METHODOLOGIES AND SUPPORT INSTRUMENTS IN THE PREPARATION AND RESPONSE TO CHEMICAL ACCIDENTS

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TABLE OF CONTENT

METHODOLOGY

Before presenting the results of the working groups, it is necessary to provide a little information about the criteria used for the exercise.

After the group discussion had concluded and each participant had been given the procedure, the participants filled out worksheets containing the following information:

1. Hazardous facilities or entities that pose a threat to the community.

2. The operation or operations carried out in the selected area.

3. The substance or form of energy that is considered hazardous, indicating amount, degree of toxicity, flammability or explosiveness, etc.

4. Type of accident that could be caused by each hazard. Can include landslides, collapse of buildings, floods, chemical leaks, fires, explosions, collisions, etc., or a combination of several types of accident.

5. People, property, or entities that are threatened.

6. Scale of consequences.

7. Consequences for human life, possible number of dead and/or injured.

8. Consequences for the environment.

9. Consequences for material goods.

10. The speed with which the accident could develop and the duration of the danger.

11. Probability of the accident.

12. Assessment of the different types of consequences, assigning a priority to each.

13. Relevant comments.

The following classes and characteristics were used in completing the forms.

Consequences for Life and Health

Class	Characteristics
1. Unimportant	temporary slight discomfort
2. Limited	a few injuries, long-lasting discomfort
3. Serious	a few serious injuries, serious discomfort
4. Very serious	a few (more than 5) deaths, several serious injuries (20), critical injuries, up to 500 evacuated
5. Catastrophic	several deaths (more than 20), hundreds of serious injuries, more than 500 evacuated

Consequences for the Environment

Class	Characteristics
1. Unimportant	no contamination, localized effects
2. Limited	simple contamination, localized effects
3. Serious	simple contamination, widespread effects
4. Very serious	heavy contamination, localized effects
5. Catastrophic	Very heavy contamination, widespread effects

Consequences for Material Goods

Class	Total cost of damage (millions of dollars, pounds, etc.)
1. Unimportant	< 0.5
2. Limited	0.5 - 1
3. Serious	1 - 5
4. Very serious	5 - 20
5. Catastrophic	> 20

Speed of Development

Class	Characteristics
1. Unimportant	localized effects/no damage
2.	
3. Medium	some spreading/small damage
4.	
5. No warning	Hidden until the effects are fully developed/immediate effects (explosion)

Probability

Class	Probability
1. Improbable	Less than 1 per 1,000 years
2.	1 per 100-1,000 years
3. Quite probable	1 per 10-100 years
4.	1 per 1-10 years
5. Very probable	More than 1 per year

PRIORITY

E Hazardous facilities and operations where an accident could have CATASTROPHIC consequences for life, the environment, or material goods. Situations in which rescue efforts may be too difficult or large in scope for local authorities. Reinforcements for the authorities and neighboring industries will be needed.

Actions

Damages can be reduced or, if possible, eliminated.
Preventive measures should be taken.
Planning for personal protection (on-site and/or evacuation) should be ensured.
Risks should be taken into account in the planning of rescue services--special equipment and specially trained personnel may be necessary for medical services, ambulances, police, etc.

D Hazardous facilities and operations where the consequences of an accident could be VERY SERIOUS.

Rescue efforts may be difficult, but it is possible to deal with the accident using the rescue/ fire brigades of the local authority and the personnel/resources of the industry in question.

Actions

Very similar to those listed under point E.

C Hazardous facilities and operations where the consequences of an accident could be SERIOUS. Local rescue (fire) brigades and industry have the resources to carry out rescue efforts.

Actions

Preventive measures.
Emergency planning.

B Hazardous facilities and operations where an accident would have LIMITED consequences for life, the environment, or material goods.

Actions

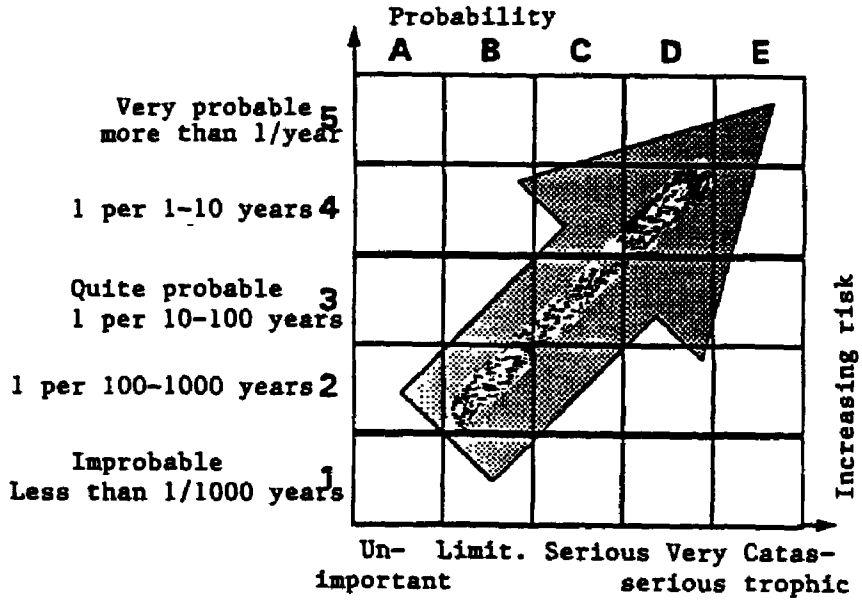
Preventive measures.
Emergency planning.

A Hazardous facilities and operations where the consequences of an accident would be UNIMPORTANT.

RISK CLASSIFICATION

Each facility or operation should be given an overall risk classification based on the matrix in Figure 1.

Figure 1. Risk Matrix



After these exercises are completed, Step 3 of the APELL Process "Development or review emergency plans and identify weaknesses" should be undertaken, together with actions to prevent accidents.

Listed below are the results obtained for the cities of Orizaba and Córdoba (state of Veracruz, Mexico).

RISK IDENTIFICATION AND ASSESSMENT

Objective

1. Locate the hazardous facilities or operations in the city of Orizaba that might cause accidents with serious consequences.
2. Define the risks, threats, and hazards present in the city of Orizaba.
3. Assess the risk and danger zones associated with the hazardous facilities or operations.
4. Rank the hazardous facilities or operations.
5. Communicate the results of the assessment.

Working Group

Name	Institution
1. Mr. José Narciso Carmona Rojas	Metalúrgica Veracruzana
2. Mr. Raúl Castillo Arteaga	Cementos Apasco
3. Mr. Luis Miguel Cerón Calderón	Kimberly Clark
4. Mr. Carlos Dávila Valdéz	Kimberly Clark
5. Ms. María de la Paz de Salgado	Red Cross - Orizaba
6. Mr. Joaquín Falcón Lara	San José de Abajo sugar mill
7. Mrs. Gloria E. Garay	Lubricantes PEMEX - Orizaba
8. Mrs. Rebeca Hernández Herrera	Civil Defense- Orizaba
9. Mr. José Luis León Pineda	PROQUINA
10. Dr. Adolfo Merelo Anaya	Red Cross - Orizaba
11. Sr. José Rangel Luna	Kimberly Clark
12. Mr. Gonzalo Rosas Leal	PROQUINA
13. Mr. Erick Teniente Nivón	Mexican Red Cross
14. Mr. Carlos Trueba Coll	Red Cross - Orizaba
15. Mr. Ignacio Vergara Luján	Kimberly Clark

Results

The results obtained from the analysis are shown on Worksheets 1-10, annexed.

To facilitate completion of these worksheets, the following risk matrixes were created.

RISK MATRIXES

1. Cementos APASCO
[APASCO Cements]

	A	B	C	D	E
5					
4					
3		X		X	
2					
1					

2. Cafés Industrializados de Veracruz
[Veracruz Coffee Industries]

	A	B	C	D	E
5					
4			X		
3		X			
2					
1					

3.Cervecería Moctezuma
[Moctezuma Brewery]

	A	B	C	D	E
5	X				
4		X			
3			X		
2					
1					

4. Embotelladora Tropical PEPSI
[Pepsi Bottling Company]

	A	B	C	D	E
5	X				
4		X			
3			X		
2					
1					

5. Fertilizantes Mexicanos
[Mexican Fertilizers]

	A	B	C	D	E
5				X	
4					
3		X			X
2					
1					

6. Gasolineras
[gasoline stations]

	A	B	C	D	E
5					
4		X			
3					
2					
1					

In addition, an inventory was drawn up of the resources available in the city of Orizaba, Veracruz, to respond to emergencies that might occur in the region.

Inventory of Resources Available for Emergencies

Civil Protection:

- 3 VHF radios
- 5 tank vehicles

Mexican Red Cross:

- 8 VHF radios
- 1 UHF radio
- 1 citizens band radio
- 7 vehicles:
  - 2 type-2 ambulances
  - 3 type-1 ambulances
  - 2 trucks
- 35 paramedics
- 35 relief workers
- 9 drivers with one specialization
- 15 women volunteers
- 20 youth personnel
- 70 nursing auxiliaries
- 4 janitors
- 2 administrative personnel
- 9 drivers, all specialized
- 20 hospital beds
- 6 physicians
- 1 anesthesiologist
- 1 traumatologist
- 1 pediatrician
- operating room

Worksheet 3

COMMUNITY: Orizaba

OBJECT/ AREA: Cervecería Moctezuma

L = Life S = Speed
E = Environment Pb = Probability
P = Property Pr = Priority

1 Facility	2 Operation	3 Hazard (Quantity)	4 Risk-Type	5 Threatened Object	6 Consequences	7 - 10 Seriousness				11 PB	12 Pr	13 Comments
						L	E	P	S			
Moctezuma Brewery	food preparation	ammonia 20,000 kgs.	toxic substance	workers community environment	poisoning contamination	3	3	3	3	4	B	Estimate of damages to urban area, property, and area of the duct Emergency plan
	energy generation	LP gas 10,000 kgs.	explosion fire	workers, property community	fires, explosion	3	2	3	3	3	C	Military support, evacuation
	food preparation	soda 300,000 kgs.	corrosive substance	workers environment	contamination	2	2	1	3	5	A	Red Cross Fire dept.
	energy generation	gas (duct)	fire explosion	workers, property community	explosion, spills, damages to drainage system, drinking water distribution	4	3	4	3	3	C	Safety zone

COMMUNITY AWARENESS

Objective

To evaluate the current level of community awareness in the city of Orizaba, Veracruz, with a view to preparing appropriate emergency plans in coordination and cooperation with the government and industry.

Working Group

Name	Institution
1. Mr. Teodoro Álvarez Castillo	Fermentaciones Mexicanas
2. Dr. Angel Arandia Jiménez	Red Cross - Orizaba
3. Mr. Guillermo Beltrán Silva	Red Cross - Orizaba
4. Mr. Abraham Blanco Morales	Fermentaciones Mexicanas
5. Mr. Pablo Carrera Carrera	Escuadrón de Rescate 411
6. Mr. Luis Corona Reyes	Kimberly Clark
7. Mr. Manuel Díaz García	Ingenio San José de Abajo
8. Mr. Juan M. Díaz Rojas	Mexican Red Cross
9. Mr. Julián García Bustos	PROQUINA
10. Mr. Mauro Mendoza Hernández	Sílices de Veracruz
11. Mr. Héctor Molina Bustamante	PROQUINA
12. Dr. Elpidio Naranjo del Carmen	Red Cross
13. Mr. César Rosales Vega	Mexican Red Cross
14. Mr. Francisco Salgado Valle	Red Cross - Orizaba
15. Mr. Jorge Toscano H.	Mexican Red Cross

Results

Current level of community awareness and preparedness

I. Description of the local community involved

Table 1. Agencies Involved in Emergency Response in the Community

Agency	Yes	No	Location	Resources	Comments
Fire department	X		Boulevard Miguel Alemán 21	56 people, 3 fire engines, 3 rescue vehicles	volunteer personnel, lack of HazMat equipment
Police and highway patrol		X			
Medical/paramedical services associated with local hospitals, the fire department, or the police	X		Cruz Ámbar. Comisión Nacional de Emergencia [National Emergency Commission]	1 ambulance Other resources unknown	Volunteer personnel Few resources
Emergency management service or civil protection	X		Palacio Municipal de Córdoba	1 council president	Adequate
Public health agency	X		ISSSTE, Seguro Social, Hospital Civil	2nd and 1st. levels	Acceptable
Environmental protection agency	X		PROFEPA	2	Acceptable
Public works and/or transportation departments	X		Calle 3 between Calle 1 and 5		Acceptable
Cruz Roja [Red Cross]	X		Juan Enrique Durant 709	80 people, 5 ambulances	Acceptable
Public shelters	X		Gymnasium, Centro Deportivo Parque Madero	Capacity: 120	Deficiencies in toilet facilities
Schools	X		116 primary, secondary, post-secondary schools		
Others					

ANNEXES

SOCIAL, LEGAL, AND TECHNICAL IMPLICATIONS

A. SOCIAL
- CULTURAL CHANGE
- CREDIBILITY
- TRUST
- IMAGE

B. LEGAL
- BUFFER ZONES
- ENVIRONMENTAL MANAGEMENT
- RISK MAPPING
- ENACTMENT OF ESSENTIAL LAWS

C. TECHNIQUES
- INVEST IN MODERN TECHNOLOGY
- CONDUCT INVENTORIES
- CARRY OUT RISK ASSESSMENTS
- UPDATE EMERGENCY PLANS

IMPLEMENTATION OF APELL IN LATIN AMERICA

1.	**ARGENTINA**		
	• BAHIA BLANCA	(NATIONAL)	MARCH 1996
2.	**CHILE**		
	• SANTIAGO	(NATIONAL)	APRIL 1995
	• CONCEPCION	(LOCAL)	APRIL 1995
	• VALPARAISO	(LOCAL)	AUGUST 1995
3.	**MEXICO**		
	• MONTERREY	(LOCAL)	APRIL 1993
	• COATZACOALCOS	(LOCAL)	NOVEMBER 1993
	• POZA RICA	(LOCAL)	MAY 1995
	• ORIZABA-CORDOBA	(LOCAL)	SEPTEMBER 1995
4.	**VENEZUELA**		
	• PUERTO MORON	(LOCAL)	JUNE 1995
	• MARACAIBO	(LOCAL)	JANUARY 1996
	• PUERTO LA CRUZ	(LOCAL)	FEBRUARY 1996