

Confronting Industrial Pollution in Rapidly Industrializing Countries: Myths, Pitfalls, and Opportunities*

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INTRODUCTION

In the last decade, a number of countries other than the most advanced industrial nations have experienced dramatic industrial growth. These rapidly industrializing countries include some of Western Europe's poorer countries (Spain, Greece, and Ireland), as well as South Korea, Taiwan, Singapore, Brazil, Mexico, the colony of Hong Kong, the socialist nations of Eastern Europe, and several other countries in South America, Africa, and Asia. During the 1980's, more middle- and lower-income countries are likely to join the ranks of these rapid industrializing countries.¹

A broad range of serious environmental and industrial health problems confront many of these countries at an early stage in their industrial development. These difficulties are at least as important as those which in the past two decades provoked intense concern in the advanced industrial nations. In very poor countries, these problems are further exacerbated by urban overpopulation and by the enormous volume of pollutants, such as sewage, solid waste, and air pollutants, which plague overcrowded urban environments.

A number of economic development strategies and growth patterns common to many of these rapidly industrializing countries cause their industrial pollution to be highly concentrated in location and type, but

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* Portions of this article are reprinted from Leonard, *Politics and Pollution from Urban and Industrial Development*, in *DIVESTING NATURE'S CAPITAL: THE POLITICAL ECONOMY OF ENVIRONMENTAL ABUSE IN THE THIRD WORLD* 263 (J. Leonard ed. 1985, © 1985 by Holmes and Mayer Publishers, Inc., New York) and appear by permission of the publisher.

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1. For general background on the emerging role of newly industrializing nations in the world economy, see R. REICH, *THE NEXT AMERICAN FRONTIER* (1983), and *POLICIES FOR INDUSTRIAL PROGRESS IN DEVELOPING COUNTRIES* (J. Cody, H. Hughes & D. Wall eds. 1980) [hereinafter cited as *POLICIES FOR INDUSTRIAL PROGRESS*].

widely diversified in scope and complexity. For example, the industrial development strategy of almost every nation that has achieved strong industrial growth in the last decade has heavily emphasized the buildup of export-oriented industries to generate economic growth, to provide large numbers of jobs, and to improve the balance of payments.² To achieve development growth based on export promotion, the governments of many underindustrialized nations have conducted vigorous efforts to improve their international trade positions. Underindustrialized nations have abandoned their traditionally limited roles as suppliers of raw materials or sellers of simple, labor-intensive products.³ Instead, these countries have quickened the pace of industrialization by encouraging relocation of industries away from the already heavily industrialized nations. In most instances, these rapidly industrializing countries, especially the small- and medium-sized nations, have carefully studied the manufacturing specialties in which they can compete most effectively. The factors typically examined include labor costs, geography, work force skills, and raw material availability.⁴ Some countries have chosen to encourage pollution-intensive processes, including parts production, the assembly of finished goods, and the manufacture of intermediate or semi-finished chemical products associated with the downstream processing of raw materials.

Transfers of technology and capital from the heavily industrialized countries also have figured strategically in the development of rapidly industrializing countries. Some nations have encouraged multinational corporations either to locate production facilities within their borders or to establish joint ventures with domestic firms. Other countries, preferring not to depend on foreign ownership of industrial enterprises, have purchased licenses, technology, or even whole plants from abroad.⁵

These industrial development strategies have increased economic opportunities in countries that lack the technological sophistication, capital resources, and consumer demand needed to sustain rapid increases in industrial output solely on the basis of their domestic resources. At the

2. Two studies that draw a clear link between export expansion and industrial growth (as well as overall economic growth) are Michaely, *Exports and Growth, An Empirical Investigation*, 4 J. DEV. ECON. 49 (1977), and B. BALASSA, EXPORT INCENTIVES AND EXPORT PERFORMANCE IN DEVELOPING COUNTRIES: A COMPARATIVE ANALYSIS (1977) (World Bank Staff Working Paper No. 248).

3. See H. CHENERY & D. KEESING, THE CHANGING COMPOSITION OF DEVELOPING COUNTRY EXPORTS (1979) (World Bank Staff Working Paper No. 314).

4. Hughes & Ohlin, *The International Environment*, in POLICIES FOR INDUSTRIAL PROGRESS, *supra* note 1, at 279, 279-84; Diaz-Alejandro, *Trade Policies and Economic Development*, in INTERNATIONAL TRADE POLICIES AND FINANCES: FRONTIERS FOR RESEARCH 93 (P. Kenen ed. 1975). See generally A. KRUEGER, LIBERALIZATION ATTEMPTS AND CONSEQUENCES (1978).

5. Hughes, *Achievements and Objectives of Industrialization*, in POLICIES FOR INDUSTRIAL PROGRESS, *supra* note 1, at 11, 19-20; Hughes & Ohlin, *supra* note 4, at 284-87.

same time, the rapid pace of industrial development in some countries, along with the internationalization of advanced technology and processes, has greatly increased the range and severity of pollution problems in developing countries. As a result, a growing number of countries that have achieved economic development now find themselves experiencing many of the same negative environmental side-effects that followed urbanization and industrialization in the United States and other industrialized nations. Indeed, such exploding urban areas as Mexico City, São Paulo, Seoul, Jakarta, Lagos, Lima, and Calcutta show that the most ominous examples of serious environmental contamination in the world are found neither in the heavily industrialized countries nor in the poorest of the poor countries, but rather in and around the cities of those countries that have recently experienced rapid industrial development and urban growth.⁶

This Article discusses a number of crucial public policy decisions that rapidly industrializing nations face because of their growing industrial pollution problems. Rather than focusing on the formal legal aspects of pollution control, the Article outlines several broad public policy choices that countries must make with respect to pollution and their industrial development strategies, the regulatory challenges that these countries must confront to mitigate or resolve the most serious existing industrial pollution problems, the role of public concern and politics in determining how to effectively address pollution problems, and the most serious obstacles to reducing industrial pollution in rapidly industrializing countries.

I

INDUSTRIAL SPECIALIZATION

Among the most significant public policy choices facing rapidly industrializing countries are those relating to industrial specialization. As more countries seek to improve their international competitiveness by shifting resources to new industries and by importing advanced technologies, environmental factors will influence the overall industrial development strategies of these nations. A country's willingness or unwillingness to accept pollution-intensive technologies that are heavily regulated in the advanced nations will influence its decision to promote particular industries and market certain products. During the 1970's, some countries competed for international industries by becoming "pollution havens," while others rejected industries that appeared to be searching for convenient escapes from stringent environmental regulations.

6. See Vining, *The Growth of Core Regions in the Third World*, *Sci. AM.*, Apr. 1985, at 4, 42.

In the 1970's, the United States greatly increased domestic regulation of water effluents, air emissions, solid wastes, the manufacture and use of hazardous and toxic substances, and workplace health and safety.⁷ These changes forced industries in the United States to expend huge amounts of capital and induced fundamental changes in the domestic structure of many industries. As these laws accumulated, industrial firms in the United States found themselves spending far more for pollution control than firms in other countries.⁸

Stricter environmental laws prompted development planners in some industrializing countries to consider whether the costs of complying with environmental regulations might influence the competitiveness and location of industries involved in world trade. A question often debated in international circles during the 1970's was whether developing countries could or should take advantage of industrial flight from the developed countries by styling themselves as "pollution havens."⁹

Despite these predictions of industrial flight, the evidence in the mid-1980's reveals that there are only a relatively small number of American industries whose international location patterns have been significantly affected by environmental regulations in the United States.¹⁰ These industries tend to fall into three categories.¹¹ First, manufacturers of some highly toxic, dangerous, or carcinogenic products have not yet

7. Among these laws are: Federal Water Pollution Control Act of 1972, Pub. L. No. 92-500, 86 Stat. 833 (codified as amended at 33 U.S.C. §§ 1251-1376 (1982)); Clean Air Act Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676 (codified as amended at 42 U.S.C. §§ 7401-7642 (1982)); Resource Conservation and Recovery Act of 1976, Pub. L. No. 94-580, 90 Stat. 2812 (codified at 42 U.S.C. §§ 6901-6987 (1982)); Federal Insecticide, Fungicide and Rodenticide Act of 1972, Pub. L. No. 92-516, 86 Stat. 975 (codified as amended at 7 U.S.C. §§ 136-136y (1982)); Toxic Substances Control Act of 1976, Pub. L. No. 94-469, 90 Stat. 2003 (codified at 15 U.S.C. §§ 2601-2629 (1982)).

8. See J. LEONARD, ARE ENVIRONMENTAL REGULATIONS DRIVING U.S. INDUSTRY OVERSEAS? (1984).

9. See C. ENLOE, THE POLITICS OF POLLUTION IN A COMPARATIVE PERSPECTIVE 111-41 (1975); Augusto de Araujo Castro, *Environment and Development: The Case of the Less Developed Countries*, 26 INT'L ORG. 401 (1972). See also Implications for the Trade and Investment of Developing Countries of United States Environmental Controls, Report by the Conference on Trade and Development, U.N. Doc. TD/B/C.2/150/Add.1/Rev.1 (1976). A good overview of the arguments for and against industrial relocation on the basis of environmental considerations is found in Khan, *Redeployment of Industries to Developing Countries—Environmental Considerations*, in TRENDS IN ENVIRONMENTAL POLICY AND LAW 287 (International Union for Conservation of Nature and Natural Resources, Gland, Switz., 1980).

10. The author conducted statistical studies from 1970 to 1982 on foreign trade patterns and overseas investment by American manufacturing industries. These studies show that although environmental regulations have had major economic impacts on industries based in the United States, for most major industries regulatory burdens have not been substantial enough to offset the advantages of producing in the United States. Preliminary findings are reported in Leonard & Duerksen, *Environmental Regulations and the Location of Industry: An International Perspective*, 15 COLUM. J. WORLD BUS. 52, 55-60 (1980). Final data from a three-year investigation are presented in J. LEONARD, *supra* note 8.

11. Data on the industries that fall into these three categories of exceptions are presented in J. LEONARD, *supra* note 8, at 41-123. The characteristics that these industries share and

developed safer substitutes or adapted their technologies to meet environmental, workplace, health, and consumer standards in the United States. For these few industries, pollution and workplace health standards have led to declining production in the United States and increasing production overseas. Strict regulation and growing public awareness of the dangers of hazardous and toxic substances has disrupted or halted production in the United States of asbestos, arsenic trioxide, benzidine-based dyes, certain pesticides, and a few other known carcinogenic chemicals.¹²

Second, stricter American environmental regulations have contributed to the international dispersion of some basic mineral-processing industries, such as copper, zinc, and lead processing. This trend is enhanced by other factors, such as the changing availability of raw materials, other nations' requirements that minerals be processed in the country where they are mined, and various economic factors including low prices, high interest rates, and recessions.¹³

Finally, environmental regulations may have increased, at least slightly, the trend toward worldwide purchasing of "intermediate" organic chemicals—that is, organic chemicals needed for the manufacture of other chemical products. This shift is partly attributable to stricter pollution control laws, but more significantly to workplace health regulations. Although whole industries have not fled the United States, some large American chemical companies have increasingly gone abroad to produce or purchase intermediates needed for chemical production in the United States.¹⁴

A few industries appear to be fleeing the United States in response to stricter environmental regulations as an alternative to modernizing technology, finding substitute products, or installing expensive pollution controls. These industries have few incentives to upgrade production facilities and product quality because they are simultaneously experiencing static or reduced demand as a result of product obsolescence or hazards. There are no documented examples of healthy, growing American industries forced to move abroad because of environmental regulations or public concern in the United States. Thus, the flight of a few ailing industries from the United States is not likely to contribute in any significant way to the development of countries trying to build their industrial base.

There is no substantive evidence, therefore, that the world is being divided into core countries that export industrial polluters and peripheral

some of the factors that explain their susceptibility to environmental relocation away from the United States are summarized in *id.* at 131-36.

12. *Id.* at 60-65, 94-123.

13. *Id.* at 42-59.

14. *Id.* at 105-12.

countries that accept these rejected industries. On the contrary, several recent reports reveal that a number of rapidly industrializing countries that went so far as to advertise themselves as "pollution havens" in the 1970's have since instituted strict anti-pollution controls.¹⁵ In short, it is largely a myth that developing countries are attracting large amounts of foreign investment and speeding up their industrial development by specializing in pollution-intensive products.¹⁶

II

OWNERSHIP OF INDUSTRIAL PLANTS

The ability of an industrializing country to minimize pollution may be significantly affected by whether it solicits multinational corporations to build industrial facilities or instead relies upon domestic companies for such development. The popular rhetoric states that multinational corporations are polluting the less developed countries with abandon.¹⁷ But, in reality, it may be easier for industrializing countries to induce multinational corporations to adopt anti-pollution measures than to persuade domestically owned companies to do the same.

Although there are many clear instances of American multinational corporations and their subsidiaries causing serious pollution problems in developing countries, most of the documented cases have involved discrete and declining types of industries. The most egregious examples of pollution by multinational corporations in the developing world have involved aging industries, industries that are difficult to re-equip, low technology operations such as mineral processing, and industries in which both production and demand are declining in the advanced countries.¹⁸

In contrast, most high-technology multinational corporations building large integrated production plants today routinely use pollution control measures everywhere they locate. Most of these companies possess the technology and the knowledge to alleviate serious potential pollution problems and to operate modern efficient plants. As a result, some developing countries are beginning to require that incoming industries construct pollution-minimizing facilities that will not substantially

15. A recent report by Charles S. Pearson, summarizing other empirical studies on international investment patterns, bluntly concludes that "[t]he 'pollution haven' strategy appears to be a loser." C. PEARSON, *DOWN TO BUSINESS: MULTINATIONAL CORPORATIONS, THE ENVIRONMENT, AND DEVELOPMENT* 54 (World Resources Institute Study 2, 1985). The rapid growth during the 1970's of environmental management agencies in developing countries is noted in Leonard & Morell, *The Emergence of Environmental Concern in Developing Countries: A Political Perspective*, 17 *STAN. J. INT'L L.* 281, 283-84 (1981).

16. For further discussion of why widespread relocation of pollution-intensive industries to developing countries has not occurred, see Leonard & Morell, *supra* note 15, at 297-99.

17. See Wyrick, *Hazards For Export*, a ten-part series in *Newsday*, Dec. 13-22, 1981; Castleman, *How We Export Dangerous Industries*, *BUS & SOC'Y REV.*, Fall 1978, at 7. See also Leonard & Duerksen, *supra* note 10, at 55.

18. J. LEONARD, *supra* note 8, at 133-36.

exacerbate pollution problems.¹⁹

Another reason why industrializing nations have some degree of latitude to drive hard bargains on pollution control is that most pollution control standards for industries in developing nations are set on a case-by-case basis. Thus, the stringency of environmental regulations for particular facilities varies according to the preferences of local or national officials, the amount of public pressure, and some rough calculation of the assimilative capacity of the local environment. Because of the ad hoc nature of this process, and the lack of national standards uniformly applied to foreign and domestic industries, most countries require multinational corporations to abide by stricter standards than those applied to locally owned industries.²⁰

Pollution control standards that are more stringent for foreign companies than for domestic firms seem to accord with the expectations of people in industrializing countries. In Spain, for example, the general level of environmental concern among government officials and the public is not very high. Spaniards, however, are particularly wary of potential environmental harms caused by foreign multinational corporations. Alfonso Enseñat, Subdirector General for the Industrial Environment of the Ministry of Industry and Energy of Spain, explains why a double standard exists in Spaniards' minds, if not in their written laws:

There are two types of technology: pre-ecological ones and ecological ones. We have to be very careful to make sure that a foreign company will use the second type here, because if not, public opinion will sooner or later turn against the company. Spaniards are very proud people. If we permit *our* industries to pollute *our* rivers, that is *our* business. But if a foreign company comes here and makes contamination, it is an insult to Spain.²¹

In Mexico, a similar double standard seems to affect industrial planning judgments. Mexican officials have reached only a very preliminary stage in addressing the pollution problems of their country. National regulations governing industrial air emissions and water effluents are rudimentary and rarely enforced. The Mexican public, moreover, is notoriously apathetic about pollution problems, perhaps because of their overshadowing concern for persistent widespread poverty or their feeling

19. This point is elaborated in C. PEARSON, *supra* note 15, at 33-42. See also Sung-Hoon Kim, Foreign Private Investment and Industrial Pollution Control in the Republic of Korea; J. Pimenta, Industrial Pollution Control in São Paulo; R. Ojikutu, Multinational Corporations, Environment, and Resource Management in the Petroleum Sector in Nigeria (1984) (papers prepared for the World Resources Institute Conference on the Role of Multinational Corporations in Environment and Resource Management in Developing Countries, Washington, D.C., June 14-16, 1984) (papers on file with author).

20. See Leonard & Morell, *supra* note 15, at 303-04 (discussing Mexico and Spain).

21. Interview with Alfonso Enseñat, Subdirector General for Industrial Environment, Ministry of Industry and Energy of Spain, in Madrid, Spain (June 18, 1980).

that the government is responsible for finding pollution remedies.²²

Yet, in deciding which types of foreign firms Mexico should attract, Mexican industrial development planners are gradually becoming more concerned about pollution and its effects on public health. Manuel Medellin Milan, Director for the Chemical Industry in the Secretariat of National Patrimony and Industrial Development of Mexico, says that Mexican officials are increasingly rejecting the view that Mexico can bear greater contamination levels simply because it is a developing country. The Ministry recently turned down an American company's proposal to build a new asbestos products plant in Mexico:

We did not accept the company's motives for wanting to come to Mexico. We think the problems of asbestos have been exaggerated in the United States, but we do not want to get involved with a company if it is running away from those problems. We are prepared to live with the risks associated with asbestos if it is for our own domestic needs, but we will not accept asbestos companies anymore if they want solely to produce for export.²³

Countries soliciting multinational corporations to build and operate production facilities can set technology and process constraints to which the multinational corporations must adhere if they wish to locate in the country. The costs to corporations of meeting these constraints and specific pollution control guidelines are often partly subsidized by various government grants and tax breaks. The remaining costs can be included in the companies' overall capital expenditure budgets for their projects. Only rarely will a company's investment decision turn on these incremental costs. If the country seems hospitable, and the long-range potential appears profitable, multinational firms may be quite willing to absorb the extra capital costs of pollution control as the price of locating in the country.

In contrast, those countries that forbid multinational corporations from owning or operating plants on their soil, for ideological or economic reasons, usually experience problems related to their own lack of expertise in pollution matters. Such countries still must often purchase foreign technology for their domestic plants. Technology importing nations have less room to bargain with foreign companies about pollution control than do countries that tolerate or encourage foreign investors.

22. Interviews with Juan Enriquez, Coordinator, and Manuel Camacho, Subsecretary for Regional Development, Secretariat of Programs and Budgets of Mexico, in Mexico City, Mexico (May 17, 1983); and Socrates Rizzo, Director of Macroeconomic Analysis, Secretariat of Programs and Budgets of Mexico, in Mexico City, Mexico (July 15, 1982). See also THE WORLD BANK, STAFF APPRAISAL REPORT: MEXICO—POLLUTION CONTROL PROJECT (Apr. 28, 1982) (internal bank document).

23. Interview with Manuel Medellin Milan, Director for the Chemical Industry, Secretariat of National Patrimony and Industrial Development of Mexico, in Mexico City, Mexico (July 16, 1982).

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Hard foreign currency is scarce and government officials hesitate to spend it unless the investments lead directly to increases in productivity. These financial conditions create a substantial disincentive to the purchase of expensive modern pollution control technology. As a result, pollution control technology in domestically owned facilities is often inferior to that in plants owned and operated by multinational firms. As one representative of an engineering firm that built a factory for Romania said:

The Romanian government hires us to design and build a plant. We tell them what is best from a technical viewpoint, but they make the choice. Since they are the ones paying the bill, they may have us build a different—perhaps less sophisticated—plant than we'd build for ourselves. If they want a plant with no atmospheric emissions we could build it for them, but they'd have to pay the bill.²⁴

These illustrations suggest that host countries favorable to multinational corporations can effectively require incoming companies to install pollution control equipment, and thereby force them to bear substantial costs of environmental protection. In contrast, technology importing countries must use hard currency to pay the full price of whatever pollution control technology they import. Thus, the financial and bargaining positions of nations such as Romania are actually weaker with respect to pollution abatement technology than the positions of countries encouraging multinational corporation ownership and operation of industrial facilities.

III

LOCATION OF INDUSTRY

Rapidly industrializing countries must eventually address the question whether to disperse or concentrate their industries. Theoretically, both approaches offer environmental advantages. On the one hand, by creating so-called "black holes" of pollution, a country can concentrate its pollution control efforts in one area. On the other hand, the deliberate dispersion of industrial sites around the countryside can significantly reduce the dangers of concentrated pollution.²⁵

24. Interview (anonymity requested), in Paris, France (July 14, 1980). Romanian officials contend that they do not need to purchase additional pollution control equipment because Romania itself produces sophisticated anti-pollution technology for installation in industrial plants built by foreign engineering firms. Interview with Matel Nicolau, Secretary, National Council for Environmental Protection of Romania, in Bucharest, Romania (July 9, 1980). Some outside observers from international agencies contend, however, that in many instances no pollution control equipment is installed. Interview with Jean Tixhon, Industry Analyst, Office of Environmental Affairs, The World Bank, in Washington, D.C. (June 25, 1982).

25. See generally SPATIAL PERSPECTIVES ON INDUSTRIAL ORGANIZATION AND DECISIONMAKING (I. Hamilton ed. 1974); LOCATIONAL DYNAMICS OF MANUFACTURING ACTIVITY (L. Collins & D. Walker eds. 1975); INDUSTRIAL LOCATION AND REGIONAL SYSTEMS (J. Rees, G. Hewings & H. Stafford eds. 1981).

In practice, few countries face such a stark choice between concentration and dispersion. Most nations already have a few areas that are not only overindustrialized and heavily polluted, but are also overurbanized compared with the rest of the country.²⁶ Many rapidly industrializing countries, such as Mexico, Brazil, South Korea, Thailand, India, Spain, and Colombia are trying both to move some industries away from traditionally industrialized areas and to establish new, more manageable industrial growth areas. These industrial "estates" also allow economies of scale in the construction of infrastructure and in the provision of waste disposal.²⁷

Regional planning for the location of industry is becoming increasingly important in many countries' overall development plans. Governments in most rapidly industrializing countries are struggling to reverse previous trends towards centralization in industrial location by encouraging or forcing new industries to locate away from already heavily developed areas.²⁸ Still, when pushed hard enough, most governments will permit industries they deem important enough to locate even in the most overpopulated and polluted areas.²⁹

For example, the industrial development strategies of Ireland, Spain, and Mexico—three industrializing countries in which the author conducted primary research—all stress as major goals the dispersion of industry to underindustrialized zones or growth pole regions.³⁰ All three countries offer explicit rewards and incentives to foreign corporations that invest in projects in outlying areas. The governments also exert subtle pressures on incoming corporations to channel their operations into certain areas. These pressures often succeed because foreign investors have fewer business ties to particular areas than do domestic firms and because their need to locate in specific towns or regions is not as great. Many foreign companies, moreover, are export-oriented, and do not have to be as close to existing population and industrial centers as do industries dependent on domestic demand.

Many foreign companies, however, have needs that can only be filled in the most developed areas of underindustrialized countries. Such

26. Vining, *supra* note 6, at 42, 44-45.

27. Cannon, *Government Impact on Industrial Location*, in *LOCATIONAL DYNAMICS OF MANUFACTURING ACTIVITY*, *supra* note 25, at 109.

28. Datta-Chaudhuri, *Infrastructure and Location*, in *POLICIES FOR INDUSTRIAL PROGRESS*, *supra* note 1, at 235; AMERICAN CHAMBER OF COMMERCE OF MEXICO, *INDUSTRIAL LOCATION IN MEXICO* 1-8, 21-22 (1983); MINISTRY OF COMMERCE AND TOURISM, *A GUIDE TO BUSINESS IN SPAIN* (4): *DEVELOPMENT INCENTIVES AND EXPORT PROMOTION* 8-11 (Madrid, Spain 1979) [hereinafter cited as *A GUIDE TO BUSINESS IN SPAIN*].

29. Interview with Daniel O'Brien, Executive Director, Foret, in Barcelona, Spain (June 25, 1980).

30. See INDUSTRIAL DEVELOPMENT AUTHORITY OF IRELAND (IDA), *IDA INDUSTRIAL PLAN 1978-82*, at 43-50 (1979); *A GUIDE TO BUSINESS IN SPAIN*, *supra* note 28, at 8-11; AMERICAN CHAMBER OF COMMERCE OF MEXICO, *supra* note 28, at 21-22, 50.

needs include access to modern communication and transportation facilities, supplies of intermediate industrial goods and economic services, skilled labor pools, and managerial expertise. Unless governments can guarantee the availability of these resources in outlying areas, even substantial incentives and location restrictions may not be enough to encourage foreign investors to locate away from heavily industrialized areas.

In Ireland, officials of the Industrial Development Authority (IDA) recognize the effect on pollution of dispersing different industries to particular areas. The IDA has pursued a strategy of dispersing foreign-built industrial plants around the countryside through a combination of fiscal incentives and political persuasion. This strategy, which complements the Irish government's desire to halt industrial migration from small villages to Cork and Dublin, has been strikingly successful.³¹

In its efforts to disperse the chemical industry, for example, the IDA has guided pharmaceutical companies with medium-sized plants and relatively little water effluent to sites near villages on inland streams. In contrast, the IDA has guided industries with larger plants and more effluent into two specific areas: Cork Harbor, particularly the Ringaskiddy area, and along the Shannon estuary in Western Ireland. Thus, when E.I. du Pont de Nemours & Co. and the IDA were negotiating the construction of a titanium dioxide plant, the IDA stated that a six-hundred acre site at Ringaskiddy was the only suitable location. The IDA also instructed Alcan Aluminum Limited (a Canadian corporation) to find a site for its alumina plant within the tidal area of the Shannon.³² Although no IDA or government policy mandates a distinction between industries based on their pollution levels, the IDA's channeling policies have created areas in which the most heavily polluting industries are effectively isolated.

Spanish government officials are pursuing a similar strategy. They have placed major restrictions on the types of new industries that can be built in Barcelona and Madrid because of industrial and automobile pollution, and heavy traffic congestion in these cities. The Spanish government has actively steered foreign industry to other regions. In 1979, Smith, Kline and French (a multinational chemical company) initiated planning permission procedures to build a new semitidyne plant in Alcalá, a heavily industrialized area near Madrid. National officials inter-

31. Interviews with Kenneth Gunn, Manager, Heavy Industry, Industrial Development Authority of Ireland, in Dublin, Ireland (Mar. 26, 1980); Liam Kearney, Industrial Promotion Analyst, Industrial Development Authority of Ireland, in Dublin, Ireland (Mar. 24, 1980); and Matthew Lynch, Manager, Environmental Department, Institute for Industrial Research and Standards, in Dublin, Ireland (Mar. 27, 1980).

32. Interviews with J.B. O'Sullivan, Deputy General Manager and Harbour Engineer, Cork Harbour Board, in Cork, Ireland (Apr. 3, 1980); and Kenneth Gunn, *supra* note 31.

vened, however, and forced Smith, Kline and French to move its new plant to Zaragoza. Spanish officials believed that the Zaragoza industrial area located well outside of Madrid was better suited to absorb the air pollution generated by the plant.³³

Even an outlying area such as Zaragoza, however, may be unable to absorb certain kinds of pollution. For example, although Spanish officials considered Zaragoza a suitable location for additional air pollution, they have been unwilling to allow into the area new industries producing significant amounts of water pollution. In the late 1970's, Foret, the Spanish subsidiary of the FMC Corporation, proposed to build a new chlorine dry bleach plant in La Zida, near the company's existing peroxide plant in the Zaragoza area. Spanish government officials asked Foret not to file for planning permission because the government was trying to improve the water quality of the already heavily polluted Ebro River running through Zaragoza. Foret eventually constructed its plant in Huelva, at the mouth of the Rio Tinto in southern Spain.³⁴

Despite the insistence of Spanish officials that multinational corporations must construct new pollution-generating facilities outside of already polluted areas, some observers doubt that the government will enforce this policy to the point of actually turning away potential foreign investors. Foret executive Daniel O'Brien explains:

If we were to go to [the government regulators] and say that we were thinking about putting a silicates plant in near Madrid, they would at first say to move it somewhere else. But, if we insisted, I think they'd finally come back to talking about Madrid. It wouldn't be easy to accomplish, and the pollution restrictions would be tight, but right now they are absolutely desperate for new projects and I just don't see them turning one away in the end.³⁵

Mexico is a third example of a rapidly industrializing nation channeling new polluting facilities to areas that remain relatively uncongested. The overconcentration of industry in Mexico is as bad as that found anywhere in the world, but according to Deane Woods, Regional Director for Cyanamid, Mexican government officials have begun in recent years to intervene in decisions about where to locate particular industries. Woods says that if Cyanamid proposed to build a phenolic resin plant in the Mexico City area, for example, the government officials "would blow us away, there's no way they'd let us now, even though a few years ago they would not have batted an eye."³⁶

The Mexican government has created substantial incentives to in-

33. Interviews with John Keeler, Managing Director, Smith, Kline and French (España), in Madrid, Spain (June 19, 1980); and Alfonso Enseñat, *supra* note 21.

34. Interview with Daniel O'Brien, *supra* note 29.

35. *Id.*

36. Interview with Deane Woods, Regional Director, Cyanamid, in Mexico City, Mexico (July 27, 1982).

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duce new industries to locate in industrial port cities and other preferred industrial areas. Government officials are also seriously contemplating whether to enact carrot and stick policies to encourage certain industries currently located in the Mexico Valley to move elsewhere. The government has already forced several domestic cement plants in the area to close down, because, after being engulfed by rapid urban expansion, they were causing serious health problems in Mexico City.³⁷

Multinational corporations are seriously concerned about the growth of the Mexico City metropolitan area because the city's environs now surround the entire industrialized strip in Naucalpan and Tlalne-pantla, an area containing many foreign-owned chemical plants. When the government set aside this industrial area several decades ago, the strip was sufficiently distant from the urban area that it did not pose serious health and environmental hazards for city dwellers. But Mexico City's explosive growth in the 1960's and 1970's has pushed the metropolitan area out well beyond Naucalpan. Today, thousands of poor urban residents live very close to industrial facilities. Many people's yards or temporary dwellings even share back walls with heavy chemical plants.³⁸

Experts on industrial location in Mexico doubt that the government's incentives are yet substantial enough to induce large companies to close profitable plants in the Mexico City area and move them to outlying priority zones. Mexican officials have thus far been reluctant to force an exodus, but many foreign companies contemplating future expansions or new investments have studied the economics of locating outside of the Mexico Valley. Edward Wiegard, director of the Mexico office of the Arthur D. Little consulting firm, contends that a prolonged economic recovery in Mexico is likely to set in motion the first significant exodus of major companies away from Mexico City.³⁹

Such dispersion may, however, create its own problems. Mexican officials may become so concerned with stimulating growth away from Mexico City that they loosen environmental restrictions in new industrial growth areas. Wiegard believes that government officials negotiating about pollution "don't care so long as a plant is going to be built away from Mexico City and will create a lot of jobs."⁴⁰

37. Interview with Guillermo Diaz Meja, Director General for Investigation of the Effects of Environment on Health, Secretariat of Health and Welfare of Mexico, in Mexico City, Mexico (July 15, 1982).

38. American Embassy—Mexico City, Preliminary Overview of Air Pollution in Mexico City (Feb. 25, 1982) (unclassified Airgram from the American Embassy in Mexico City, Mexico to the United States Department of State, Washington, D.C.) (on file with author).

39. Interview with Edward Wiegard, Director, Arthur D. Little (Mexico), in Mexico City, Mexico (July 28, 1982).

40. *Id.*

IV

ALLOCATING RIGHTS TO POLLUTE

Most rapidly industrializing nations rely on the assimilative capacities of their waterways to absorb water pollution. Allocating the rights to pollute these waterways is likely to become an increasingly politicized process. As assimilative capacities become severely strained and key waterways deteriorate, industrializing countries must decide whether the public or the private sector should take primary responsibility for building water treatment facilities. Industrializing countries seeking to allocate rights to pollute face many difficult problems. Among the toughest are inadequate long-term planning, a lack of complete and relevant technical information, and the fragmented nature of decisionmaking on allocation questions.

In many rapidly industrializing countries, little or no conscious long-term planning occurs with respect to allocative decisions. Rather, because of the employment-generating potential of large industries and the obvious need of industries for pollution repositories, governments often promise industries continued permission to dump raw effluents into rivers, bays, and coastal waters. Even if these bodies of water can cleanse themselves under existing effluent levels, problems will arise in the future when more industries cluster along their shores or when nearby urban populations grow substantially.

As the self-cleansing capacities of local bodies of water are reached, government planners confront difficult policy choices. They can choose among several courses of action: permit continued pollution by all sources (which often occurs until a crisis arises), require new incoming industries to invest in pollution control (forcing them to suffer competitive disadvantages compared to older industries with assured pollution rights), renege on agreements with existing industries and force all industries to treat their wastes, or force municipal governments to bear pollution control costs by requiring them to build new sewage treatment facilities. If governments engage in careful advance planning and make these choices explicit, some assimilative capacity can be reserved for municipal growth, and perhaps public and private institutions can plan and construct joint treatment facilities. In the past, though, instead of planning for the future allocation of assimilative capacities, governments generally have neglected such considerations. As a result, governments have been forced to revoke previous arrangements with polluting operations.

For example, in 1970, the Cork County Council in Ireland granted permission to Pfizer, an American pharmaceutical and chemical company, to dump into Cork harbor raw organic nutrients from its organic chemicals and organic synthesis complex. The Cork officials granted the permission after their analysis indicated that the harbor's assimilative ca-

capacity was significant and fully capable of dispersing and neutralizing Pfizer's wastes. After Pfizer began emitting effluents into the harbor, local citizens and An Taisce (the National Trust of Ireland) pressured Cork County officials to revoke the permission granted to Pfizer. In 1973, when this local pressure began, those favoring revocation of the permission argued not that the harbor was already too polluted, but that Pfizer had received too large a share (fifty percent) of the estimated assimilative capacity of the harbor. Although Pfizer was using only about one-third of its allowance to pollute, environmental and economic development groups joined together to argue that one company's monopoly of so much of the total assimilative capacity of the harbor was both unfair to other firms and likely to stifle future industrial development in the area.⁴¹ Today, Cork County no longer permits Pfizer to discharge into Cork Harbor; instead the company daily sends its wastes out to sea to be dumped from barges.⁴²

The lack of information available to government regulators when they bargain with multinational corporations about allocating local assimilative capacities creates uncertainty in planning that works against both the short- and long-term interests of the companies. The experience of Eli Lilly in Cordoba, Spain several years ago illustrates this kind of planning problem. Before its difficulties began, Eli Lilly had purchased a large tract of land, completed discussions with national officials regarding fiscal assistance, and was preparing to begin construction of a new plant just outside of Cordoba along the Guadalquivir River. As the process of obtaining final planning and zoning permits from Cordoba municipal officials progressed, the local water authority initiated discussions regarding water pollution controls. Although Cordoba had extremely high unemployment, local officials nevertheless expressed concern that Eli Lilly's new industrial plant would contribute to the further degradation of the Guadalquivir, which already was seriously polluted by agricultural wastes and municipal sewage. Cordoban officials, however, lacked the scientific or technical ability to evaluate the Eli Lilly proposal and relied instead on limited information about pollution controls obtained from the United States and Great Britain. As often happens in less industrialized countries, the officials sought to establish standards for Eli Lilly's water effluent by relying upon this fragmented information from developed countries. Confusion about the nature of the standards adopted delayed the issuance of Eli Lilly's final construction permits. While Eli Lilly waited, local officials and bureaucrats argued about the

41. INDUSTRIAL DEVELOPMENT AUTHORITY, A SURVEY OF POLLUTION IN IRELAND 2-3 (1976).

42. *Id.* at 3; interviews with Phillip Mulally, Chairman of An Taisce, in Cork, Ireland (Apr. 3, 1980); and Cashel Riorden, Manager of Pollution Control, Pfizer, in Ringaskiddy, Ireland (Apr. 3, 1980).

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distinctions between discharge standards applicable to effluents and ambient standards applicable to receiving waters.⁴³

Eli Lilly eventually cancelled its plans for construction at the Cordoba site and instead bought and renovated an existing Spanish-owned plant north of Madrid. Eli Lilly officials insist that changing economic factors and the availability of the Madrid plant prompted their decision. They express confidence that, had they persisted in their desire to construct the Cordoba plant, they could have obtained the necessary permits.⁴⁴ Nevertheless, the wrangling caused by the local officials' poor information and confusion about the British and American standards certainly hampered Eli Lilly's attempts to expedite the construction of its proposed Cordoba facility. Cordoba's mayor, Julio Anguita, and John Asher, Director of Procter & Gamble in Spain, believe that these regulatory delays played a major role in Eli Lilly's decision to cancel the project.⁴⁵

In short, both local and national officials in industrializing countries frequently must engage in pollution control bargaining without adequate information regarding the immediate and potential long-term environmental problems of different industries. This paucity of information sometimes leads to the imposition of inadequate environmental controls for particular industrial plants, as apparently happened to Pfizer in Ireland. As Eli Lilly found in Cordoba, however, the inability of government officials to acquire adequate knowledge about pollution control can also create severe delay problems during the pollution control bargaining process.

V

PROVISION OF INFRASTRUCTURE

A major problem for any country seeking to stimulate rapid industrial development is how to provide the modern infrastructure and services needed to support manufacturing industries and to ensure the safe disposal of industrial wastes. This is particularly true where the country

43. Interviews with Jesus Martin Felipe, General Manager, Eli Lilly (España), in Madrid, Spain (July 4, 1980); Julio Anguita, Mayor of Cordoba, in Cordoba, Spain (July 1, 1980); John Asher, Director, Procter and Gamble (España), in Madrid, Spain (June 19, 1980); and C.P. Gorman, Director of Environmental Affairs, Eli Lilly, in Washington, D.C. (May 13, 1981).

44. Letter from C.P. Gorman, Director of Environmental Affairs, Eli Lilly to H. Jeffrey Leonard (May 22, 1981).

45. Interviews with Julio Anguita and John Asher, *supra* note 43. Asher says that Procter & Gamble benefited from Eli Lilly's misfortune, because, when Procter & Gamble sought permits for its own new plant in Cordoba, the mayor's office remembered the city's loss of the Eli Lilly plant and intervened to expedite the pollution control bargaining process. Procter & Gamble also encountered few difficulties in its pollution control negotiations with local officials because it worked with Mayor Anguita and publicly supported his campaign to clean up the Guadalquivir River. Interview with John Asher, *supra* note 43.

is attempting to encourage industry to locate in less developed areas instead of near already industrialized areas.⁴⁶ In Ireland, Spain, and Mexico, for example, many bottlenecks and problems have arisen because industrial development has proceeded in outlying areas without adequate supporting infrastructure, and because no waste disposal facilities are available for these industries. In Mexico, the lack of sufficient infrastructure and amenities is one of the key constraints frustrating the government's efforts to encourage industry to locate outside of the Mexico Valley.⁴⁷

In some cases, infrastructure problems result from a failure by government and industry planners to anticipate and provide for each others' needs. For example, one new industrial facility may suddenly double the demand for water creating severe difficulties for municipalities that need to pump enough water to satisfy both municipal and industrial uses. This problem occurred in Westmeath County, Ireland, after the county successfully attracted a number of new industrial facilities with high demands for fresh water. One plant alone, operated by GAF Corporation, needed approximately one-quarter of a million gallons of water per day for its operation. Another, operated by General Tire, required a constant water pressure of sixty pounds per square inch to achieve the proper quality in its production process. In both cases, Westmeath County experienced difficulties in consistently meeting the companies' specifications.⁴⁸

Both GAF and General Tire had major confrontations with the local government over water supply. Officials for both companies argued that the county was not meeting the obligations it incurred as part of the bargain that had brought the companies to Westmeath. GAF was accustomed to drawing large amounts of water whenever needed. This situation caused major problems at times of peak water demand, because the company was drawing water away from other users. General Tire complained to local officials that fluctuating water pressure frequently forced the company to throw away incomplete product batches. In both cases, Westmeath officials responded that the companies were not considering the county's plight in trying to supply adequate amounts of water for municipal uses.⁴⁹

Both the industries and the local government had a legitimate complaint, but only after a lengthy period of confrontation did they negotiate

46. See *supra* notes 25-40 and accompanying text for a more detailed discussion of industrial location strategies in rapidly industrializing countries.

47. SECRETARIA DE PATRIMONIO Y FOMENTO INDUSTRIAL, PLAN NACIONAL DE DESARROLLO INDUSTRIAL 1979-82 (1979) (National Industrial Development Plan); AMERICAN CHAMBER OF COMMERCE OF MEXICO, *supra* note 28, at 69-72.

48. Interview with Sean Lucy, Westmeath County Council, in Mullingar, Ireland (Apr. 9, 1980).

49. *Id.*

a solution to their competing demands for water. As a short-term solution, the county installed a special valve so that GAF could draw water only in incremental amounts. For the future, county officials are focusing on bringing into the area "dry" industries that will not further strain their capacity to supply water to existing industries and municipal users.⁵⁰

The pollution problems created when industrial complexes are installed without adequate infrastructure often are cumulative and difficult to remedy later. For example, one of the most serious potential pollution problems facing Ireland, Spain, and Mexico is that virtually no legal provisions or physical facilities exist for the proper disposal of hazardous and toxic waste materials. Little effort is made in these countries to segregate potentially hazardous and toxic chemicals during normal effluent treatment and waste disposal procedures. Many officials of American-owned factories in rapidly industrializing countries candidly admit that the toxic waste disposal problem is now largely ignored and that better provisions for the disposal of certain wastes must be made soon.⁵¹ As the recent American experience with toxic dumps has shown, the economic, political, and public health consequences of this environmental problem are potentially huge.

The most serious problems in the hazardous waste area involve solid waste disposal. American companies operating plants in Ireland today are extremely sensitive about the question of solid waste disposal because they do not want to confront a situation such as that faced by a Raybestos Manhattan facility at Ovens that had nowhere to send its solid waste.⁵² Solid waste disposal in Ireland is regulated by local planning permissions. These permissions usually contain planning conditions that require the company to make suitable arrangements for the removal of its solid wastes. For projects that generate no toxic chemicals, such conditions create few problems. Indeed, the Irish subsidiary of Squibb (Squibb-Linson) sells its solid waste to a local golf course for use on its greens.⁵³ Where disposal of toxic solid wastes is involved, the planning permissions sometimes outline clear procedures for companies to follow to avoid problems caused by toxic metals or other compounds. For example, according to the terms of a 1974 planning permission granted to

50. Interview with Sean Lucy, *supra* note 48. For a general overview of the relationship between industrial siting, water supply, and sewer facilities, see Brassill, *Sanitary Services Infrastructure for Industrial Estates*, in CONFERENCE ON PLANNING FOR INDUSTRIAL DEVELOPMENT 1 (1978) (proceedings of a seminar by the Irish Planning Institute, in Dublin, Ireland, Nov. 16-17, 1978).

51. Many of the American government and corporate officials whose interviews are cited in this Article commented on the toxic waste problem.

52. See *infra* notes 88-91 and accompanying text.

53. Interview with Joe Harford, Process Manager, Squibb-Linson, in Dublin, Ireland (Mar. 28, 1980).

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Syntex Ireland Limited for its Clare County plant, the company must precipitate from its effluent the insoluble salts of magnesium, zinc, iron, and fluoride. These salts and all other sludges and solid wastes from the plant are then buried, according to strict procedures, at a site approved and monitored by Clare County.⁵⁴

Unfortunately, companies can often satisfy the terms of their planning permission simply by hiring private contractors to haul away solid wastes. Both the Irish government and many companies are reluctant to account for the destination of any toxic wastes that are hauled away. Companies frequently view their responsibilities as satisfied once the wastes are removed from their sites. Irish officials claim that because no adequate toxic waste disposal facilities exist in Ireland, much of the country's toxic waste is now being sent to England for disposal.⁵⁵ Despite these claims, strong evidence indicates that substantial amounts of solid waste containing toxic materials is being illegally dumped at local public refuse dumps and other unknown locations in Ireland.⁵⁶

The absence of a controlled waste disposal facility in Ireland, particularly in the Dublin and Cork areas, has been a source of increasing public concern in recent years and a growing problem both for the Irish government and for Irish and foreign companies.⁵⁷ The experience of Eli Lilly, which came to Ireland at the height of the controversy over solid waste dumping in Cork County, illustrates the nature of the problem. Eli Lilly's new plant in Kinsale probably never would have been granted a planning permission had the company not made explicit plans to dispose of all potentially toxic waste materials at the plant site. Eli Lilly's plant thus includes both a thermal oxidizer to incinerate the plant's solid waste and advanced activated charcoal water treatment technology to control minute quantities of toxic chemicals that might be in the plant's effluent.⁵⁸

Not every company, however, can afford or justify the in-house measures taken by Eli Lilly. Most other industrial officials argue that the problem of toxic waste dumping is as much a governmental as a private sector problem. These officials argue that because the economics and logistics of toxic waste disposal often demand centralized dumping, incineration, or disposal facilities, the governments of rapidly industrializing

54. Clare County Council, Local Government (Planning and Development) Act, 1963: Notification of a Grant of Permission (Subject to Conditions) (issued to Syntex Ireland Ltd., Jan. 21, 1974) (on file with author).

55. Interviews with Kenneth Gunn and Matthew Lynch, *supra* note 31.

56. *Driver Accused of Dumping Chromium Waste, Environmentalists Urge Toxic Waste Sites*, INT'L ENV'T REP. (BNA) 285, 285-86 (July 9, 1980).

57. Collins, *Toxic Dumping Causes Alarm in Cork*, *Hibernia*, Aug. 2, 1979.

58. *The Harbour Board Commissioners Meeting with Elanco*, Kinsale & District News Pictorial, Aug. 1978, at 15; *An Taisce Signs Unique Agreement*, *TAISCE JOURNAL*, May-Oct. 1979, at 37; letter from C.P. Gorman, *supra* note 44.

countries should be responsible for providing such facilities. Irish, Spanish, and Mexican government officials have expressed similar concern about the need for toxic waste dumping procedures, but fiscal limitations and public opposition to local sites has significantly slowed progress toward establishment of proper facilities.

In Spain, Alfonso Enseñat, Subdirector General for the Industrial Environment, reports that the Spanish Ministry of Industry and Energy has been negotiating with the World Bank to acquire financing for at least one major waste disposal plant and has plans eventually to build five hazardous waste facilities in priority regions around the country. According to Enseñat, several private Spanish entrepreneurs have expressed interest in operating such facilities. Enseñat favors domestic, private sector participation over governmental or foreign direction. At present, he says, waste dumps are most urgently needed near Bilbao, Barcelona, and Tarragona. Enseñat readily admits, however, that until these facilities are established, both the government and industry prefer not to tackle the hazardous waste disposal issue. "[Spain's] regulations on air pollution are highly advanced, but on the disposal of toxic wastes we need more time, a few more years; we cannot ban the dumping of the wastes if we do not have a disposal plant to accept them."⁵⁹

In Ireland, toxic waste dumps are currently needed in several areas both because of the large number of chemical-using industries that have recently located there and because of the high level of public concern arising from recent controversies involving solid waste disposal.⁶⁰ John Gannon, a former head of the Industrial Development Authority of Ireland (IDA), and a member of the national Planning Appeals Board, suggests that Ireland "needs some new arrangement for the disposal of toxic and problem wastes . . . [indeed] unless improved disposal mechanisms are introduced, Ireland's industrial development will be adversely affected."⁶¹ Although Irish government officials have outlined a national strategy for providing industries access to toxic waste facilities, the plan has not yet been implemented.⁶² One problem in implementing the plan is identical to that often encountered in the United States: each time the national government designates a particular area as appropriate for a toxic waste dump facility, opposition at the local level proves

59. Interview with Alfonso Enseñat, *supra* note 21.

60. For a discussion of one such controversy involving solid wastes from a Raybestos Manhattan asbestos facility, see *infra* notes 88-91 and accompanying text.

61. Gannon, *Ireland's Industrial Development and Waste Management*, in *TODAY'S AND TOMORROW'S WASTES* 170 (J. Ryan ed. 1980) (proceedings of a seminar by the National Board for Science and Technology, in Cork, Ireland, May 21-22, 1979).

62. Lynch, *Towards a National Waste Management Strategy*, in *TODAY'S AND TOMORROW'S WASTES*, *supra* note 61, at 171; *Ireland Plans a Comprehensive Toxic Waste Disposal Strategy*, *WORLD ENV'T REP.*, May 11, 1981, at 6, 6-7; *Ireland Plans Center for Hazardous Wastes*, *WORLD ENV'T REP.*, Apr. 30, 1982, at 8.

overwhelming.⁶³

In all of Mexico, there are apparently only two facilities adequate for incinerating toxic wastes. One in Monterrey is operated by the government; the other, near Cuernavaca, was built by a consortium of companies, mainly American, to serve a complex of industrial plants.⁶⁴ In most cases, companies that need to segregate certain toxic substances from their water effluents appear to be following the same practice that was followed for decades in the United States: the wastes are put in drums and taken away from the plant by waste disposal companies. Most of the American firms that dispose of wastes in this manner cannot account for the final destinations of the drums. Some material appears to be disposed of at municipal and private landfill facilities, but a few American company officials candidly admit that many of Mexico City's disposal firms probably dump toxic wastes directly into Mexico City's sewer system. In addition much of Mexico City's wastewater is pumped untreated to agricultural areas in Hidalgo for irrigation, and both Mexican and American business officials are alarmed at the potential long-term health implications of this practice.⁶⁵ The fear that toxic waste drums are being wantonly dumped is supported by the appearance of many empty drums in Mexico City's squatter settlements, where people without indoor plumbing cut them in half for use as water barrels.⁶⁶

It is difficult to know how much of Mexico's toxic waste problem is caused by foreign companies. Many of the companies, moreover, have limited alternatives for disposing of their toxic wastes. For example, Mexican officials denied Dow Chemical permission to install an incinerator at its Tlaneplantla plant.⁶⁷ Until the Mexican government acts to remedy this still largely hidden problem, foreign companies either will have to rely on joint private solutions, as in Cuernavaca, or hope that because toxic wastes are laundered through domestic firms, they will remain insulated when a controversy arises. But, as Deane Woods, Regional Director of Cyanamid's Mexican operations, says, "all we need is for one of these empty drums to be stamped with our name on it for this

63. *County Council Encounters Difficulties in Search for Permanent Asbestos Dump*, INT'L ENV'T REP. (BNA) 245, 245-46 (June 11, 1980).

64. Interview with Jose Luis Calderon, Subdirector for Water Contamination, Secretariat of Urban Development and Ecology of Mexico, in Mexico City, Mexico (Jan. 24, 1984).

65. This sentiment was often expressed in the author's interviews with officials from subsidiaries of thirteen American chemical and mineral processing companies. A similar sentiment was expressed by six members of the Permanent Commission on the Environment of the Mexican Association of Manufacturing Industries (CANACINTRA), at a meeting for the author arranged by the Commission's president, Raul Suarez Muñoz Ledo, in Mexico City, Mexico (July 20, 1982).

66. Interviews with members of CANACINTRA, *supra* note 65.

67. Interview with Camilio Gutierrez, Head of Operations, Dow de Mexico, in Tlaneplantla, Mexico (July 27, 1982).

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thing to turn into a major scandal."⁶⁸

VI

ANTICIPATING LONG-TERM ENVIRONMENTAL HAZARDS

Industrializing countries seeking to attract international capital must not only assess the immediate pollution problems that incoming industries might cause, but must also try to project the long-term environmental impacts of welcoming such industries. Such projections are difficult because there is seldom adequate information for informed judgment and because some industries at first appear much more environmentally benign than they eventually prove to be. Industrializing countries accepting new industries are therefore playing a sort of Russian roulette both because of their lack of advanced research capabilities, particularly with respect to environmental carcinogens, and because of deficiencies in information transfer from the more technically advanced nations.⁶⁹

In most successful rapidly industrializing countries, national and local government officials are much more adept now than a decade ago at bargaining vigorously with the proponents of a proposed facility that poses obvious, significant, and unacceptable pollution dangers to water, air, the general public, or workers. Few of these countries, however, have the ability to evaluate proposals or make informed decisions about the long-term implications of accepting industries that produce subtle, less visible environmental hazards. Many countries are only now discovering connections between major public health or pollution problems and certain industries that previously displayed no significant dangers. In their past negotiations with foreign companies about proposed facilities, industrial development authorities in rapidly industrializing countries generally did not anticipate or plan for these long-term problems. These countries were unable either to conduct enough research for sound environmental projections or to keep abreast of all the latest American research.

Informational problems not only lead to adverse human health effects but also cause political and public relations problems as well. People living and working near industries that are subsequently shown to be health-threatening often react angrily toward both the government and the corporation, and they are not easily reassured by new safety standards and procedures. In both Spain and Ireland, although officials seldom speak openly about the subject, the public has become increasingly concerned about the potential health problems associated with the phar-

68. Interview with Deane Woods, *supra* note 36.

69. For further discussion of the problem of inadequate information for environmental decisionmaking in developing countries, see Leonard & Morell, *supra* note 15, at 300-02.

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maceutical industry, an industry that has played an important part in the industrial development strategies of both countries.

In Spain, Alfonso Enseñat and the Spanish Ministry of Industry and Energy contacted the World Health Organization and the United States Environmental Protection Agency to get more information on the subtle environmental hazards raised by industries such as pharmaceutical companies. But Enseñat acknowledges that his department lacks the capability to stay abreast of all the latest developments: "Only a very underindustrialized country would purposely industrialize by risking the health of its population, [however,] our problem is that we cannot always see into the future." A pharmaceutical plant may seem attractive now, he says, because, compared with a big chemical plant, "it only has a trickle of effluent and a puff of white smoke. But let's hope that we do not have to pay the price later."⁷⁰ Evilio Quinones, General Manager of Merck, Sharp and Dohme (España), says that despite Enseñat's expressed interest, the Spanish government has shown little outward concern that the pharmaceutical industry is causing possible long-term health problems. "Our industry is very concerned about the potential for discovering more links with cancer," Quinones continues, "but I don't see anyone within the Spanish government [being] particularly aware [of the problem]."⁷¹

In Ireland, concern about the pharmaceutical industry is more widespread than in Spain, both among the public and among national and local government officials. The public is interested in part because of odor problems that plague several prominent American firms with industrial plants in the Irish rural countryside. Public fears have been particularly aroused by a plant operated in County Clare by Syntex Corporation. Most Irish officials tend to sympathize with Syntex in its running battles against local citizens who have sued the company claiming that its odors create a nuisance. Some local officials, however, are unsure whether they should keep fighting for Syntex because they are concerned that Nerolin, the emission component causing the sweet odor noticed by residents, may cause long-term adverse health effects.⁷² Irish officials cannot be sure whether workers and local residents eventually

70. Interview with Alfonso Enseñat, *supra* note 21.

71. Interview with Evilio Quinones, General Manager, Merck, Sharp and Dohme (España), in Madrid, Spain (June 17, 1980).

72. Crowley, *Syntex in Bad Odour in U.S. and Co. Clare*, Hibernia, May 25, 1978, at 35; *High Court Asked to Prevent Plant from Emitting Offensive Chemical Stench*, INT'L ENV'T REP. (BNA) 898 (Mar. 3, 1981). Irish officials were alerted to the potential ill health effects of Nerolin by a controversy in the United States involving a challenge by the United States Food and Drug Administration to the safety of Syntex's product. See *Suit is Filed Against Syntex*, N.Y. Times, Sept. 2, 1976, at 49, col. 7; *F.D.A. Acts to Remove Painkiller from Market*, N.Y. Times, Oct. 15, 1976, at 6, col. 6; *Syntex Assails F.D.A. Over Report of Concern's Anti-Arthritis Drug*, N.Y. Times, Oct. 20, 1976, at 17, col. 1; *Syntex Reaches Settlement on Suits*, N.Y. Times, Feb. 17, 1979, at 28, col. 6.

will pay with their health for the employment generated by Syntex. They must simply wait, either for definitive research findings from the United States or for the accumulation of data comparing the health of local workers and residents to the national norms.

One reason many countries cannot conduct adequate environmental impact research is that multinational firms frequently are very reluctant to provide technical information to national and local government officials. Although foreign government officials allege that corporations sometimes deliberately offer local officials misleading or at least confusing information, informational problems most often arise from omission rather than from intentionally false statements. In the name of protecting proprietary information, corporate officers are reluctant to talk with outside officials about certain aspects of their companies' production processes. Tom Kilgarrif, Westmeath County Chief Assistant County Engineer for Sanitary Services, says that his office regularly has trouble obtaining adequate information from foreign firms with plants in the county:

We have a problem getting enough information to help us evaluate a proposal or identify the source of a problem that develops downstream (from Mullingar) because the companies claim they cannot divulge trade secrets. Sometimes we have to assemble a whole team of experts and go through a number of tests just to find out basic things that the companies could tell us in a minute. We have to be trusted with some of this information if we are going to be able to make reasonable judgments and answer to our own public. Besides, I believe that in many cases if the companies were more forthcoming, a lot of rows that occur later on could be avoided. People get upset when they think a company is hiding some bit of information or leading them astray.⁷³

Many other local officials in Ireland reiterate this lament. They believe that multinational firms should share more technical and process-oriented data to help governments evaluate the environmental impacts of such industries.

Up to a point, multinational corporations do cooperate in providing information to local officials. Some multinational corporations even invite local and national officials to come to their home countries to examine existing plants similar to the ones proposed. Officials from both Ireland and Spain have participated in such journeys. For example, before granting approval for a Syntex plant in Ireland, local officials and representatives of Ireland's Institute for Industrial Research and Standards visited a Boulder, Colorado plant operated by Araphne Chemicals, a Syntex subsidiary.⁷⁴ Even though they encourage these on-site inspec-

73. Interview with Tom Kilgarrif, Chief Assistant County Engineer for Sanitary Services for Westmeath County, in Mullingar, Ireland (Apr. 9, 1980).

74. See Leonard & Morell, *supra* note 15, at 295-96; interview with Matthew Lynch, *supra* note 31.

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tions, multinational corporations still often hesitate to provide the more important information such as detailed breakdowns of the chemical inputs, intermediate and final products, and by-products of their plants.⁷⁵

Another informational problem is created by production processes that produce dangerous intermediate chemicals used or altered later in production. The factories neither bring in nor expel these intermediate chemicals, and officials charged with regulating the internal environments and the overall risks of such plants to the public may be unaware of the existence of such dangerous substances. Local officials contend that this type of information gap could cause serious problems if, for example, a local fire brigade responding to an industrial fire or explosion had no idea that it might encounter dangerous chemical substances.

Still another informational problem is that many multinational corporations, particularly in the pharmaceutical and light chemical industries, frequently fail to update local officials when they change processes, raw materials, or final products. Companies consider the ability to make swift changes in response to shifting market demands essential to competitiveness. Corporate officials state that no one can predict at the initial planning stage all of the possible products and raw materials a plant may use in the future. The companies contend, moreover, that having to file a new application every time they alter some aspect of their production process would unnecessarily increase the burdens of delay and the potential for public controversy. From the perspective of local officials however, trouble often begins when companies make process changes. For example, at two pharmaceutical plants in Ireland—Merck, Sharpe and Dohme (Ireland) in Carrick-on-Suir and Penn Chemicals in Ringaskiddy—odor problems did not begin until after both plants had operated for some time. Although neither company violated its planning permissions when it began making the products causing the odors (both had listed the products in their original planning applications), the sudden onset of odors and the ensuing public outcry nevertheless surprised the local officials in both cases.⁷⁶

VII

POLITICS AND INDUSTRIAL POLLUTION

In some countries, industrial pollution has become an issue around

75. Interviews with Declan Murphy, Special Assistant, Industrial Development Authority of Ireland, in Dublin, Ireland (Mar. 24, 1980); Tommy Rice, County Manager, Tipperary County, in Clonmel, Ireland (Apr. 1, 1980); and Jim Keating, Development Officer, Tipperary County, in Clonmel, Ireland (Apr. 1, 1980). See also *No Effort on Pollution Say An Taisce*, Irish Press, Mar. 25, 1980; *Lack of Pollution Code Criticized*, Irish Press, Apr. 3, 1980.

76. Interviews with Matthew Lynch, *supra* note 31; Tommy Rice, *supra* note 75; Joe Donahue, General Manager, Merck, Sharp and Dohme (Ireland), in Carrick-on-Suir, Ireland (Apr. 1, 1980); and Declan Scott, General Manager, Penn Chemicals (Smith, Kline and French), in Ringaskiddy, Ireland (Apr. 3, 1980).

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which groups opposing the government seek to mobilize support for their own political programs.⁷⁷ In Spain, for example, most ecological groups engage in broader political activity; they generally are strongly opposed to the national government and are often linked with political forces favoring regional autonomy. One Spanish government official noted that, in Spain, "ecology is almost never just an issue by itself. It is almost always a means to political ends."⁷⁸

In Spain's Basque region, one of Europe's oldest and most polluted industrial regions, environmental protest has become an important means of expressing Basque support for regional separatism. Though American firms generally are not the worst environmental offenders in the Basque region, nearly every American firm with facilities there has faced protests and efforts by local groups to block new construction or shut down existing operations. Several years ago, for example, Dow Chemical's proposal to produce pesticides in one of its plants near Bilbao provoked such intense protest that the company eventually changed its plans and produced the pesticides at a plant in the United Kingdom.⁷⁹

In the city of Trudela, along the Ebro River and adjacent to the Basque region, several municipal council members have frequently criticized the Spanish subsidiary of Rohm and Haas, claiming that the facility is seriously polluting the river. The general manager of Rohm and Haas (España), Jorge Ramirez Rodriguez, admits that the plant—which produces soil fumigants, resins, and dispersants—did have pollution problems after it was completed in 1968.⁸⁰ The plant was originally designed to send its wastewater to a series of lagoons for settling and flocculation before final discharge. Seepage from the lagoons, however, contaminated both the Ebro River and nearby wells that provide water for Trudela residents. After long negotiations, Trudela water authorities required Rohm and Haas (España) to take steps both to eliminate the problem and to design a treatment system that could be monitored. The company complied by installing a \$750,000 waste treatment plant with a single outflow into the Ebro.

In contrast to Spain, Mexico has seen little organized public concern about pollution despite Mexico City's widely recognized status as one of

77. For further discussion of the relationship between environmental pollution and political protest in developing countries, see Leonard & Morell, *supra* note 15, at 288-93.

78. Interview with Fernando Barrientos, Assistant to the Director, National Institute for the Conservation of Nature, Ministry of Agriculture of Spain, in Madrid, Spain (June 12, 1980).

79. Interview with Alfonso Enseñat, *supra* note 21.

80. This summary is based on interviews with Jorge Ramirez Rodriguez, General Manager, Rohm and Haas (España), in Barcelona, Spain (June 23, 1980); Jules Stewart, McGraw-Hill Business News Service, in Madrid, Spain (July 3, 1980); Jeronimo Angulo, Director General of the Chemical and Textile Industries, Ministry of Industry and Energy of Spain, in Madrid, Spain (June 17, 1980); and with local officials and citizens in Trudela, Spain (June 25, 1980).

the world's most polluted cities. Nevertheless, both officials in the current administration of President Miguel de la Madrid and political planners for the ruling Partido Revolucionario Institucional (PRI) are worried that pollution may one day become a major political issue.

One of PRI's concerns is that a prolonged temperature inversion in Mexico City during the dry (winter) season could create a "killer smog" like those that have occurred in London, Tokyo, and Donora, Pennsylvania.⁸¹ The Mexican government would not be prepared to respond to a similar situation.⁸² PRI political strategists also fear that should the Mexican economy improve, quality of life issues such as pollution, clean water, and traffic congestion could become important means by which Mexico's other political parties, on both the left and right, will seek to mobilize support.⁸³

Before the 1982 political campaign, PRI officials commissioned studies on Europe's "Green Party" movement in order to assess the likelihood that such parties could emerge in Mexico. During his election campaign that year, de la Madrid tried to make pollution concerns an important political issue.⁸⁴ In December 1982, shortly after assuming office, President de la Madrid announced the creation of a new Secretariat of Urban Development and Ecology (SDUE). This new organization centralizes responsibility for both conservation and environmental pollution control efforts. Since SDUE's creation, its officials have sought to revise Mexican pollution control laws and to give President de la Madrid's administration a successful record of dealing with Mexico's most urgent and visible pollution problems.⁸⁵

In many countries outside the United States, the public is generally uninformed about both the operations of industrial plants and their potential environmental problems. It is often difficult or impossible for the public to obtain information about chemicals or hazardous materials from companies or local officials.⁸⁶ This lack of information sometimes causes environmental groups and the general public to react with outrage at the revelation of pollution or public health problems at a particular industrial facility. Yvonne Scannell, a law professor at Trinity College in

81. For a further description of these air pollution disasters and other similar episodes, see Prindle, *The Disaster Potential of Community Air Pollution*, in *THE AIR WE BREATHE* 171, 177-80 (1961).

82. Interview with Juan Enriquez, *supra* note 22.

83. Interview with Socrates Rizzo, *supra* note 22.

84. PARTIDO REVOLUCIONARIO INSTITUCIONAL, *CONSULTA POPULAR: MEDIO AMBIENTE Y CALIDAD DE VIDA* (1982) (pamphlet published by the Instituto de Estudios Políticos, Económicos y Sociales, Mexico City, Mexico).

85. SECRETARIA DE PROGRAMAS Y PRESUPUESTO, *PLAN NACIONAL DE DESARROLLO: 1983-1988*, at 256-66 (1983) (National Development Plan).

86. For further discussion of the difficulties that the general public in developing countries has in obtaining adequate information on environmental hazards, see *supra* notes 70-76 and accompanying text.

smoldering for some time, the controversy once again erupted in April 1980, when the local residents' association blocked access to the dump and invited reporters, photographers, and county officials to examine the site. Although Raybestos Manhattan officials claimed that they had strictly complied with all proper dumping procedures, on-site inspection provided clear evidence to the contrary. Asbestos pellets and waste brake pads were strewn about the site unburied, and a waste bin was covered with large amounts of asbestos dust.⁸⁹

Following the Ringaskiddy protest in April 1980, shipments of waste asbestos to the dump were again halted. Raybestos Manhattan was forced to stockpile its wastes at the Ovens plant site. Throughout the controversy, IDA and Cork County officials defended Raybestos Manhattan publicly, issuing statements denying any findings of company wrongdoing. Privately, however, many officials sharply criticized Raybestos Manhattan, not only for failing to honor previous agreements, but for exacerbating the public protest by arrogantly rejecting suggestions that it should inform and reassure the local citizens.⁹⁰

Raybestos Manhattan officials in Ireland denied that the publicized controversies caused the company any economic losses. In contrast, plant workers and Cork County officials state that production delays in 1977, caused by the fight over the Ovens dump, resulted in the plant's frequent failure to operate at full capacity. As a result, the company lost key marketing opportunities in Europe. In November 1980, Raybestos Manhattan announced the closure of its Ovens plant.⁹¹

VIII

THE OLD INDUSTRY PROBLEM

In rapidly industrializing countries, the worst industrial pollution problems generally are caused by old industrial facilities constructed at a time when pollution control technologies were less sophisticated, communities were less concerned about hazardous wastes, and governments were less able to predict the potential environmental impacts of particular industries. The increasing vigilance and concern about industrial pollution in these countries has caught many companies midway through their long-term plant investment cycle.

89. These events are described in *County Council Encounters Difficulties in Search for Permanent Asbestos Dump*, *supra* note 63. In addition, the author visited the waste dump site and spoke with local citizens, county officials, and representatives of Raybestos Manhattan on April 3, 1980.

90. See *Raybestos Manhattan Waste Disposal Held in Violation of Permit Conditions*, INT'L ENV'T REP. (BNA) 285 (July 9, 1980).

91. MacSweeney, *Controversial U.S. Asbestos Firm Pulls Out of Ireland*, WORLD ENV'T REP., Nov. 17, 1980, at 1. The company's position was elaborated in a letter from John H. Marsh, Director, Environmental and Governmental Affairs, Raybestos Manhattan, to H. Jeffrey Leonard (Apr. 29, 1981).

National and local governments face a difficult problem when old plants are operating with levels of air emissions and water effluent that the public and the law no longer consider acceptable. As in the United States, officials often resort to double standards that treat old factories more leniently than new ones. For example, Spain's national pollution standards for emissions and effluents clearly distinguish between new and old plants. Similarly, in both Ireland and Mexico, de facto distinctions exist simply because pollution control conditions on new plants are stricter, while old plants, except in extreme cases, continue to operate under terms originally negotiated at the time of construction.

Thus, like most industrialized and industrializing countries, Ireland, Mexico, and Spain continue to suffer current pollution problems because of past decisions. The governments of all three countries have, in cases of extreme pollution, shut down plants despite adverse economic impacts. Nevertheless, in most cases, little can be done to reduce the high pollution levels of old plants until the facilities become obsolete. The governments of these countries are not likely to enforce stringent regulations and put such plants out of business. Thus, even more than in the United States, many industrial pollution problems in rapidly industrializing nations are likely to remain "generational" in nature. They will only be eased when a new generation of industrial facilities are built, using adequate pollution reduction techniques, in locations designed or chosen to minimize pollution dangers.

Pfizer's magnesite plant in Dungarvan, Ireland is an example of a multinational corporation still operating a plant built with "pre-ecological" technology. The Waterford County Council approved Pfizer's magnesite facility in the late 1960's, when the Council issued pollution control provisions that have since proved inadequate to protect the water and air. The plant's outfall has encrusted a substantial area of the seabed with calcium sulfate (commonly known as gypsum).⁹² In addition, the entire area adjacent to the plant is often covered with fine gray dust from Pfizer's stacks. Farmers more than five miles away complain of the adverse effects on their crops from the dust, and several recreational beaches up the coast are sometimes shrouded in thick haze even on sunny days. These pollution problems have caused repeated clashes between the company and local officials.⁹³

92. Dungarvan Bay's water pollution is noted in Lynch, *Coastal Industrial and Urban Developments: Projection of Future Pollution Loads*, in *COASTAL POLLUTION ASSESSMENT 207* (W. Downey & G. Ni Uid eds. 1978) (proceedings of a seminar by the National Board for Science and Technology, in Cork, Ireland, Apr. 20-21, 1978).

93. The dust problems are detailed in a 1976 confidential report prepared for the Waterford County Council on the Pfizer plant, also known as the Quigley Magnesite plant. Planning Division, The National Institute for Physical Planning and Construction Research, *A Report for Waterford County Council: Comments on Landscaping Proposals for Quigley Magnesite Plant, Dungarvan, Co. Waterford* (Oct. 1976) (on file with author). Complaints about Pfizer

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If a new magnesite plant were built in Dungarvan today, it would probably have much stricter air emission and water effluent standards. Unfortunately, the problems at Pfizer's existing plant cannot be solved now simply by imposing new pollution controls on the old technology. Although Pfizer has spent considerable amounts of money trying to improve the situation, any substantial effort by authorities to correct Pfizer's pollution problem would require the company more or less to redesign and re-equip the entire plant. If forced to make such changes, Pfizer probably would prefer to close the plant altogether. Although Irish officials have required the company to make marginal adjustments to deal with the worst problems, they still permit much more pollution from the old plant than they would from a new plant.

Spain faces the same dilemma with respect to two titanium dioxide plants, one owned by Dow Chemical and the other owned by Titanio. These two companies are Spain's only producers of titanium dioxide.⁹⁴ The Titanio plant, located in Huelva, has the capacity to produce about fifty thousand metric tons of titanium dioxide annually. Dow Chemical's plant, located at the company's complex in Bilbao, can produce about twenty-four thousand metric tons per year. Both of these old plants use the sulfate process, which creates much more pollution than does the newer chloride process.⁹⁵

Titanium dioxide pigment plants throughout Europe have already faced major disruptions and public outcries because of their pollution problems.⁹⁶ Although no major public demonstrations have focused specifically on the operations of Titanio or Dow Chemical, neither company is currently meeting the water effluent standards that Spain will be required to conform to when it joins the European Economic Community (EEC). Spanish officials have said that the EEC's increasingly stringent standards for titanium dioxide wastes are one of the few EEC regulations that Spain may have difficulty meeting.⁹⁷

Because it is larger and discharges directly into a harbor, Titanio's Huelva plant has more acute environmental problems than Dow Chemical's plant, although both will require substantial improvements in the

were presented by several Waterford and Dungarvan officials in a public meeting, in Dungarvan, Ireland (Apr. 1, 1980), and in an interview with James Shine, Chief Planning Officer of Waterford County, in Dungarvan, Ireland (Apr. 1, 1980). For further background on the pollution problems caused by Pfizer's magnesite plant at Dungarvan, see Leonard & Morell, *supra* note 15, at 295.

94. This overview of the titanium dioxide industry in Spain is based primarily on an unpublished report prepared for the author by Jules Stewart, McGraw-Hill Business News Service, Madrid, Spain (Apr. 19, 1981) (on file with author).

95. Davenport & Ferguson, *Titanium Dioxide Pigments*, in CHEMICAL ECONOMICS HANDBOOK MARKETING RESEARCH REPORT 788.5000 A, 788.5001 G, H (June 1978).

96. These problems are described in LEONARD, *supra* note 8, at 94.

97. Interview with Jeronimo Angulo Arambura, Director General of Chemical and Textile Industries, Ministry of Industry and Energy of Spain, in Madrid, Spain (June 17, 1980).

future. The British firm that owns Titanio, Imperial Chemical Industries, is converting its other European plants to the chloride process, and presumably will eventually convert the Huelva plant. Dow Chemical, however, is rumored to be interested in selling its facility. Built in the 1950's, Dow Chemical's only European titanium dioxide plant is a small-scale operation, and the company may not consider converting the plant to be worth the necessary investment.⁹⁸

Whatever the companies do, at least in the near future, Spanish officials and the Spanish public must live with the old sulphate process and its pollution. Europe now has a substantial oversupply of titanium dioxide, and improvements in plants must await an increase in demand, an improvement in the general economic situation, and pressure from more stringent EEC regulations.

Even without pressure from government regulators, multinational corporations often shut down their old polluting plants or sell them to domestic firms. The risks of continuing to operate old plants may simply become too high, especially because the public tends to judge multinational corporations more harshly than domestic companies.⁹⁹ Foret, FMC's Spanish subsidiary, recently closed an old plant in Valencia, even though Spanish regulators had not pressured the company to do so. The location of the plant had become increasingly urbanized and local residents were complaining about pollution problems. The steps needed to reduce the pollution would have been prohibitively expensive, and Foret decided to close the plant before a major public controversy arose. As Foret's Daniel O'Brien explained:

The stacks of the plant were spewing smoke right into nearby apartments, and we were getting a lot of complaints. So we paid off the workers and shut down. We were lucky, it never even hit the papers. It didn't take a genius to see what we were doing to the people. Sooner or later people would have become upset enough and the newspapers would have begun to go at us, anyway, so we decided to get out of it clean.¹⁰⁰

In Mexico, similar fears of adverse public reaction may convince some foreign investors to leave Mexico City before the government forces a shutdown of old plants needing replacement. Camilio Gutierrez, head of operations for Dow Chemical (Mexicana), says that Dow Chemical will be able, for the foreseeable future, to comply with virtually all requirements that government regulators may impose on its Tlalneplantla plant. Gutierrez speculates, however, that:

I think we might end up leaving here, since this is no longer a very appropriate site for a big gringo company like Dow Chemical. At some point I think somebody upstairs [in corporate headquarters] is going to want to

98. See Stewart, *supra* note 94.

99. See *supra* notes 21-23 and accompanying text.

100. Interview with Daniel O'Brien, *supra* note 29.

get us out of here to a more typical Dow Chemical site; we are practically in the middle of the town now.¹⁰¹

When multinational corporations buy out domestic industries or establish close relationships with them, the parent companies sometimes confront another variety of the "old industry" problem. In Mexico, several multinational company officials acknowledge that their domestic partners and suppliers often cannot comply with the worldwide environmental standards set by corporate headquarters. These officials fear that the public, the media, and the government eventually will associate the parent companies with pollution problems caused by the antiquated plants of their domestic affiliates.¹⁰²

CONCLUSION

Many of the examples presented in this Article indicate that both private companies and the governments of rapidly industrializing countries should strengthen and clarify their pollution control policies. The goals of these policies should be not only to minimize the environmental hazards associated with rapid industrial development, but also to minimize related political controversies and economic disruptions.

Industrializing countries need not accept gross environmental damage by foreign firms as the price of economic development. Most multinational companies—whether American, European, or Japanese—are willing, when required, to take precautions to protect both workers' safety and the surrounding environment. A government that clearly and forthrightly outlines its minimum pollution control standards for foreign investors is likely to encounter few multinational firms that will withdraw from negotiations on this basis alone.

Only a small number of specialized and aging industries appear to be fleeing the advanced nations in search of pollution havens, and none of these is likely to contribute substantially to any nation's overall development. In fact, for most multinational industries, location decisions are usually based on factors such as labor costs, tax incentives, market conditions, political stability, and the availability of transportation and adequate infrastructure. In a nation's overall investment climate, such factors generally are much more significant than pollution control costs. Industrializing countries therefore should deal firmly with foreign firms

101. Interview with Camillo Gutierrez, *supra* note 67.

102. This has already occurred in the case of Bayer, the German chemical company, which became embroiled in a major controversy involving chromium pollution by one of its Mexican suppliers. Interview with Hans Schurlein, Technical Director, Bayer de Mexico, in Mexico City (July 23, 1982); *Mexico Forces Plant Closure*, *Business Latin America*, Aug. 30, 1978, at 274; *Mexican Chromate Factory Closed for Third Time*, *WORLD ENV'T REP.*, Oct. 23, 1978, at 4.

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on issues of pollution control and workplace standards and require incoming companies to match the standards they comply with elsewhere.

In addition, rapidly industrializing countries can minimize foreign companies' costs of complying with environmental regulations by exempting or reducing pollution control technology from import taxes. Grants and other incentives can also minimize the burdens of compliance. Thus, with minimal revenue losses or diminishment in foreign investment, a rapidly industrializing country can ensure that most incoming industries take no fewer precautions to protect the environment and public health than they take in more developed countries.

Although many economists and international organizations continue to believe that environmental controls in industrializing nations must be geared to coincide with their level of development and affluence, no concrete evidence suggests that a country can prosper in the international investment economy simply by minimizing the strictness of its environmental regulations. Nor does any evidence suggest that an industrializing country will deter multinational corporations simply by requiring them to adapt to environmental codes similar to those in effect back home.

In addition, consciously maintaining low environmental restrictions in the hopes of attracting more foreign industry is extremely risky. The few industries likely to be attracted by such a strategy tend to be those producing goods that are not only hazardous to produce, but are also hazardous to use. Thus, purchasing countries are likely eventually to impose trade barriers against the importation of such products.

Countries with minimal environmental standards also tend to attract declining or stagnant industries trying to perpetuate themselves both by seeking pollution havens and by resisting technological advancements that are inescapable in the long term. The production of asbestos products, for example, may seem at present to be a lucrative export industry because demand in the advanced countries remains high. The industry's profitability, however, will probably soon decline; stricter regulations, enormous legal liabilities, and the development of safer substitutes are likely to undercut dramatically the market for asbestos products.

Similarly, production of titanium dioxide by the old sulfate process might seem to be a sound investment because international demand for titanium dioxide pigment is projected to remain high in the future. The sulfate production process, however, is obsolete, and is fast being replaced by the newer and far more efficient chloride process. In the future, old-style sulfate plants will be unable to compete with chloride plants, even if the former operate without any pollution restrictions.

To avoid long-term environmental and health problems, industrializing countries must see beyond the obvious forms of pollution and con-

sider the invisible, often extremely dangerous hazards posed by certain industries. In the early 1970's, Irish officials mistakenly assumed that the production of asbestos brake pads presented no significant health dangers. They might have been more cautious, however, if they had more carefully evaluated the emerging literature on the perils of asbestos. Had they known of these dangers, they might have refused Raybestos Manhattan's proposal to build its plant at Ovens.

Loose environmental constraints also pose a threat to foreign industries because egregious pollution can provoke strong anti-government and anti-multinational corporation sentiment at the grassroots level. As many of the examples presented in this Article demonstrate, pollution frequently becomes a volatile local political issue. Local citizens often resent what they perceive to be collusion between their government and foreign firms to despoil their nation's environment or to threaten public health. Thus, industrial strategies based on attracting pollution-creating industries can seldom, if ever, be tenable as a long-term policy.

Although industrializing nations have a great deal of latitude to control incoming multinational corporations, they must construct predictable regulatory schemes that do not disrupt long-term capital investment planning. A present strategy, for example, of guaranteeing companies lax pollution control standards may be counterproductive in the long-term because political pressures may force future officials to tighten the original standards after companies have relied on them. Requiring elaborate controls from the outset may thus be more conducive to making a country attractive to foreign investment. Many companies, anticipating plant lives of twenty-five to forty years, are wary of promises by governments never to impose significant pollution control regulations.

Another factor rendering stringent controls more prudent is the increasing incidence around the world of public objections to polluting industries. In Ireland, Spain, and many other rapidly industrializing countries, citizens and organized groups base their vigorous opposition to foreign corporations' new plant proposals on environmental grounds. In some cases, the opposition is more politically than environmentally motivated. Some opposition groups have rallied support against new plant proposals by exaggerating potential impacts and by exploiting the fears of uninformed local residents. In other instances, however, strong evidence exists that the project actually would cause severe environmental damage.

The problem of public opposition is exacerbated by the extreme difficulty which the general public and responsible groups often have in obtaining information. The dearth of information tends to help extreme anti-industry groups to inflame fears and to mobilize opposition. Thus, policies that allow responsible groups to participate in the industrial siting process should not only improve the quality of development, but

should also help reduce the power of groups pursuing purely political goals.

Another problem governments must face as they formulate environmental regulations is how they should treat old industries. Old industries, both foreign and domestic, are the largest sources of industry-related environmental problems. At the same time, old industries are the least able to minimize their pollution, a problem evident in the United States as well as in newly industrializing nations. Most countries tend to regulate new industries more stringently than old ones. Thus, unless they are willing to close old polluting plants and exacerbate high unemployment, rapidly industrializing countries must live with their past mistakes. Yet, as the contrast between Pfizer's two Irish operations illustrates, governments can exercise some degree of leverage over foreign-owned facilities depending on local circumstances and the economics of various industries. In some situations, companies can be required to upgrade their plants.

In applying different standards to new and old industries, rapidly industrializing countries must be careful not to give foreign companies stronger incentives to buy or expand existing plants, rather than to build new facilities. Similar inverse incentives have created environmental problems in the United States. In Spain, Eli Lilly's decision to purchase an existing Spanish-owned plant, rather than to construct its own proposed plant in Cordoba, may have been based in part on such incentives.

As some of the examples from Ireland, Spain, and Mexico demonstrate, multinational firms operating abroad are generally much more threatened by the politics of pollution than by technical government regulation. In rapidly industrializing countries, the environmental controls imposed on multinational corporations are rarely decided only by regulatory agencies or courts. In these nations, the most significant threat to foreign firms are the perceptions of the government, the public, and politically motivated groups as to whether such firms are polluting and, more importantly, whether political advantage can be gained by alleging real or potential pollution problems.

The political nature of environmental policy decisions has two major implications for multinational corporations. First, foreign firms generally cannot be certain of how strict the long-term pollution control standards for their industrial plants will be. The standards may vary considerably from year to year because of sporadic regulatory enforcement and changing political concerns. As a result, when foreign firms construct new factories they should err on the side of overestimating the strictness of the eventual environmental controls. The costs of overcapitalizing a new industrial plant by installing more-than-adequate pollution control technology are small compared with the potential costs of re-

trofitting to accommodate rapidly changing regulations or facing the adverse consequences of public anger over pollution.

The second consequence of environmental politics is more difficult for firms to correct through technological solutions. Most rapidly industrializing countries that have succeeded in attracting investors from the United States and other countries have also stimulated the expansion of domestic firms. These latter companies generally produce more pollution than the multinationals. In Ireland, Spain, and Mexico, however, foreign investors, especially those from the United States, are the first to bear scrutiny when industrial pollution becomes an important public and governmental concern. Thus, even firms that meet reasonable environmental standards are not always secure from governmental regulators under public pressure to curb industrial pollution.

As a number of cases cited in this Article illustrate, discussions about pollution control between a company and local officials often are carried out in an atmosphere of stormy political debate, intense intergovernmental conflict, and overlapping jurisdictions. Conflicts arise long after formal agreements are reached at the national level, and even after negotiations at the local level have led to firm agreements on specific pollution standards and anti-pollution measures. Pollution control agreements change frequently because they are subject to renegotiation as circumstances within a country change. Although standards must be outlined long before a plant's construction, final permits and certifications cannot be issued until a plant is ready to operate. In the interim period, the local political atmosphere can change radically, and governments may respond to new pressure by amending the original standards. Often the resulting proposed renegotiations focus more on local political conditions than on the actual environmental impacts of the proposed facilities.

Government officials and the public in rapidly industrializing countries sometimes desire more than just a reduction in the pollution contributed by a foreign firm. They also want foreign firms to assist with the overall anti-pollution effort needed in a particular area. For multinational companies, the challenge is thus not only to comply with regulations, but to make some positive contribution to a country's efforts to reduce industrial pollution.

In many instances, companies can enhance their own situation most by helping local officials and responsible local groups obtain information about pollution and pollution control measures. These persons often cannot collect such information on their own, although it may be readily available both to the companies and to the American public. In the past, the guarded attitudes of multinational firms regarding such valuable data often has increased general public suspicion of foreign companies and has provided opportunity for ideological groups with anti-industrialization or

anti-foreign philosophies to exaggerate the dangers of industrial pollution. In the future, multinational corporations in rapidly industrializing countries should provide greater information and adhere to stricter pollution control standards, both to protect the environment and human health, and because it is now clearly in their own interest.