevada 89702
19. Steven R. Frady, Deputy State Fire Marshal  
State Fire Marshal Division  
Stewart Facility  
Capitol Complex  
Carson City, Nevada 89710
20. David Gates, State Insurance Commissioner  
State Insurance Division  
201 South Fall Street  
Capitol Complex  
Carson City, Nevada 89710
21. George P. Gazaway  
Hawthorne Army Ammunition Plant  
P.O. Box 2279  
Hawthorne, Nevada 89514
22. Capt. Bill Goddard  
Commercial Enforcement Section  
Nevada Highway Patrol  
Department of Motor Vehicles and Public Safety  
555 Wright Way  
Capitol Complex  
Carson City, Nevada 89710
23. Terry K. Graves, Operations Manager  
Stauffer Chemical Company  
P.O. Box 86  
Henderson, Nevada 89015
24. Earl Greene, Deputy Fire Marshal  
Clark County Fire Department  
707 East Desert Inn Road  
Las Vegas, Nevada 89109
25. John Gustafson  
Preparedness Staff  
Office of Solid Waste and Emergency Response  
U.S. Environmental Protection Agency  
401 M Street S.W.  
Washington, D.C. 20460

26. Robert Hall  
359 Pueblo Boulevard  
Henderson, Nevada 89015
27. Richard C. Heckendorff, Director  
Development Services  
City of Henderson  
225 Lead Street  
Henderson, Nevada 89015
28. Phil Herrington, Director  
Reno Building & Safety Department  
P.O. Box 1900  
Reno, Nevada 89505
29. Gene Holderness, Manager  
Hi Shear Technology  
204 Edison Way  
Reno, Nevada 89502
30. Richard Holmes, Director  
Clark County Department of Comprehensive Planning  
225 Bridger Street  
Las Vegas, Nevada 89155
31. Wayne K. Horiuchi, Special Representative  
Government Affairs & Community Relations  
Union Pacific Railroad  
1000 G Street, Suite 200  
Sacramento, California 95814
32. Thomas J. Huddleston, Fire Marshal  
Corona Fire Department  
815 West Sixth Street  
Corona, California 91720
33. Rex Jordan, State Fire Marshal  
State Fire Marshal Division  
Stewart Facility  
Capitol Complex  
Carson City, Nevada 89710
34. Alan Kightlinger, Fire Protection Officer  
Nevada Division of Forestry  
885 Eastlake Boulevard  
Carson City, Nevada 89704

35. Bob King, Director  
Division of Emergency Management  
2525 South Carson Street  
Capitol Complex  
Carson City, Nevada 89710
36. Donna Lewis, District Manager  
Division of Occupational Safety & Health  
4055 South Spencer Street, Suite 100  
Las Vegas, Nevada 89158
37. Jack Maddox  
American Society of Safety Engineers  
P.O. Box 94133  
Las Vegas, Nevada 89193
38. Herman Millsap  
Hawthorne Army Ammunition Plant  
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Hawthorne, Nevada 89415
39. Dr. Frank Mitchell, O.D.  
Chief Medical Officer  
Agency for Toxic Substances and Disease Registry  
U.S. Department of Health & Human Resources  
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Atlanta, Georgia 30333
40. Rusty Nash, Deputy District Attorney  
Washoe County District Attorney  
P.O. Box 11130  
Reno, Nevada 89520
41. Mike Nevin, Fire Protection Officer  
Nevada Division of Forestry  
885 Eastlake Boulevard  
Carson City, Nevada 89704
42. Dr. Joan Owen, Director  
Center for Diagnosis & Development  
1700 Desert Inn Road  
Las Vegas, Nevada 89109
43. John Pappageorge, Deputy Chief  
Clark County Fire Department  
707 East Desert Inn Road  
Las Vegas, Nevada 89109

44. John Renz, Director  
Douglas County Community Development  
P.O. Box 218  
Minden, Nevada 89423
45. Ken Ryckman  
Clark County Emergency Management Coordinator  
225 Bridger Avenue  
Las Vegas, Nevada 89155
46. Jim Schofield, State Assemblyman  
1740 Howard Avenue  
Las Vegas, Nevada 89104
47. Mark Schrader, Commissioner  
Storey County Commission  
Storey County Courthouse  
Virginia City, Nevada 89440
48. Jerry Shelly, Safety Inspector  
Board for the Regulation of Liquified Petroleum Gas  
P.O. Box 338  
Carson City, Nevada 89702
49. Nancy Sims  
634 Valley View Circle  
Henderson, Nevada 89014
50. Lowell Smith, State Forester-Firewarden  
Nevada Division of Forestry  
201 South Fall Street  
Capitol Complex  
Carson City, Nevada 89710
51. Don W. Snow, Hazardous Materials Control Officer  
Southern Pacific Transportation Co.  
401 I Street  
Sacramento, California 95814
52. Bill Stafford, Vice President of Risk Management  
Industrial Indemnity  
255 California Street  
San Francisco, California 94111
53. Dale Starr, Chief  
Henderson Fire Department  
243 Water Street  
Henderson, Nevada 89015



- 54. Wayne Teglia, Co-Chairman  
Nevada State Emergency Response Commission  
Director,  
Nevada Department of Motor Vehicles & Public Safety  
555 Wright Way  
Capitol Complex  
Carson City, Nevada 89710
- 55. Ken Thomas, Chief  
Insurance Services  
State Industrial Insurance System  
1700 West Charleston Avenue  
Las Vegas, Nevada 89102
- 56. Leo Tierney, Director  
Hazardous Materials Operations  
Union Pacific Railroad  
1416 Dodge Street  
Omaha, Nebraska 68179
- 57. Pam Walz  
339 Jorge Way  
Henderson, Nevada  
89014
- 58. Bob Webber, Director  
Clark County Building Department  
225 Bridger Avenue  
Las Vegas, Nevada 89155
- 59. Al Wheeler, President  
Nevada Motor Transport Association  
Wheeler Trucking Corporation  
3375 Polaris Avenue  
Las Vegas, Nevada 89102
- 60. Mike Wright  
International Steelworkers  
1772 Barr Avenue  
Pittsburgh, Pennsylvania 15205
- 61. Don Young, Chief  
Sparks Fire Department  
1605 "B" Street  
Sparks, Nevada 89431

## ANNOTATED BIBLIOGRAPHY

1. Uniform Fire Code. Western Fire Chiefs Association and International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, California 90601. 1988. 506 pages.

The Uniform Fire Code is promulgated by committees organized by the Western Fire Chiefs Association and the International Conference of Building Officials, in cooperation, and has been adopted by 28 states as a minimum standard. The Uniform Fire Code sets out provisions necessary for fire prevention while achieving uniformity in terms and requirements with other codes published by the International Conference of Building Officials. Contained within the Uniform Fire Code, which is revised every three years, is Article 80 and its companion Appendix II-E, dealing specifically with hazardous materials, while other articles deal with other highly combustible, flammable and dangerous materials setting standards for a fire-safe environment.

2. Uniform Building Code. International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, California 90601. 1988. 926 pages.

The Uniform Building Code is promulgated by committees established by the International Conference of Building Officials to provide greater safety to the public through uniformity of building laws. The code is founded on broad-based performance principles that make possible the use of new materials and new construction systems, and has been developed to be compatible with publications in other disciplines to provide an inter-related framework through which the greatest safety potential may be reached. Contained within Chapter 9 and other sections of the Uniform Building Code are specific provisions for those occupancies in which hazardous and highly combustible materials are stored, used or processed.

3. National Fire Codes. National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269. 1987. 11 volumes.

The National Fire Codes are annual compilations of codes, standards, recommended practices, manuals, guides and model laws prepared by technical committees organized under sponsorship of the National Fire Protection Association,

and include only those documents which have been adopted by the association. The National Fire Codes include specific materials on such matters as certification of fire safety inspectors, fire investigators, fire suppression and alarm systems, industrial fire brigades, storage and handling of hazardous and highly combustible materials. The National Fire Protection Association was organized in 1896 to promote the science and improve the methods of fire protection and prevention, to obtain and circulate information on these subjects and to secure cooperation in establishing proper safeguards against loss of life and property by fire.

4. Fire Protection Handbook. National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269. Sixteenth edition, 1987.

The Fire Protection Handbook is developed by the National Fire Protection Association as a single-source reference book for fire authorities complimenting the 11-volume National Fire Codes of the National Fire Protection Association. Contained within the Fire Protection Handbook are chapters dealing with hazards of occupancies; fire alarm, detection and extinguishing systems; special fire protection systems; industrial and process fire hazards; special fire protection and prevention problems; transportation fire hazards and other specific topics.

5. Nevada State Fire Marshal Regulations, Nevada Administrative Code Chapter 477. State Fire Marshal Division, Stewart Facility, Capitol Complex, Carson City, Nevada 89710. 1986. 80 pages.

The regulations adopted by the State Fire Marshal set the minimum standards for the State of Nevada through adoption of model codes and standards including the Uniform Fire Code, Uniform Building Code, National Fire Codes and other such documents with companion standards. In addition, the regulations include the framework for licensure of fire extinguisher and fire extinguishing systems service and installation companies, and those individuals performing such work as well as licensure of pyrotechnics and blasters. The regulations also set standards for fire prevention in child care facilities and other institutions, and sets disciplinary procedures for various violations.

6. Hazardous Materials Operations Support Plan. State of Nevada Hazardous Materials Committee and Nevada Division of Emergency Management, Capitol Complex, Carson City, Nevada 89710. 1986. 103 pages.

The Hazardous Materials Operations Support Plan provides a base for coordinated hazardous materials response and recovery support efforts by state government in cooperation with local, federal and private organizations. Contained within the plan is an inventory of resources available to respond to hazardous materials emergencies and to assist with training and preparations for such emergencies.

7. State of Nevada Emergency Plan. Nevada Division of Emergency Management, Capitol Complex, Carson City, Nevada 89710. 1987. 221 pages.

The State of Nevada Emergency Plan is a comprehensive plan through which the state has prepared for mitigation, preparation, response and recovery for any natural or man-made disaster. The plan has been developed as a resource document to provide guidance and direction to state and local governments on assignments, resources and means to accomplish the protection and saving of lives; prevention of, or minimization of damage to property; and the relief of suffering while promoting recovery from the effects of emergencies or disasters.

8. Department of Defense Contractors' Safety Manual for Ammunition and Explosives. U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161. 1986. 167 pages.

The Department of Defense Contractors' Safety Manual for Ammunition and Explosives provides safety standards common to Department of Defense and private industry ammunition and explosives operations and facilities. In addition to the standards set in the manual, there are also field audit procedures to ensure safety guidelines are met at government facilities, or private industry facilities under Department of Defense contract. In most cases, the safety guidelines set in the manual parallel or are more stringent than those set in the National Fire Codes of the National Fire Protection Association.

9. Uniform Disaster Mitigation Plan. International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, California 90601. 1979. 26 pages.

This document has been prepared as a model plan through which local jurisdictions may develop emergency operations plans adjusted to the particular needs of their communities. The plan includes standard operation procedures for initiating disaster assessment and mitigation; mutual aid plans and standard agreements; hazardous abatement procedures and model documents as well as other specific topics critical to dealing with disaster mitigation and recovery.

10. Introducing Intermodal Tank Containers. Hazardous Materials Training Technical Training Personnel Department, Union Pacific Railroad, Christofer Centre, 1000 G Street, Suite 200, Sacramento, California 95814. 1987. 15 pages.

This pamphlet is designed to provide both railroad employees and local emergency response personnel with a basic introduction to intermodal tank containers--how they are built, what fittings and safety devices are provided, what they are designed to carry and how to handle them in normal and emergency situations.

11. Recognizing and Identifying Hazardous Materials (Student Manual). National Fire Academy-National Emergency Training Center, Chemical Manufacturers Association, Association of American Railroads, Union Pacific System, Christofer Centre, 1000 G Street, Suite 200, Sacramento, California 95814. 1988. 56 pages.

Recognizing and Identifying Hazardous Materials was developed to enable the reduction of the harm created by hazardous materials emergencies. Through the materials within this document, as presented in the classroom setting, basic skills may be developed which can assist in the identification of hazardous materials problems in communities; recognition of the presence of hazardous materials; and, the identification of specific hazardous materials and associated hazard characteristics. Course topics contained within the student manual include an overview of hazardous materials, the decision making process in hazardous materials emergencies, detection and identification of hazardous materials.

12. Defining Your Hazardous Material Problem. Hazardous Material Training Technical Training Personnel Department, Union Pacific Railroad, Christofer Centre, 1000 G Street, Suite 200, Sacramento, California 95814. 1986. 49 pages.

This student manual is designed for emergency response personnel to assist in development of action programs in the mitigation of hazardous materials emergencies with a goal towards interaction, recognition and use of resources so that response personnel become part of the solution, not part of the problem when responding to hazardous materials emergencies. Among the topics covered in this program are estimating likely harm from hazardous materials without intervention; visualizing hazardous materials behavior; decision making in emergencies; detecting hazardous materials presence and identification of hazardous materials.

13. Understanding Railroad Tank Cars. Hazardous Material Training Technical Training Personnel Department, Union Pacific Railroad, Christofer Centre, 1000 G Street, Suite 200, Sacramento, California 95814. 1987. 35 pages.

This student manual was developed to help railroad employees and local emergency response personnel favorably change the outcome in accidents involving tank cars transporting either hazardous materials or non-hazardous materials. The book includes information pertinent to tank car specifications, construction and fittings with detailed information on shipping documents and categories of tank cars in use.

14. Hazardous Material First Responder Course. U.S. Environmental Protection Agency and Union Pacific Railroad, Christofer Centre, 1000 G Street, Suite 200, Sacramento, California 95814. Undated. 115 pages.

This student manual was developed for railroad employees and local emergency response personnel who are first on the scene of a hazardous materials emergency. Specific information is provided on identification of hazardous materials problems, incident analysis, toxicology, person protective equipment, decontamination, response operation procedures, contingency planning, development of resources, beginning the hazard analysis process and other topics.

15. Study of the Hazardous Materials Management Committee on Chemical, Toxic and Low-Level Radioactive Wastes, Bulletin No. 87-4. Legislative Commission of the Legislative Counsel Bureau, State of Nevada, Capitol Complex, Carson City, Nevada 89710. 1986. 297 pages.

This report was produced by subcommittee to conduct an interim study of the history, rules and procedures for the transportation, handling, storage, emergency response and disposal of hazardous materials including chemical, toxic and low-level radioactive wastes. In addition to recommendations made as a result of the study, the report contains specific information pertaining to transportation issues and identifies hazardous materials transportation routes. Among the topics addressed are pre-notification requirements for shipments of hazardous materials or wastes; training and equipment for response personnel; centralized statewide data and information system; and, identification of state and federal statutes and regulations defining hazardous substances, hazardous materials, radioactive wastes and hazardous wastes.

16. Study of the Hazardous Materials Management Committee on Chemical, Toxic and Low-Level Radioactive Wastes, Bulletin No. 88-1. (Supplemental report to Bulletin No. 87-4). Legislative Commission of the Legislative Counsel Bureau, State of Nevada, Capitol Complex, Carson City, Nevada 89710. 1988. 181 pages.

This companion document to Bulletin No. 87-4 was developed as an update of information pertaining to the field of hazardous materials management and issues, and in the wake of legislation developed during the 1987 Session of the Nevada Legislature including measures addressing critical issues associated with transportation, routing, permits and inspection activities, emergency response and funding for hazardous materials programs. Included in the volume are a number of recommendations for consideration by the 1989 Session of the Nevada Legislature.

17. Comprehensive Plan, City of Henderson, Nevada. Development Services Department, City of Henderson, 243 South Water Street, Henderson, Nevada 89512. 1986. 179 pages.

Developed as an advisory plan to foster specific ordinances and regulations, the Comprehensive Plan of the City of Henderson includes a profile of the development of the community, its population and economic base as well as community services. The plan addresses planning issues dealing with residential, industrial, general business, recreational and other land uses as well as annexation.



18. Hercules Area Master Plan. Salt Lake County Public Works Department Planning Division, Salt Lake County Government Center, North Building, 2001 South State Street #N3700, Salt Lake City, Utah. 1987. 35 pages.

During the 1970's controversy developed over allowing residential uses in the vicinity of the Hercules Bacchus Plant near West Valley City, Utah. As a result, the Salt Lake County Planning Commission began a study in 1978 to determine the nature of the hazards to safety that would be created by an accidental explosion at Hercules, and to develop a land use plan and strategy for the area that would be affected. Recommendations developed as a result of the study are included in the plan with "overpressure zone" approaches to development planning in the affected areas.

19. West Valley City Overpressure Zone Ordinance. West Valley City Community Development Department, 2470 South Redwood Road, West Valley City, Utah 84119. 1988.

This ordinance addresses overpressure zones and land uses, commercial and industrial uses, existing ordinances, notification requirements and glass requirements for windows, doors and skylights, and is a direct result of the Hercules Area Master Plan and study.

20. 1987 Emergency Response Guidebook, A Guidebook for Initial Response to Hazardous Materials Incidents. U.S. Department of Transportation, Research and Special Programs Administration, Office of Hazardous Materials Transportation, Washington, D.C. 1987. 226 pages.

This guidebook was developed for use by firefighters, police and other emergency response personnel as a guide for initial action to be taken in order to protect responding personnel as well as the public during incidents involving hazardous materials. The guidebook contains guides which provide only the most vital information in a brief, practical form with identification of the most significant potential hazards. Included is information and guidance on initial action to be taken. Explanations of terms, types of placarding and resources is also outlined.

21. School Science Laboratories--A Guide To Some Hazardous Substances. Council of State Science Supervisors, National Institute for Occupational Safety and Health, U.S. Consumer Product Safety Commission, Washington, D.C. 20207. 1984. 58 pages.

This publication was written as a supplement to the NIOSH Manual of Safety and Health Hazards in the School Science Laboratory to identify certain potentially hazardous substances that may be in use in many school laboratories and to provide an inventory of these substances so that science instructors may take the initiative in providing for the proper storage, handling, use and, if warranted, removal of hazardous materials.

22. A Light on Workers' Compensation, A Guide to Workers' Compensation in Nevada. Nevada State Industrial Insurance System, Capitol Complex, Carson City, Nevada 89710. 1986. 33 pages.

This booklet is an introduction to workers' compensation insurance in Nevada and Nevada's State Industrial Insurance System. The information is intended for employers insured by SIIS and their employees. Although general rather than specific, the booklet addresses most questions about workers' compensation coverage in Nevada with topics covering rates; payroll reporting; premium and coverage information; responsibilities of employers and employees when there is an injury; and, an outline of benefit services.

23. Occupational Health & Safety. "Right To Know Laws: A Guide To Maintaining Compliance." Brian M. O'Neill, James M. Stone, Bruce T. Rosenbaum. Medical Publications, Inc. 225 N. New Road, Waco, Texas 76710. Volume 57, Number 6. June 1988. Pages 28-36, 48.

Occupational Health & Safety is a periodical which addresses numerous issues pertaining to occupational health and safety. In particular, this article deals with the Right-to-Know Laws which compel managers to disclose the presence of hazardous substances to employees and customers to provide an awareness of potential exposure hazards; and to emergency response agencies to plan for prevention or mitigation of hazardous materials incidents.

24. City of Reno Land Use/Transportation Guide. City of Reno Department of Planning and Community Development, P.O. Box 1900, Reno, Nevada 89501. 1984. 1 page.

The document is a full-color folded guide to transportation links within the City of Reno while also identifying land use throughout the city via color charting including identification of such uses as distribution and warehousing, manufacturing, residential areas by category, open spaces and recreational areas and other land use categories. Included is a profile of land use, housing, population and economic figures.

25. Hazardous Materials Emergency Planning Guide (NRT-1). National Response Team of the National Oil and Hazardous Substances Contingency Plan, G-WER/12, 2100 2nd Street S.W., Washington, D.C. 20593. 1987. 123 pages.

The National Response Team (NRT) is composed of 14 federal agencies with major responsibilities in environmental, transportation, emergency management, worker safety and public health areas, and is the national body responsible for coordination of federal planning, preparedness and response actions related to oil discharges and hazardous substances releases. The NRT is responsible for publishing guidance documents for the preparation and implementation of hazardous substance emergency plans. NRT-1 provides a guide through which federal, state and local agencies can plan for hazardous materials incident prevention and response and covers such specific topics as hazards analysis; organization of planning teams; development of emergency plans and continual planning efforts after initial plans have been developed. NRT-1 has been written as a companion document to Technical Guidance for Hazards Analysis.

26. Technical Guidance for Hazards Analysis--Emergency Planning for Extremely Hazardous Substances. U.S. Environmental Protection Agency, Federal Emergency Management Agency, U.S. Department of Transportation, 401 M. Street, S.W., Washington, D.C. 20460. 1987. 186 pages.

This guide, companion document to Hazardous Materials Emergency Planning Guide (NRT-1), provides technical assistance to the Local Emergency Planning Committees in the assessment of lethal hazards related to potential releases of extremely hazardous substances. The booklet provides information on methods of hazards analysis for extremely hazardous substances as well as utilization of the results of analysis activities to assist in the development of local emergency plans.

27. Hazardous Waste Management Plan. Nevada Division of Environmental Protection, 201 South Fall Street, Capitol Complex, Carson City, Nevada 89710. 1987. 59 pages.

The primary purpose of this plan is to address the proper management of hazardous waste in Nevada and includes information pertaining to generation and management of hazardous wastes in the state by both large generators and small-scale generators. The plan deals with transportation, hazardous waste management facilities, and addresses selected management alternatives as well as resource allocation.

28. Regulations for the Nevada Occupational Safety and Health Enforcement Program, Nevada Administrative Code 618.010-618.848. Nevada Division of Occupational Safety and Health, Capitol Complex, Carson City, Nevada 89710. 1986. 93 pages.

These regulations supplement Nevada Revised Statute 618, the Nevada Occupational Safety and Health Act adopted in 1973. The regulations provide enforcement guidelines, recordkeeping requirements, procedures for obtaining variances from the standard, and practice before the Review Board. In addition, there are standards included addressing pressure vessel and elevator safety. However, there are no provisions specifically addressing hazardous materials.

29. Occupational Safety and Health Standards for the Construction Industry, Code of Federal Regulations (29CFR1926). Nevada Division of Occupational Safety and Health, Capitol Complex, Carson City, Nevada 89710. 1986. 213 pages.

The Division of Occupational Safety and Health adopted 29CFR1926 due to the uniqueness of the hazards present in the construction industry. These safety standards only apply to construction projects and were adopted in 1971 with provision for continual revision. This standard was adopted from the Code of Federal Regulations verbatim and includes standards on toxic chemicals, personal protective equipment, fire protection and the use of explosives.

30. Occupational Safety and Health Standards for General Industry, Code of Federal Regulations (29CFR1910). Nevada Division of Occupational Safety and Health, Capitol Complex, Carson City, Nevada 89710. 1986. 573 pages.

The Nevada Division of Occupational Safety and Health adopted 29CFR1910 verbatim in 1971 as a statewide minimum standard. In addition, NDOSH adopted national consensus standards derived from the American National Standards Institute and the National Fire Protection Association as agency safety and health standards. Included in these standards are those specifically addressing means of egress, hazardous materials, personal protective equipment, fire protection, materials handling, air contaminants and hazards communication. In addition, OSHA has promulgated new standards on emergency response operations to protect employees at hazardous materials incidents.

31. 1985 Uniform Fire Code, A supplemental Document Completing the Fire Code of the City of Las Vegas. City of Las Vegas Department of Fire Services, 500 Casino Center Boulevard North, Las Vegas, Nevada 89101. 1987. 20 pages.

This addition to the Uniform Fire Code of the Western Fire Chiefs Association and the International Conference of Building Officials, adopted as a minimum standard by the Nevada State Fire Marshal and the City of Las Vegas, addresses particular needs on the local level in the City of Las Vegas and is an example of how a jurisdiction may adopt more stringent standards than the minimum. Among the areas addressed are those which deal with water supply, fire alarm signalling systems, fire extinguishing systems, flammable decorative materials, fire prevention programs and matters pertaining to flammable liquids and storage containers as well as specific standards adopted by the City of Las Vegas.

32. Before the Fire--Fire Prevention Strategies for Storage Occupancies. National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269. 1988. 17 pages.

Devastating fires in a number of warehouses and distribution centers have resulted in a number of multimillion dollar losses. In a significant number of cases, the warehouses were equipped with automatic sprinkler systems and other built-in fire protection systems, yet fast-spreading fires overpowered these systems and were beyond control when local fire departments arrived. This has been particularly disturbing to those who were familiar with the exemplary record of successful sprinkler operation. The problem can be traced to a lack of hazard awareness and human behavior

that has compromised the protection offered by sprinkler systems and other safeguards. Although the built-in protection was specifically designed for a certain storage environment, passing years often result in a changing storage environment more hazardous than originally planned. This may be due to an increased quantity or height of storage as well as a change in the type or arrangement of materials stored. This report addresses these points with a view towards prevention of warehousing and distribution center fires.

33. Community Teamwork: Working Together to Promote Hazardous Materials Transportation Safety. U.S. Department of Transportation, Research & Special Programs Administration, Materials Transportation Bureau, Washington, D.C. 1983. 70 pages.

This guide was designed to provide ideas on how to develop a hazardous materials transportation safety program at the most economical cost. Examples are presented of different state and local agencies sharing the cost of providing labor, equipment and materials. Ways in which private industry have supported state/local safety programs are also identified to help maximize the use of available federal, state and local resources, and increase inter-agency cooperation; consolidate hazardous materials transportation activities with other state/local programs; expand the use of mutual aid agreements; maximize the use of part-time and volunteer staff; and, encourage greater local industry involvement in hazardous materials incident prevention and emergency response activities.

34. Risk Assessment for Pollution Liability, A Survey of Insurers and Environmental Consultants. The All-Industry Advisory Council, 1200 Harger Road, Suite 222, Oak Brook, Illinois 60521. 1985. 33 pages.

This document is the result of a study by the All-Industry Research Advisory Council, which was formed by the property-casualty insurance industry to provide the public and the industry with timely, reliable research information relevant to public policy issues affecting risk and insurance. This report describes how insurance companies assess the physical hazards involved in handling substances that can pollute the environment and generate liability insurance claims. Findings are based on a survey of 14 insurance companies writing pollution liability coverages and nine environmental

consultants active in providing risk assessments for insurance purposes. Other related surveys deal with the underwriting and claims handling aspects of insuring gradual pollution hazards such as seepage from storage tanks or storage sites and facilities.

35. The Trade Union Report on Bhopal. International Confederation of Free Trade Unions, International Federation of Chemical, Energy and General Workers' Unions, Geneva, Switzerland. 1985. 20 pages.

This report was developed following the 1984 leak of methyl isocyanate at the Union Carbide pesticide plant in Bhopal, the capital of the state of Madhya Pradesh, Indian, in which at least 2,500 were killed and more than 200,000 were injured. The report is an account of the accident and the factors which caused it, mostly based on information obtained from workers, which detailed weaknesses in the safety of the plant. The report outlines the fact that none of the factors that caused or contributed to the Bhopal accident were unique to the Union Carbide plant and are, in fact, common to many chemical manufacturing and other industrial processes throughout the world.

36. Engineering & Safety Service Index of Technical Reports and Bulletins. American Insurance Services Group, Inc., Engineering & Safety Service Information Center, (212) 669-0478. 1988. 26 pages.

This publication indexes the Engineering & Safety Services Technical Report and Bulletin series to assist in the study of specific materials, processes and other information including those areas dealing with specific hazardous materials or the processes in which they are used.

37. Hazardous Substances, Chemicals, Explosives and Inflammable Materials Reference Bibliography, A Bibliography Created for the Henderson Commission. Combined staffs of the Nevada State Library and Archives and the Nevada Supreme Court Library, Capitol Complex, Carson City, Nevada 89710. 1988. 13 pages.

The compilation of representative resource materials, published since 1983, includes only monographic materials, sets and loose-leaf services which are received on a subscription basis. No search of indexes was made to develop a listing from periodical articles, technical reports, case law or on-line databases.

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