CONTROL OF URBAN DEVELOPMENT AROUND HIGH-RISK INDUSTRIAL SITES

-- EXPERIENCE IN FRANCE --

A DETERMINISTIC, CASE BY CASE APPROACH

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F R A N C E

I. THE HERITAGE OF THE PAST

The trend in industrial techniques and activities since the start of the century has resulted in more complex processes, greater manufacturing and storage capacity and the use of an increasingly wide range of substances, some of them highly toxic. These changes caused by the technological and economic development of our society have led to a marked increase in sources of risk.

At the same time, the population has increased greatly and, more importantly, has moved from country to town, which has resulted in heavy urban development, particularly around industrial sites, where jobs are to be found but also where the exposure to risks is the highest.

This trend has not been confined to the industrialized world, and has sometimes been even more pronounced in developing countries.

Towns have gradually moved closer to factories without anybody really asking whether this was acceptable; the only difficulties affecting their coexistence have been the complaints by local residents, mainly about noise, smell and dust.

The hazards caused by the proximity of towns and high-risk industrial plants were not widely realized until very recently, following accidents such as those in Bhopal and Mexico City, to name only the most significant, and most dramatic.

This heritage of the past is a regrettable one. It is hardly a reason for doing nothing now, or indeed in the future. Is the present situation, which is already very serious in some cases, to be allowed to grow worse on the

grounds that it is impossible to demolish or relocate all existing dwellings or industrial plants?

Another example is the leak of a toxic substance forming a cloud that drifts with the wind; if wind speed is 5 m/s, which is quite usual, within one minute the cloud will have travelled 300 m.

Can the population be evacuated or told to stay indoors at such short notice? Even if it was possible, is it certain that the entire population would heed the instructions? Moreover, in a critical situation, the best emergency plan can always go wrong, as some recent accidents have clearly shown. And even if they prevent casualties, emergency plans will not stop the destruction of buildings and therefore heavy economic losses in the event of explosions or fires. In this connection, it should be noted that implementing sophisticated emergency plans sometimes proves very costly.

At present, however, emergency plans are still a good way of trying to limit the effects of an accident.

Instead of prohibiting certain buildings in risk areas, one idea could be for them to be reinforced or incorporate specific design features.

The possible types of reinforcement include improved containment, mainly for toxic gases, with the use of double glazing, double doors and specific ventilation systems. But these measures do not provide full guarantees: will the siren be turned on in time, will the occupants close the windows, and will the ventilation system be out off? And few systems provide sufficient guarantees in the event of an explosion. In terms of effectiveness, such an approach thus cannot be compared with a building ban. In the case of existing buildings, however, it is obviously a useful extra precaution.

II.2 INTERNATIONAL ACTION

The major international organizations such as the Commission of the European Communities, OECD and UNEP have recently encouraged further study of urban development control in connection with their work programmes on technological risk prevention.

At a high-level Conference held in Paris in February 1988, the OECD countries agreed on the need to control urban development around hazardous sites.

A number of countries, including the Netherlands, the United Kingdom and France, have already made good progress in this direction. In the United Kingdom, for example, any application for a permit to build near a hazardous site is submitted for approval to the Health and Safety Executive, the department responsible for factory inspection. In the Netherlands, urban development control is based on a calculation of the risk to individuals and society. The Federal Republic of Germany is implementing new legislation, which includes the definition of statutory isolation distances, in connection with the application of the Community Seveso Directive on major accident risks.

Moreover, it is obvious that, in already urbanized areas, new sites and existing facilities will give rise to different kinds of problems; it is seldom possible to go back on vested rights.

And who is to compensate landowners prohibited from building? In France, it could be the central government, which takes the decision to authorize a plant, the industrial company which creates the risk and is therefore responsible for the need for isolation zones, or the local authorities which benefit from the plant's existence and are responsible for urban development. Should the polluter pays principle be applied and the cost met by the industrial company?

The practices which have recently evolved in France and which will be discussed subsequently have provided answers to some of these questions, although it must be admitted that certain difficulties remain.

V. EXPERIENCE OF URBAN DEVELOPMENT CONTROL IN FRANCE

First of all the French regional and local government system should be briefly described.

France is divided administratively and geographically into 100 "departments". In each department, the Prefect, a senior civil servant, is responsible for carrying out the central government's administrative functions. He has no authority over local elected representatives.

France is also divided into 36,000 municipalities run in each case by an elected mayor. A mayor has many, varied responsibilities which have increased with the decentralization acts since 1982. He is responsible, for instance, for urban development and issuing building permits. The central government cannot overrule the mayor's decisions unless they refer the matter to an administrative tribunal.

V.1. THE LEGAL APPROACH

Facilities that create pollution or hazards are governed by the Act of 19th. July 1976 and Decree of 21st. September 1977 "on installations registered for environmental protection purposes". The State Secretariat for the Environment and the Prevention of Major Technological and Natural Risks is responsible for this field at national level, while the department Prefect, the government's representative, is responsible locally for implementing the Act. He is assisted by a specialist body, the Inspectorate for Registered Installations.

Although the Registered Installations Act requires industry to observe operating regulations and keep a minimum distance between industrial plants and housing, experience has shown that the legal provisions in force until 1987 did not make the restrictions work the other way round, i.e. did not prohibit various kinds of construction, particularly of housing and transport infrastructure, near hazardous plants.

It is the industrial company benefiting from these restrictions which compensates any land owners who may be affected; this provision simply applies the "polluter pays" principle. In the event of disagreement, the amount of compensation due is settled in court.

There is no obligation to set up restrictions in the public interest; this provision is only one possibility among others, the aim being to ensure that industrial plants are isolated from urban areas; if the industrial company can guarantee that this objective will be respected (purchase of land, amicable arrangements with the land owners), this new legal provision need not be used.

The same applies if the mayor modifies the land use plan, but in that case there can be no compensation.

The facilities covered by this new provision were listed in a decree of 14 November 1989; broadly speaking, they include those stated in the European Seveso Directive and large explosives for manufacturing or storage units.

V.1.2. EXISTING INDUSTRIAL FACILITIES

In the case of existing industrial facilities, improvements have been made to established procedures, especially in the Urban Development Code.

The Act of 22nd. July 1987 requires urban development schemes to define the provisions for the prevention of

technological risks. The mayor, who is in charge of urban development in his municipality, is therefore now responsible for prevention. If he does not take appropriate steps, the Prefect, representing the government, must implement the measures laid down by the Act.

Owing to the complexity of certain situations, there must be extensive discussion in all cases between the local authority, the industrial company and the administrative authority. Local consultation with the mayor makes it possible to take into account specific aspects such as the changes the municipality wishes to see, geographical and topographical characteristics, or the plant's development prospects. The purpose of this consultation is to define the type of urban development (population density, high-rise buildings, premises open to the public, etc.) possible in the various areas around the source of risk. It has already resulted in a consensus for many existing sites.

Take for example the case of a municipality which has a land use plan; the role of the Prefect, who represents the government and is responsible for enforcing the legislation on registered installations, is initially to state the risks clearly and objectively and to inform the local authority. This information is generally provided by means of a procedure known as a PIG (general interest project). In the PIG, the Prefect informs the mayor of the zones exposed torisks by the presence of industrial facilities and in the general interest requires these risks to be taken into account in the urban development scheme.

Although efforts can be made to take into account existing risks so as to enable industrial plants and towns to co-exist, it seems difficult to repeat the process for new risks on existing sites. The only solution ensuring stability is to use the best available safety technologies for industrial plant extensions without modifying the size of the hazard zones. This approach has been frequently adopted in France, particularly by using a double containment system for units consuming or storing phosgene or chlorine, and semi-buried tanks for extensions to LPG depots.

Where the technology does not exist, other possibilities remain, i.e. prior agreement between the industrial company and the mayor to enforce greater distances, or refusal of the operating permit by the Prefect.

These various possibilities may, however, be difficult to implement, if an industrial company, which has obtained a building permit from the mayor purely on the basis of urban of urban planning factors, builds its facility before obtaining the operating permit issued by the Prefect or

before negotiating the inclusion of isolation distances in the land use plan. All or part of this facility may therefore be called into question when the decision on an operating permit is being considered. But elected representatives and the government may then have the impression that the industrial company is forcing their hands. To avoid this difficulty, it has sometimes been suggested that the building permit should be granted only when the operating permit has been issued and the risks are therefore known.

V.2. THE TECHNICAL APPROACH

France has strong legal provisions for controlling urban development around high-risk plant, but a methodology also had to be worked out to define the zones within which this control was necessary.

There were two possible approaches: either draw up national regulations or use the possibility of local consultations.

In the first case, the government defines national regulations which apply strictly to all industrial plants in a given sector of activity; this approach ensures that all industrial sites of the same type are treated in exactly the same way and therefore rules out any possibility of distorting competition; it is an attractive solution in the case of new facilities.

Although a minimum of national technical rules are required, it is obvious that a number of risk parameters cannot be standardized nationally since units always differ in terms of some of their equipment, local topography, the state of the existing support structure, etc. On the policy side, the mayor can hardly be excluded from the decision process and be stripped of every responsibility by national regulations that precisely stripped of every responsibility by national regulations that precisely concern land use which in any case comes within his jurisdiction.

The only approach which is acceptable from the policy viewpoint and technically justified is to assume major accidents will occur, determine their effects and brief the elected representatives and the public concerning them. Everybody must realize all the consequences of the various possible accidents before taking any decision whatsoever concerning land-use planning.

The hazard study, carried out case by case, will therefore be decisive when calculating the isolation zones to be defined around facilities.

Does this case by case approach result in heterogeneity or even in arbitrary local administrative decisions?

In the case of a particular substance, the same types of risk should obviously be taken into account in the initial phase of hazard notification (BLEVE, fracture of the largest liquid carrying pipe, etc.). Lists of reference accidents and methodologies for assessing effects can be used for this purpose; they are then adjusted, where appropriate, to the particular case, mainly on the basis of the information given by the operator's hazard study.

A list is given below of the reference accident scenarios for which the Inspectorate for Registered Installations requires an analysis in hazard studies in order to define the risk zones around industrial facilities.

In the case of some types of highly standardized facilities and new plants only, regulations can be used in additions to these references and enable industry to incorporate these requirements more easily in the site selection process.

Failing scientific knowledge or references, it is, obviously, always possible to make a mistake in calculating hazard zones or to overlook certain types of accidents. By including major accidents in the hazards study, a certain spread of risks is covered from the outset. But it is always possible for an unexpected accident to occur, and this is why the effects should be determined cautiously, i.e. with a certain safety margin. Pessimistic assumptions (adverse conditions affecting the spread of a toxic cloud, etc.) must therefore be taken into account.

It is sometimes suggested that assumptions should be based on medium values, but what would happen if, a few months after isolation distances had been defined, the effects of an accident greatly exceeded these medium values?

It might also be asked whether the wind pattern should not be taken into account in calculating isolation zones, the suggestion being that it is possible to build more in areas where there is less wind, and therefore that the potential number of casualties is offset by the probable wind direction. But this approach is open to criticism since it requires very precise meteo data concerning the site and is also difficult to explain to the inhabitants concerned.

1. Buildings can be graded on the basis of their use and the degree of risk:

A. High-rise buildings

B. Premises used by the public

C. Sports grounds without premises for the public

D. Housing

E. Limited extensions to existing housing

F. Modifications to existing premises with no extensions and no change in use.

Various consultations concerning practical cases have led to a definition of two zones with differing restrictions. The characteristics of these two zones can be summed up in simplified form as follows:

* zone one (nearest the plant):
Authorization for categories E and F without an increase in population density.

* zone two (farthest from the plant)
Authorization for categories F, E, D and C with limitation on population density.

* High-rise buildings and premises used by the public are prohibited in these two areas because of their casualty potential and evacuation difficulties.

2. Industrial facilities can be authorized near hazardous plants, subject to certain conditions, for in their case appropriate prevention or emergency measures can be taken; for instance, gas masks can be carried by staff, who will have received appropriate training.

There are, however, certain minimum requirements: a limited workforce, the compatibility of the industrial activities concerned, and the possibilities of training and equipping personnel in the plants concerned.

The authorization to conduct industrial activities near others also contributes to achieving a geographical and economic optimum. Should every hazardous plant be surrounded by non-occupied land, thus neutralizing a considerable area, or should the concentration of hazardous facilities in certain zones be accepted, provided that, of course, this concentration does not add to risks as a result

of the domino effect, the danger of proximity in some cases and so on?

The report on the conclusions and recommendations of the environmental protection meeting held in Sofia in October 1989 in connection with the Conference on Security and Co-operation in Europe (CSCE) also stressed the need to respect safety distances between hazardous facilities and the local population.