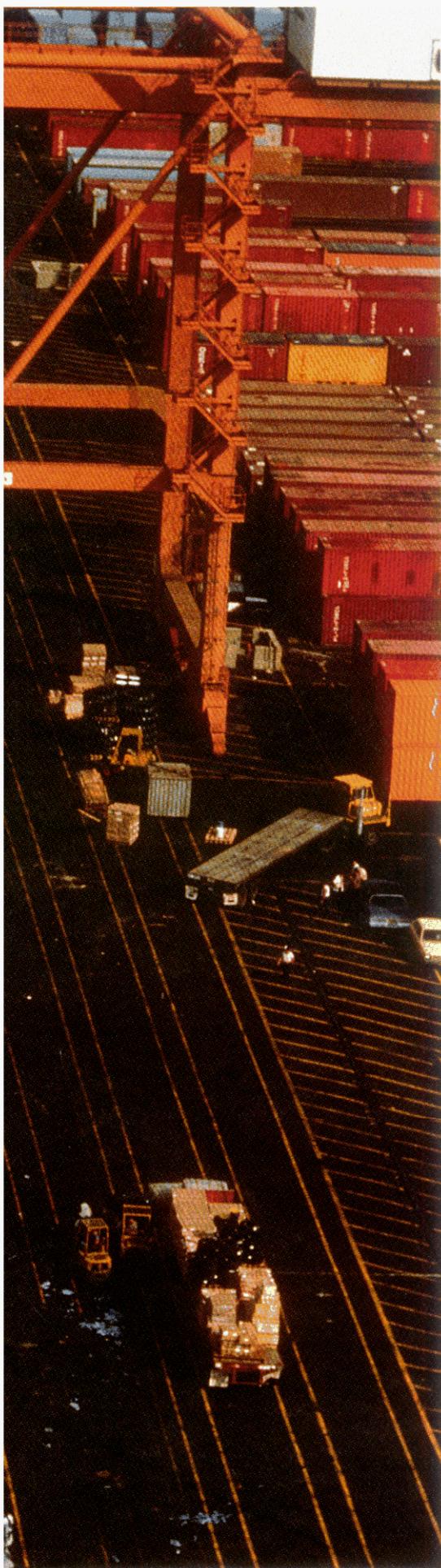


ES&T PRÉCIS

DOING THE RIGHT THING IN EXPORTING HAZARDOUS TECHNOLOGIES

Ethical responsibilities involved in the export of potentially hazardous technologies will be discussed at next year's Earth Summit in Rio de Janeiro; here is a report from an international symposium on the subject held in Luxembourg, November 13-16, 1990.



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To facilitate new ways of thinking about the technology transfer process—particularly as Western multinational corporations (MNCs) appear poised to export potentially hazardous technologies to Eastern Europe and the Soviet Union—Clark University, in conjunction with the Center for Population Studies in Luxembourg, the Gerling Consulting Group (Zürich, Switzerland, and Cologne, Germany), the Stockholm Environment Institute, and the Boston Institute for Responsible Management, organized a symposium in November 1990 in Luxembourg under the patronage of the Luxembourg government. The symposium brought together representatives of industry, government, insurance and consulting companies, academia, and international organizations to discuss experiences with and ethical issues surrounding hazardous technology export from Western nations to Third World Countries. The conference participants discussed, among other topics, the opportunities and risks of biotechnology transfer, the siting of chemical production facilities, and waste management issues.

Rather than report on each presentation, we focus on the key issues addressed during the symposium, and synthesize the many perspectives expressed in the individual papers, panel discussions, and plenary debates. The participants developed a set of ethical and pragmatic guidelines for technology transfer, which were later summarized by the conference organizers and endorsed by most participants. The resulting document has been forwarded to the Geneva-based Preparatory Committee for the 1992 United Nations Conference on Environment and Development in Brazil. (This document can be obtained from O. Renn, CENTED, Clark University, Worcester, MA 01610.) The

Précis articles are reports of meetings of unusual significance, international or national developments of environmental importance, significant public policy developments, and related items.

following sections reflect the major arguments of this document.

Pragmatism and conciliation

The decade of the 1980s witnessed a significant shift in the nature of the debate over technology transfer by MNCs to Third World countries (1, 2). Until then, although the debate was a continuum rather than a dichotomy, it was dominated by two opposing camps. One, when taken to its extreme, advocated foreign investments of all types in order to accelerate economic development (3). The other viewed foreign investments as a strategy of global capitalism to exploit the human and environmental resources of Third World countries (4–6). [For a comprehensive review of different theoretical perspectives that underlie contrasting assessments of the impact of MNC technologies on Third World countries, see Chapter 4 of Jenkins (6).] Both camps were driven more by ideology than by analysis in expressing their respective viewpoints.

Today, formerly dichotomous viewpoints are shifting toward a new paradigm less constrained by ideological imperatives. This paradigm seeks to identify the elements of technology transfer that are mutually beneficial to the MNC and the host country, and to determine appropriate policies for risk reduction. Host country self-determination and the legacy of uncontrolled foreign investments are helping to shape this emerging paradigm.

The Union Carbide gas leak disaster in Bhopal, India, was a watershed in the evolution of this new vision of corporate responsibility in developing countries. Against the backdrop of immense personal tragedy, the Bhopal accident demonstrated vividly that cooperation between the MNC and the host country is essential to ensure adequate protection for workers, the community, and the environment. The simplistic view that foreign investment automatically benefits the host country, even when substantial hazards are involved, could no longer be sustained. At the same time, the exploitation perspective was equally unsatisfactory in explaining the disaster. Instead, a mix of management failures, poor training and supervision, gradual divestment, and technologies inappropriate to local conditions combined to create the preconditions for an acute breakdown of human and hardware systems (7).

With the collapse of the communist system, the ideological competition between capitalism and socialism has given further momentum to more pragmatic approaches to technology transfer and international cooperation.

At its core, the new paradigm views MNC and host country goals in managing imported technologies as non-zero-sum with significant benefits to both parties, yet requiring trade-offs and painful choices among desirable private and public goods. It impels the re-evaluation of investment strategies, corporate behavior, and national goals in light of these benefits and trade-offs. Successful cooperation among MNCs and host countries reveals that explicit mentioning of values and trade-offs in negotiations enhance performance and cooperation between host countries' regulatory institutions and foreign investors. Such a strategy calls for the consideration of ethical principles to guide MNCs, host countries, and parent countries in their technology transfer decisions.

Several existing codes of ethical conduct designed to guide extraterritorial corporate, and, in some cases, governmental behavior show close ties to early ideological interpretations of hazardous technology transfer. A perceived need to "control" inappropriate MNC activities is a major theme presented in several codes drafted during the 1970s (8-12). Emphasizing the pervasive role of MNCs in the world economy, these codes sought to control corporations with appropriate laws, policies, and regulations adopted by governments and international organizations.

Other codes of conduct affecting technology transfer have been drafted by organizations that cast the foreign activities of MNCs in a more favorable light (13-16). Rather than regulate MNCs, governments are encouraged to facilitate their positive contributions through the creation and development of effective capital markets and infrastructure. Insofar as regulations are necessary, it is suggested that they be framed in such a way that the rights of existing enterprises are respected, new investment is encouraged, and flexible application of codes and guidelines is practiced.

Our reading of these and other codes reveals their increasing detail and pragmatism in balancing MNC and host country interests. Notable among these is the Conseil Eu-

ropéen des Fédérations de l'Industrie Chimique's "Principles and Guidelines for the Safe Transfer of Technology" (13). In addition to prescribing the allocation of responsibilities between involved parties (technology suppliers and receivers, contractors, and host states), the guidelines explicitly cover seven detailed stages of technology transfer, from its procurement to implementation and routine operation. Taken as a whole, we have found existing codes and related ethical literature (17) to contain a wide range of prescriptive criteria useful for the structuring of corporate and national behavior in environment, health, and safety.

At the beginning of a new decade and with an eye toward the new millennium, it is timely to consolidate these guidelines, to integrate the often confusing "recipes" for ethical conduct into a consistent structure, and to evaluate the "real world" experiences (18-22) with respect to achieving the desired goals. Such review is all the more relevant as the world faces new challenges involving the export of hazardous technologies from the industrialized West to Eastern Europe and the Soviet Union. Former communist countries, eager to attract foreign investment, are positioned to set new standards. Governments and potential investors will benefit from integrated guidelines for all stages of the technology transfer process.

Principles of ethical conduct

Drawing from the major schools of ethics in philosophy, the export of technologies and materials from industrialized to developing or less developed countries may be analyzed within the following four ethical paradigms (23):

- Utilitarian. Whatever promises the most benefits for all parties involved, is also the most desirable arrangement for the proposed transaction or transfer.
- Deontological. Based on civil rights and generally accepted standards of decent behavior, arrangements are acceptable only if they meet these standards regardless of actual outcome.
- Fiduciary. One of the parties takes special responsibility for the arrangement of the transaction and acts as a patron for the other parties.
- Consensual. All arrangements are ethically acceptable if all the parties affected explicitly or implicitly give prior consent to them.

The application of each principle implies different procedures and methods. If a utilitarian perspective is accepted, options for arranging transfers or exports would be evaluated according to their cost/benefit ratio, and measures to increase safety or environmental quality according to their cost-effectiveness.

In contrast, the deontological principle would oblige the parties to meet special ethical criteria, for example to reduce the risk to some acceptable level or to implement the best available pollution control technology. The obligation to achieve "equivalent" safety and environmental protection levels (equal ends through possibly different means) in the host country and the exporting country is a typical and widely used criterion based on deontological reasoning.

According to the fiduciary approach, one party, for example the corporation, assumes responsibility for negative impacts of the transaction on other parties (even without legal obligation) and acts as an advocate to serve their interests. A typical example might be the corporate arrangements to ensure safe and environmentally beneficial use of their products after they have been sold to customers, commonly referred to as product "stewardship."

Finally, consensual principles focus on the procedures of reaching an agreement. All parties involved should be given the opportunity to review the present knowledge of potential impacts of the transaction and then to select implicitly or, even better, explicitly, an arrangement that they all regard as beneficial.

Each of these principles has obvious advantages and shortcomings. If applied correctly, the utilitarian approach guarantees the optimal allocation of given resources for obtaining a specific set of objectives, but may not be equitable or respect individual rights. The pursuit of deontological criteria prevents or at least mitigates unwanted consequences, but may waste valuable monetary or material resources. The fiduciary principle obliges the most appropriate party to base its actions on an integration of values and interests of all parties involved, but is likely to produce biased value sets if the values of the patron conflict with the values of another party. Informed consent ensures that all parties perceive a subjective benefit from the selected arrangement, but

this perception may be based on incomplete or biased information or may be wrongly inferred from indications of implicit approval, such as absence of organized opposition.

Given the imperfections of any one of the four principles, a combination is preferable in order to take advantage of the merits of each and compensate for the shortcomings. The following guidelines emerge:

(1) MNCs should accept a fiduciary responsibility for their facilities and products and act in the interest of the people who are affected by their economic activity. A rule of thumb here is: Don't do anything that you would object to in your own country under similar circumstances.

(2) It is essential to gain explicit prior consent insofar as this is technically and politically feasible. Prior consent can be accomplished through:

- accepting the host country's standards and regulations;
- negotiating acceptable arrangements with the legally responsible host country's agencies;
- providing full information about potential impacts to all constituencies;
- creating a vehicle to elicit public concerns and possible objections; and
- providing constituents with an opportunity to voice their consent or dissent.

(3) Fundamental civil rights should not be traded off against economic benefits or other objectives. In addition, the rule that health and safety standards should be equivalent (though not necessarily identical) to those of the exporting country seems wise to adopt. It should be waived only in exceptional circumstances, for example, to avoid a severe economic disruption.

(4) If an MNC abides by Guidelines 1, 2, and 3, all other choices left to the corporation or the host country should be made on the basis of utilitarian methods, i.e., cost-benefit, cost-effectiveness, and other utility optimization techniques.

Delineation of procedures

If these four guidelines are accepted as a basis for organizing the transfer of hazardous technologies or materials, the next step is to specify concrete objectives and appropriate procedures. Objectives are yardsticks to measure the success or failure of any given transaction with respect to the four guidelines. Procedures, in turn, define the steps

necessary to implement these objectives. The participants of the Luxembourg symposium suggested many objectives and procedures that would meet the ethical guidelines. Among the most important are the following:

(1) In accordance with the fiduciary commitment, it is essential that the MNC, on its own initiative or through mandate by a host government, provide diverse options, all of which are capable of meeting the goals intended by the transaction. These options should include nontechnological solutions as well as solutions based on indigenous technologies or methods, assuming these are technically and economically feasible. It should not be automatically assumed that the techni-

impacts, both positive and negative. This analysis serves two functions. It provides the basic material for the various constituencies to review the impacts and gain the knowledge necessary to approve or disapprove a planned transaction. It also helps to establish a data base to evaluate different options and later measures of safety and environmental protection according to cost-effectiveness. Uncertainty about future impacts will remain, but the impact analysis provides the best current knowledge available to make a prudent decision.

(3) A preliminary selection of options should occur on the basis of firm deontological principles. Any option that violates any basic individual right (as given in the UN Bill of Rights or other international code) or any host country law or regulation (unless explicitly overruled by the host country authority) does not qualify for further consideration. In addition, all options should be dropped that do not provide a level of safety and environmental protection equivalent to that of an identical facility or technology in the exporting country. In exceptional cases, one may waive this principle if the evidence shows clearly and unambiguously that a cancellation of the proposed transaction may lead to a less desirable environmental outcome than its implementation. It should be noted, however, that in almost every case a new option can be designed that meets the objective of equivalent safety *and* is economically and technically feasible. The burden of proof for justifying a waiver of the equivalence principle rests on the corporation.

(4) The principle of equivalent levels of safety and environmental protection does not necessitate the export of identical safety and environmental practices. The goal is to have functional equivalents available that achieve approximately equal performance using a variety of means. It is prudent to use the tools of utility optimization methods to select the measures that will ensure an equivalent degree of safety and environmental protection. Regulations or strict rules requiring the use of identical means may result in a waste of scarce resources. Flexible responses to different levels of workers' qualifications, the relative prices for labor and machines, infrastructural conditions, and other situational variables may be necessary to ensure economical

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cal options that are preferred in industrialized countries are always the most appropriate method of providing the same or a similar service in many developing countries or in Eastern European countries. At the same time, however, a well-meaning paternalistic offer of only so-called “appropriate technologies” is also inadequate insofar as the MNC unilaterally determines what is appropriate.

(2) Each of these options should be carefully analyzed for potential

operation and competitive advantages.

(5) Notwithstanding the need to be flexible in selecting the means for ensuring equivalent levels of safety, it is helpful to set priorities for the selection of means, particularly if the potential benefits of each option are difficult to quantify. Proposers and host countries should develop priority lists which they can use in later negotiations. A priority list for safety technologies may appear as follows (ordered from first to last priority):

- inherently safe technologies (physical properties);
- forgiving technologies (able to withstand human error);
- passive safety devices (do not need human intervention to be activated);
- active safety devices (do need human intervention to function);
- accident mitigation technologies (protection of workers and residents in the case of accidents).

These technologies can and should be combined to enhance the overall safety level, but such a priority list helps to determine the feasibility of the higher order means before turning to a lower order solution. The same concept can be applied to pollution management. A priority list may appear as follows:

- avoidance of pollutants (through materials and process innovation);
- establishment of closed cycles (recycling or reuse of potential pollutants);
- volume reduction through recycling;
- application of the "as low as reasonably achievable" principle (to reduce emissions of pollutants);
- incorporation of best available control technologies to achieve levels below permissible limits; and
- meeting, but not achieving levels lower than, regulatory standards.

(6) Option selection and modification should be achieved by consent between the proposer and the host country agency. It seems advisable to focus first on the shared values and goal and then turn to controversial issues. These negotiations should be preceded by an agreement by the host country and the proposer to commit themselves to a specific option and its special modifications in terms of safety standards and environmental protection. This process should incorporate the impact analysis (provid-

ing the factual base for debating each option) and the preferences of both parties (providing the value base for aligning each other's interests) into the negotiations. It is not necessary to restrict the negotiations through special rules other than fairness, honesty, good will, consistency and, if mutually agreed to, a procedure for dispute resolution.

(7) After an agreement is reached, it is the obligation of the proposer to inform affected host country constituents insofar as is possible. Even if public involvement is not mandated in the host country, every effort should be made to provide information to the affected public and to establish a forum for feedback. Organizing such an involvement process proves difficult in many recipient countries, especially in those countries unaccustomed to public scrutiny of private and official decisions. A process will be successful when proposers are cognizant of these constraints while seeking to inform the public of potential side effects and to incorporate local conditions (often unknown by the regulator) into the technical design or institutional management of the technology or facility. (An additional benefit is that a public aware of side effects is less at risk than an uninformed public.)

(8) After the selected option is implemented, fiduciary responsibility should be the guiding principle for the operating phase. Regardless of the host country's ability to monitor or control safety and pollution, the operators should act as if they were entrusted by the host country to assume responsibility for the impacts of their actions on anything that the host country values, ranging from workers' safety, community health, and preservation of natural habitats to conservation of cultural artifacts. Many MNCs have developed sophisticated and effective protocols to ensure self-regulation even in the absence of external pressure or legal obligations. Because the corporate safety culture practices (i.e., the guiding principles and values that act as internalized motivators for all employees within a company with respect to safety and environmental health) differ considerably, it is not appropriate to standardize these protocols and to develop a boilerplate for all purposes. It is important, however, that each company create a system of internal checks and balances. This system should

ensure and specify monitoring requirements, safety checks, emission controls, and impact assessments. The less a host country exercises supervision in environment, health, and safety, the more important becomes the internal corporate organization to ensure controls.

(9) Within reasonable limits, corporate responsibility extends to upstream processing of the product and downstream distribution, even in the absence of legal requirements. The latter, known as product stewardship, is particularly pertinent to developing countries where end-users are often ill informed and emergency medical response systems nonexistent or substandard. However, this responsibility can only be assumed within reasonable boundaries. Car manufacturers, for example, cannot be held responsible for an accident caused by a drunken driver. What constitutes a reasonable boundary cannot be defined in abstract, but depends on the nature of the technology and the sociocultural context in which it is placed. It appears, however, that warning about risks and training consumers to handle the product safely fall within the responsibility of the producer.

These nine specifications and four principle guidelines offer a foundation for MNCs to design their own guidelines or evaluate their existing rules. Principles and guidelines applicable to MNCs are equally valid for host countries and the international community. Safety and environmental protection equivalent to those of the exporting country, adherence to inviolate rights and values, enlargement of technology options to serve host country wants and needs, and assurance of corporate liability are also relevant host country objectives.

To realize these principles and guidelines requires the development of policies by host countries, the exporting countries, and the international community. Policy structure largely depends on the country's political system, its culture, and its regulatory style. However, policies can be classified in terms of compliance mechanisms (information, incentive, and coercion) and implementing agency (international, governmental, corporate).

In reviewing the policy instruments—self-regulation by the MNCs, provision of economic incentives for environmentally re-

sponsible behavior, or imposition of regulatory standards upon the MNCs—it seems advisable to reserve national standards for inviolable values (such as protection of life and health) and for other national objectives that are impossible or extremely difficult to link to the self-interest of the MNCs. Examples of the latter are equitable development (i.e., equal development opportunities for all regions of a country and for all social classes) or national self-sufficiency. Excessive standards may deter potential investors and, given that provision for adequate health and safety levels is in the self-interest of many MNCs, may turn out to be redundant or even counterproductive. However, most MNCs prefer to adjust to prescribed standards rather than to face high degrees of regulatory uncertainty.

International guidelines may help host countries to use internationally available expertise to articulate national standards and to build regulatory capacity. Another possibility, although difficult to accomplish, may be the establishment of an international body with authority to monitor facilities in all member countries. The major emphasis should be on linking economic incentives with self-regulation within the context of acceptable host country environmental targets and risks. If effectively implemented, an international organization is the most flexible, cost-effective, and nonbureaucratic path by which to meet the desired objectives.

In conclusion . . .

The Luxembourg Symposium on Values and Responsibilities in the Transfer of Hazardous Technologies provided an opportunity for industrialists, consultants, administrators, and academics to discuss their perspectives; to review their experience with existing codes of conduct and corporate performance; and to outline a list of principles, guidelines, and procedures for responsible and mutually beneficial pathways to sustainable development in the Third World and Eastern European countries.

The major conclusion of the symposium was that, despite many drawbacks and problems, cooperation between MNCs and host European countries can be arranged in a mutually beneficial manner. Principles of ethical conduct have helped to shape successful policies in the past; they will continue to be need-

ed for meeting the challenges of the future.

A fiduciary approach to safety and environmental management that is sensitive to cultural values and lifestyles of the host country, coupled with good-faith attempts to gain approval by affected constituencies, is at the heart of the recommendations. In addition, constitutional rights, international law, and—to a lesser degree—the rule of equivalent safety and environmental quality should be regarded as inviolable values which should not be sacrificed for economic gain.

On the procedural side, governments are well advised to take advantage of the self-interest of MNCs and encourage self-regulation. Legal controls and regulations are necessary, but should be coupled with economic incentives to ensure cost-effectiveness and bureaucratic simplicity. Corporations should develop policies for internal monitoring and constant quality control within the organization. This is particularly essential in countries with weak regulations and inadequate enforcement.

Responsible export of hazardous technologies poses a major challenge in today's global economy. Corporate and host country environmental goals are invariably pursued concurrent with economic development, social justice, national identity, and political autonomy. Balancing these goals is a complex task for host countries and MNCs, particularly when hazardous technologies are involved. The participants of the Luxembourg symposium expressed hope and confidence that the outcome of their deliberations may help all parties to cope with this task.

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