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MAJOR TECHNICOLOGICAL RISKS:
French Policy - Prevention and Emergency Management

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draft

France has not experienced emergency situations such as Seveso or Mississauga-Toronto to date. However, major technological risk is a real problem for our country as it is for any other industrialized country.

In fact, for the last twenty years, several events have occurred in France that clearly pose the challenge:

Feyzin, January 1966: Fire and explosion of an unconfined vapour cloud in a refinery (South of Lyon); 16 dead (many firemen) and 63 injured.

Lievin, 1968: Explosion of a truck filled with ammonia. Escape of a 19 ton toxic cloud; 6 dead, 10 hospitalized.

Grandes Armoises, 1969: Rupture of a hose during a transfer of ammonia from a fixed to a mobile tank. Toxic aerosol. Escape of 4 tons. Land affected (2 km x 450 m).

Saint-Amand-les-Eaux, 1973: Explosion of a truck filled with propane; 6 dead, 37 injured.

Pierre-Bénite, 1976, 1978: Discharge of a wagon (21 tons) filled with acrolein in the river Rhône (South of Lyon); fauna destroyed from Pierre-Bénite to Vienne (320 tons of fish). Escape of some 200 kg of acrolein into the atmosphere; inconvenience for several thousands people in the neighbourhood.

Pierrelatte, 1977: Escape of uranium hexafluoride and hydrofluoric acid (without consequences).

Amoco-Cadiz: 5th "black tide" on the French coast. Huge oil spill of 220 000 tons.

The first case - Feyzin - motivated the development of a general revision of the prevention system against industrial accidents: a new law in 1976 was the result. An innovative policy is being developed today in the field of prevention, that parallels the E.E.C. Seveso Directive, which has much in common with the British Health and Safety Executive System.

The last case - Amoco-Cadiz - underlined the major difficulties of managing large emergency situations.

We shall successively examine these two points - prevention and reaction to major emergencies. In particular we will outline the general framework of emergency prevention and response as well as the recent developments in these fields.

1. Prevention of major accidents

1.1. General framework

The legislation in the field of industrial accidents prevention dates back to an imperial act of October 15, 1810. Modified in 1917 (and also in 1932, 1961), this legislation has been significantly modernized: the fundamental texts are now the Law of July 19, 1976, the "Registered Works for Environment Protection", and the Decree of September 10, 1977.

On the national level, the relevant administrative action is under the responsibility of the Direction de la Prévention des Pollutions (Service de l'Environnement Industriel, Ministère de l'Environnement). On a local level, it is the responsibility of the Inspectorate of Registered Works whose functions are carried out under the authority of the Préfets by the "Directions Interdépartementales de l'Industrie".

The main principles of this legislation are as follows:

a) Procedures

The types of installations which must be regulated are specified in an official list that is periodically modified. According to quantitative thresholds, it is determined whether an installation must be "authorized" or just "declared". Each year, about 2 500 authorizations are issued for the creation or substantial modification of an

industrial activity; 50 000 installations are under the authorization requirement.

Activities referred to in the list must comply with technical regulations; specifying, for instance, the measures to prevent fires, explosions or accidental discharges. These regulations are made specific to each installation: they are the "end product" of a technical analysis applied to the project requiring an authorization.

The decision-making process is decentralized and subject to cross-examination. The purpose of the legislation concerning industrial hazards is to assure open procedures which allow the true expression of different points of view and, as such, ensure that the final decision will be the result of a real arbitration process, in particular clarified by both technical and economic analysis. The process is designed to avoid heavy handed procedures and to enable decisions to be reached at a local level where all the various factors can best be assessed.

The final decision is made by the Préfet. However, it is issued at the end of an open and adversary procedure, including a public inquiry (conducted on the basis of a precise report on the project) and the consultation of different departmental organizations (i.e. Conseil Départemental d'Hygiène).

If the project passes the procedural stage, a prefectural authorization settles the technical regulations for the operating conditions as well as the disposition for control.

b) Technical studies

According to the 1977 text the manufacturer must, in particular:
- submit with this application a study of the impact of his project on the environment;

- attach to his application a study of the dangers ^{*} presented by its project (Art. 3, 5);
- report any significant modification of the installation to the administrative authority (Art. 20);
- report significant incidents to the administrative authority (Art. 38).

Article 3, 5: A study setting out the dangers which the installation may present in case of an accident and justifying the measures to reduce the probability of its occurrence and its effects as determined under the responsibility of the applicant. ^(Risk to be attacked) This study shall spell out the consistency of the organization of the private means of emergency at the disposal of the applicant or such as he has ascertained to be available for combating the effects of an eventual accident, taking into consideration the public means of rescue known to him.

Article 20: Any modification made by the applicant of the installation, of its manner of utilization or its environment of such nature as to cause a notable change of the elements of his application for an authorisation shall be brought to the attention of the Préfet together with all information required for evaluation before it is carried out.

Article 38: The operator of an installation subject to authorization of declaration has a duty to declare without delay to the inspectorate for registered installations all accidents or incidents that have occurred on account of the functioning of this installation (...).

c) The cross-examination process: a few details

1. When the Préfet considers that the application is complete he shall, by order, direct the opening of a public inquiry. Such order shall specify:

* This is not a detailed risk assessment which is now developed for some of the most "dangerous" installations.

- the subject and date of the inquiry;
 - the time and place at which the public may inspect the application and record their observations;
 - the name of the Commissioner holding the inquiry;
 - the area within which the notice to the public will be displayed.
- Thus, the general public will have direct access to the application and be able to express their ideas about it. At the request of the applicant, the Préfet may remove from the documentation any items that involve the disclosure of manufacturing secrets.

2. After the closure of the inquiry the Commissioner shall communicate to the applicant the observations made; the applicant must submit a written reply.

3. The Commissioner shall, then, forward the inquiry papers to the Préfet with his reasoned conclusions.

4. At the opening of the inquiry, the Municipal Council of any commune concerned by the project is asked to state its opinion.

5. When the inquiry is opened, the Préfet shall forward a copy of the application for review to his technical services.

6. All these documents are studied by the Inspection Service for Registered Installations, which prepares a report.

7. This report is submitted to the Health Council of the department.

8. The applicant is heard by this Council.

9. In view of the opinion of this Council, the Préfet prepares a draft order which is brought to the attention of the applicant; he submits his written observations to the Préfet.

10. Finally, the Préfet takes his decision: an order of authorization is issued which contains specific rules; these rules have particular

regard to the efficiency and economy of available techniques as well as the quality, function and use of the surrounding environment.

1.2. Recent developments and perspectives

The 1976 Law and the 1977 Decree introduced new concepts to industrial risks policy and management, by clarifying the several intervening parties' responsibilities, reinforcing the technical requirements, and opening the decision process to a larger public.

In the last several years, the Ministry of the Environment has made a major effort to take into account major risk. At present, the concerned manufacturers are asked to prepare more precise and developed studies on risks.

The experiences in the nuclear field have served as a guide to define methods of risk analysis and control. The industrialists are for instance required:

- to describe their installations and their projects;
- to record the dangers:
 - . given the products used,
 - . given all possible reactions,
 - . given the processes in use;
- to record the safety measures adopted;
- to emphasize particularly the most serious menaces connected with the execution of the project.

Such a safety study was first applied to extensions of the Rhône-Poulenc factory at Grand Quevilly (in 1976) which involved the construction of a synthesis unit of ammonia (1000 t/day) and the setting up of a cryogenic storage of 24 000 tons of ammonia. Some ten safety studies have been realized since then.

On November 26th, 1981, the Minister of the Environment announced his decision to develop in-depth safety studies to be applied to the most dangerous installations selected from the 50 000 requiring authorizations. Some 20 installations are to be studied each year. And, more generally, the problem of major hazard has become an important item of the Ministry and its services. It played a key role in the adoption by France of the Seveso Directive at the E.E.C. level.

1.3. Two specific fields

a) Transport of dangerous products

The Ministry of Transport is in charge of the problem. The French system lists chemicals or groups of identical chemicals by a group number consisting of a series of figures denoting the class, category and order of the product within a category. Thus hydrochloric acid is listed as 51. 405. All container transport (where one vehicle carries bulk chemicals) must have:

- (a) a yellow card in the driver's cab indicating an authorization to transport (given by the Service des Mines after checking the container);
- b) a bill of loading listing name and number of chemical according to the French system;
- (c) a security card which must show the danger, the appropriate response, safety measures, fire precautions;
- (d) an orange label displayed on the vehicle with two code numbers and a hazard warning diagram. Hydrochloric acid has a label with two numbers 88 and 1789, the first signifying the danger, the second the chemical according to the U.N. scheme.

Certain mechanical safety rules are enforced for vehicles carrying explosives and all heavy vehicles are subject to speed limits and other temporal and spatial route restrictions.

b) Nuclear installations

During the debate on the adoption of the 1976 Law on registered installations, it was underlined several times by the Minister that nuclear centers are outside the field of application of the new 1976 Law and would be covered by special laws.

We mention here only some aspects of this legislation on nuclear installations; this legislation has been growing incessantly since the 60s.

In the first place it must be emphasized that in France (an exceptional situation among O.E.C.D. countries) there is no general law on nuclear installations. All the texts governing this activity are therefore drawn up by the single regulatory authority, and Parliament has only to pronounce on them. Thus one finds a large number of provisions given in the form of decrees which apply various laws like those of 1917 on registered installations, of 1961 on atmospheric pollutions, odours, etc.

The essential text among these multiple provisions is the decree of December 11, 1963 which establishes the list of "basic nuclear installations", stipulates that they can only be created after an authorization has been issued by decree after a public inquiry, an advice from an interministerial commission and an approving opinion from the Minister for Health. They are subject to control by especially assigned inspectors belonging to the Central Service for the Protection against Ionising Radiation (S.C.P.R.I.). This text was completed and modified by a second decree of March 17, 1973.

The authorization procedure for the creation and control of an installation is, in short as follows: the regular activity of the public authorities in this field is exercised along three principal mutually complementary lines:

- a system of individual authorizations for each installation;
- the drawing up and application of general technical rules;
- supervision.

The request for authorization is accompanied by a "preliminary safety report". This report is analyzed by the Department for Nuclear Safety (Commissariat à l'Energie Atomique), which reports in turn to a "Permanent Group" of experts in the Ministry of Industry. This group subsequently transmits the file to the S.C.S.I.N. (Central Service for Nuclear Installation in the Ministry of Industry) which gives its opinion on the safety of the installation and spells out the conditions that must accompany the authorization. The S.C.S.I.N. establishes a draft decree of authorization and consults the Inter-ministerial Commission for Basic Nuclear Installation; the approval from the Minister of Health is then requested before the authorization is signed. In the case of reactors a "provisional safety report" is established six months before fuel is loaded; it goes through the channels up to the S.C.S.I.N. which proposes the authorization of the loading to the Minister. Finally, before normal operation starts, the operator has to submit a "final safety report" which leads, under the conditions provided, to the authorization for the start of operations.

In parallel with this, there is a public inquiry at the local level to obtain the declaration of public usefulness. This consultation is of the same type as the one provided for registered installations. The conclusions by the inquiry officer are sent to the Minister of Industry by the Préfet. They then enter into the national procedure which will take its course and may finally lead to the necessary authorizations.

2. Emergency organization

2.1. General framework

The organization of emergency planning in France is co-ordinated by the Ministry of Interior but, at the same time, under the responsibility of the local government at the level of the Département.

a) Historical references

1716: The first professional firemen appeared in Paris; but elsewhere rescue organizations were left to charitable bodies.

1810: The fire at the Austrian embassy led Napoléon to dissolve the civilian body in charge of Paris emergencies and to give this responsibility to an infantry battalion.

1938: The fire at the "Nouvelles Galeries" in Marseilles was decisive. Up to that time the cities - except Paris - remained poorly organized in face of fire and emergencies. The notion of safety was still very vague and on the eve of the Second World War two thirds of the French cities were without proper fire companies. The 1938 fire in Marseilles caused the necessary psychological shock: it became clear that rescue could no longer be left in the exclusive care of local communities and that they had to be adapted to the size of the potential risks. Modern transport and communication networks gave rise to a re-thinking of the organization which until then had been conceived strictly on a local level. Thus, the idea was born that the government should guide, sustain and coordinate the efforts of the municipalities with a view to intervening directly with powerful means in extreme cases.

Second World War, an integrated approach: peace-war-time organization. The law of July 11, 1938 provided an organization for war-time. The service created for this purpose on the national level, the Directorate of Civil Defence, was to be placed under the authority of the

Ministry of Defence. It was later transferred (law of March 16, 1942) to the Interior Ministry. In 1943 (law n° 597 of September 20), Civil Defence and Emergency services were joined under a General Directorate for Civilian Protection (Direction Générale de la Protection Civile).

The post-war period, due to various events (creation of the French nuclear force, the Korean war, the large forest fires in Les Landes in December 1949), confirmed this integrated organization of the defence against events seriously affecting the population. The decree of November 17, 1951 (n° 51-1314) upheld the choice made in 1943 and created the National Civil Protection Service within the Interior Ministry to be in charge of protecting the life and the assets of citizens in both peace-time and war. The Service was made official and given financial means in 1952 (decree of January 17).

1975: An important step was taken in 1975. The National Civil Protection Service became a high level body, ranking among the other important directorates of the Interior Ministry, and was renamed the Direction de la Sécurité Civile. This Direction was and remains in charge of the overall organization and coordination of emergency services throughout the country.

b) Basic organization, means and planning

The main function of the operational services of the Direction de la Sécurité Civile is to develop and coordinate the emergency response in case of major disasters. A national emergency room and état-major are ready to intervene from the headquarters near Paris.

Planning: the ORSEC^{*} plans (emergency organizations); The principle of an emergency organization in the form of plans established in advance and in a uniform manner for the whole country was established by an interministerial order of February 5, 1952. The ORSEC plan is at the same time a repertory of means in terms of men and equipment

* Organisation des SECours.

and a document that outlines the tasks and the command organization of rescue. Its framework is the département. The Préfet, as representative of the government, is responsible for its implementation, the training of staff, the start, conduct and halt of operations. For the execution of his command duties he has at his disposal a general staff, the head of which is the so-called departmental director of Civil Safety and an ad hoc group, consisting mainly of technicians chosen according to the type of accident.

The operating principle of this ORSEC organization is the coordinated utilisation of existing means, primarily the corps of firemen: 190 000 volunteers, 10 000 professionals and (in Paris and Marseilles) 7 000 military. The ORSEC plan permits the addition of other means which the Préfet considers useful (ambulances, public work machinery). If needed, reinforcements may be supplied by neighbouring départements and even by the region or on the national scale. If the situation requires, the Direction de la Sécurité Civile, which has a general staff and operations room, ensures coordination at the ministerial level.

The ORSEC plans were completed by a series of additional plans such as those concerning hydrocarbons (worked out after the Feyzin disaster in 1966), marine pollution (Polmar, 1971), the dangerous substances (ORSEC Tox Plan, 1972) and radioactivity (ORSEC Rad Plan, 1974).

Specific Intervention Plans: Complementing these structural plans, are an increasing number of established "Specific Intervention Plans" (PPI) * designed to guide rescue operations in case of accidents in specific plants. These plans deal in detail with operations on the level of internal emergencies as established by companies (such as for a refinery, petrol storage, hydrocarbon storage, or nuclear centre). These internal plans aim at internal accidents and are implemented under the responsibility of the factory director or the chief of the

* Plans Particuliers d'Intervention.

establishment until the ORSEC plan comes into operation, which marks the transfer of command to the Préfet. The concept here is to have a specific plan for a specific installation, and not only the overall ORSEC plan.

c) From the factory and the "commune" up to the Ministry

At the most local level, both emergency planning and response are the responsibility of the commune as set out in the Municipal Code. If the risks extend beyond the commune, authority passes to the next level of government, the département where authority and responsibility lie with the Préfet. In some cases, planning will also be carried out by the Préfet at the regional level, coordinating the activities of several départements.

A departmental plan will be established by a working group whose membership includes local representatives of the Ministries of Environment, Agriculture, Equipment, Health, Factory Inspectorate and Labour, and officials from the Gendarmerie, and the services for rescue and fire protection. The plan is distributed to the above authorities, to the Ministry of Interior, to local mayors, to rescue centres and hospitals.

The responsibility for response to an accident lies in the first instance with the industry of company using or transporting the material. Within the government, response to emergencies is the responsibility of the mayor, the Préfet or the Minister of Interior depending on the scope and severity of the accident.

d) System of alert and response

The sequence of alert and response to an accident in a static installation such as a factory is as follows (details of the recommended system of alert and response are set out in the ORSEC plan):

1- The internal security service of factory uses the on-site emergency plan and warns the local resident directly if there is an immediate risk.

- 2- The head of internal security service or factory manager alerts the local emergency services if the accident cannot be controlled by internal responses.
- 3- The installation alerts the mayor and the police.
- 4- The police informs the local factory inspector.
- 5- The mayor alerts the Sous-Préfet who informs the Préfet.
- 6- The head of the local police department reports to the office of the Préfet, as do the officials of the Centre de Secours (emergency centre).
- 7- On receiving the alert the Préfet establishes a control centre coordinated by the head of the cabinet and by the departmental Chief of Civil Protection.
- 8- In most cases if internal, on-site response is inadequate, the fire service will respond. The fire chief will coordinate his response with company officials and will be in charge of the operation until the Préfet assumes responsibility.
- 9- The Préfet will then request assistance, if needed, from the nearest technical, medical or other information and resource centres as listed in the departmental emergency plan.

2.2. Two specific fields

a) Transportation accidents

In the case of a road accident, the driver is responsible for the initial alert and will contact the local police and the shipper or receiver of the product he is transporting. The driver, if possible, attempts to limit the effects of the accident, and warns the neighbourhood (road signs, verbal directions, placement of the vehicle). If the driver is injured, witnesses will alert the police and attempt to rescue any victims. Any alert should give information on the location and nature of the accident and the name and number of the dangerous product which should be displayed on the vehicle.

The police alerts the competent local emergency service, the mayor, and the higher police authorities. As with a factory accident, both the police and the mayor report to the office of the Préfet. The departmental inspector of fire and emergency services will normally direct the operations. The fire service responds initially, using index cards kept by almost all fire stations which give information on the hazards and appropriate responses to most chemicals. The departmental inspector of fire and emergency services may seek advice and information from specialists listed in the ORSEC Tox plan. If necessary, experts will be flown to the site under the authority of the Direction de la Sécurité Civile. Assistance may also be requested from private industries or organizations that have special technical equipment.

Rail accidents need the same system of alert, except that the SNCF (rail operator) is also alerted. Inland water accidents also need the same system of alert, except that the engineer-in-chief of the navigation service participates in the coordination of response.

b) Nuclear accidents

The structural plan is called the ORSEC Rad plan. In addition, the manufacturer has an internal plan (Plan d'Urgence Interne - PUI: site emergency plans) and the public authorities specific PPI (general emergency plan).

On December 29, 1978 the Ministry of Interior published a diagram of PPI types and "recommendations for the preparation and the implementation of protection measures in the vicinity of electro-nuclear centres in case of incidents or accidents which might eventually have radiological consequences".

According to this text, each specific plan must include:

- a common core gathering the following elements:
 - . the concerned authorities,
 - . the methods for transmitting the alert,

- . the list of possible rescue measures,
- . the command structure;
- maps and plans;
- an operational document giving, according to the alert level:
 - . the concerned authorities,
 - . a diagram for diffusion of the alert,
 - . the means of transmission,
 - . the identification procedure for messages (preparation of standard type telegrams),
 - . the methods of transmission,
 - . the organization charts for the command structures,
 - . the description of the participating parties' functions,
 - . the list of means,
 - . a statement of possible intervention scenarios.

In case of accidents, nuclear organizations (Commissariat à l'Energie Atomique, Electricité de France), health organizations, such as the SCPRI (Service Central de Protection contre les Rayonnements Ionisants), and specialized teams (CMIR: Cellules Mobiles d'Intervention Radiologique) would intervene under the responsibility of the Ministries of Industry, Health and Interior.

2.3. Expertise centres

Apart from the organizations in charge of nuclear problems, different expertise centres must be mentioned:

- the Institut National de Sécurité produces data sheets on the toxicology of many chemicals which are circulated;
- centres of medical expertise include the 17 anti-poison centres located in different parts of France. The centres provide toxicological, medical and epidemiological information which can be obtained in the event of an accident. Most centres are located in hospitals or universities, have direct links with emergency services and offer a 24-hour service;
- the Ministry of Interior operates an operational centre with a

24-hour service for alerting and providing information on national civil protection and defence;

- the Ministry of Health is responsible for coordinating the SAMU centres system (Service d'Assistance Médicale d'Urgence), which provide emergency medical staff and resources in case of an accident;
- private companies operate mutual aid schemes, especially for chlorine, but such schemes are restrained since liability questions have not been solved;
- there is no central information centre on chemicals or chemical hazards, such as Chemsafe in the U.K. or Chemtrec in the U.S.A., although such a system is being considered.

2.4. Perspectives and developments

It has become clear that the problem of major technological risk is a crucial challenge to be met by emergency agencies. Different initiatives have been developed recently to achieve greater efficiency. These initiatives aim at:

- 1- preparing a new concept for ORSEC plans able to face very large disasters affecting more than one département. It is referred to as a national ORSEC plan;
- 2- preparing a more integrated emergency organization, with new links between the departmental level and the national one. The creation or the development of operational centres for regional and interregional levels is being considered after a first development in the South-East region (the CIRCOSC^{*} that coordinates all emergency responses against forest fire in the French Mediterranean zone - 14 départements);
- 3- increasing the capabilities of the national operations centre in the Direction de la Sécurité Civile Headquarters near Paris (transmission, expertise, information, data processing);
- 4- creating new capabilities to be sent to the disaster site, and an "advanced" operational centre able to face a major disaster when local structures are seriously affected by the event;

* Centre Interrégional de Coordination Opérationnelle de la Sécurité Civile.

- 5- creating "Etats-Majors" (disaster control groups) at different geographical places for facilitating a real strategic command of the overall management of a crisis;
- 6- reinforcing the leadership responsibilities in the case of major disasters. The recent law on "droit et liberté des communes, des départements et des régions", stipulates (art. 101): "when more than one department is affected, the Premier Ministre may entrust one - and only one - official representing the public authority, with taking the lead of the overall emergency operations";
- 7- training emergency officials for very large events;
- 8- organizing exercices for testing and developing the capabilities of the different organizations involved;
- 9- developing the regional assessments of major risk;
- 10- encouraging the efforts made in the field of emergency and disaster medicine.

In conclusion, it must be underlined that major technological risk is now becoming an acknowledged problem. Naturally, this acknowledgment is relatively new and the difficulties are numerous: there is still much to be done.

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