

Can you imagine US regulations that would allow an EPA inspector to come into your plant and because your waste water discharge was out of compliance, require that you shut down the entire plant or a key part of your process? Not only would you have to continue paying all your workers but you could not start your plant up again until you signed a consent agreement to bring your facility into compliance, and post a bond to finance the required improvements.

In March 1991, Mexican President Carlos Salinas closed the PEMEX 18th of March oil refinery in Mexico City. The closing of this refinery, which accounted for 8% of PEMEX's crude distillation capacity and involved a \$500 million investment and 5,000 jobs, demonstrates Mexico's commitment to improving the environment.

SEDESOL has increased its environmental budget sixfold, but US per capita spending on the environment was US \$0.08 in 1989; US \$0.20 in 1990; and US \$0.48 in 1991. By contrast, US EPA expenditure in 1991 was \$24.40 per capita.

In January it was announced that the Federal Government had formed a Commission for the Prevention and Control of Pollution in Mexico, with a budget of US \$169 million for 1992, 50% of which is a loan from the World Bank and Japanese banks, and the other 50% is from the Federal Government. This amount is about four times more than the national expenditure of SEDUE for 1991.

Handling and disposal of hazardous waste

According to various sources, Mexico generates between 5 and 6 million tons of hazardous waste per year. This amount is relatively small in relation to the 250 million tons per year generated in the US, but is similar to the annual rate of waste generation for Germany, England or France. About 3

million tons per year are generated in the Mexico City valley.

About 60% of total hazardous waste generated in Mexico is discharged into sewers, the rest being dumped in barren areas, municipal landfills or others. It is estimated that less than 5% of total hazardous waste is disposed of in an environmentally sound way.

Since 1988, Mexican authorities have taken a serious approach to toxic controls, mainly through legislation, enforcement, prevention of trans-border transfer of toxic materials, and encouragement of the private sector to operate waste facilities.

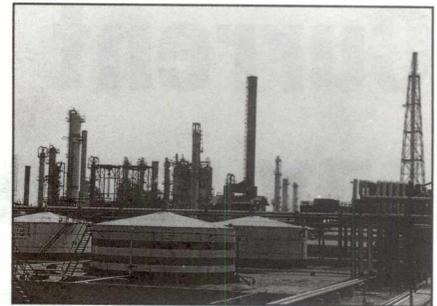
Existing deficiencies in toxic and hazardous waste management infrastructure, together with the "not in my backyard" syndrome has produced clumsy management of hazardous waste in Mexico. Due to a lack of enforcement pressure from the regulatory authorities, many generators of hazardous waste currently choose cheap alternatives to the treatment required by law and in some cases this has had serious public health implications. The improper disposal of hazardous waste has become increasingly serious in in-bond areas.

Hazardous waste management is regulated in Mexico by SEDESOL under regulations published in the government's official gazette on November 25, 1988.

These regulations implement the General Law on Ecological Balance and Environmental Protection in matters of hazardous waste.

The term "hazardous waste" is defined in Mexico in roughly the same manner as under US regulations. However, Mexico is presently still using the Extraction Procedure (EP) Toxicity Test rather than the Toxicity Characteristic Leaching Procedure (TCLP).

Generators or handlers of hazardous waste are required to obtain SEDESOL permission to carry out such activities. All hazardous waste



In 1991 the 18th of March oil refinery was closed to improve the environment.

generators are required to register with SEDESOL and maintain a monthly log of waste generated. As with US regulations, incompatible waste must be segregated and waste must be appropriately stored or containerized.

Transportation of hazardous waste may only be undertaken in vehicles authorized by the Department of Communications and Transport. A bi-annual report of hazardous waste movement is required.

All hazardous waste treatment, storage and disposal (TSD) facilities must obtain SEDESOL authorization. TSD facilities must have personnel training programs for hazardous waste handling, documented qualifications of the facility manager and an emergency plan. Storage of hazardous wastes must be away from office, service and production areas and areas where finished goods and raw materials are stored. Storage areas must contain sumps or containment structures with a capacity equal to 20% of the material stored. This is to control leaks or overflows. A fire-extinguishing system is also required in the storage area.

All open areas used for hazardous waste storage must be located above extreme high water level with a 1.5 safety factor. All flooring must be impervious to the waste stored. Covered areas must be adequately ventilated. Hazardous waste in uncovered bulk storage is not authorized if the waste can produce a leachate.

A log book must be maintained for all waste storage areas to record

waste as it enters or exits the facility. Unlike US regulations that limit the time waste can be stored, Mexican regulations include no time limit. Storage time is generally a function of available space.

In the event of a spill during handling, SEDESOL must be notified immediately and a written report submitted to SEDESOL within three days. The report must describe the location of the incident, the cause, the types and quantities of waste involved, emergency actions taken including clean up, and any ecosystem damage.

In-bond industries are required to return all hazardous waste generated from components originating in the United States to the United States. Mexico excludes imports of all hazardous waste except such waste as is to be recycled or reused. This is to prevent Mexico from becoming an international dumping ground.

Regulations for the status of worker health and safety

The environment includes the complete physical setting in which man lives and work environment is a very important component of this reality. In addition only a very thin line separates environmental health and occupational health.

In fact, firms that have for some decades taken care of their work environment have fewer

environmental problems today. By contrast, firms with relatively high rates of industrial accidents or hygiene and security problems are the ones that SEDUE had to press to meet pollution control requirements.

The most commonly reported categories of health problems in Mexico deriving from inappropriate working conditions have resulted from:

- Exposure to chemical products or waste.
- Breathing high concentrations of solid particles.
- Inadequate protection equipment and prevention systems.
- Exposure to asbestos and silica.
- Contact with lead either as dust or fumes.
- Exposure to solvents.
- Excessively high concentration of gases such as carbon monoxide, sulphur dioxide and others.
- Impact by physical agents such as noise, vibrations, heat, light deficiencies and others.

Among the most common health problems resulting from inadequate working conditions are accidents, respiratory diseases, skin disorders, cardiovascular disorders, cancer and reproductive system damage, neurological and psychological deficiencies.

The impact of pollution on health, as well as occupational health, is regulated by the General Health Law.

The functions of the Department of Health with respect to health regulations are as follows:

- To establish the technical norms for the use of substances, machinery, equipment or tools to reduce risks to the health of exposed workers.
- Determine the maximum pollution exposure limits of workers and conduct relevant toxicology research.
- Enforce public health regulations with the cooperation of local authorities.

According to the Health Law, companies are obliged to observe all norms or standards of industrial hygiene and safety, adopt appropriate measures to prevent accidents and guarantee the health and safety of their workers.

The 271 articles that make up the Health Law regulations are set by Federal Labor Law which requires the establishment in all firms of Mixed Safety and Hygiene Commissions in the workplace, including owners' and trade union representatives.

In short, in compliance with Article 27 of the Constitution, Mexico has a very complete set of regulations to protect the health and safety of workers. However, in many cases, these regulations are not implemented or enforced until serious incidents have affected workers, and trade unions have stepped in.

New "polluter pays" waste-water treatment regulations

In a recent study prepared by Environmental Resources Limited, the London ERM, for the International Finance Corporation, it was estimated that the capacity of Mexico's 223 municipal and 177 industrial waste-water treatment plants is at most 16% of total municipal and industrial waste-water generated in the country.

In addition, many of these plants frequently do not operate satisfactorily. In the dry parts of the country, much of the untreated

Table
Mexican taxes on waste-water discharge which exceed
Technical Ecological Norms (Standards) (a)

Zone No. (b)	US\$ per million gallons	US\$ per lb of COD	US\$ per lb of total suspended solids
1	505	0.04	0.07
2	126	0.01	0.017
3	50	0.004	0.007
4	25	0.002	0.0035

a Conversion rate US\$ 1.00 = 3,000 Mexican pesos.
b Zones were established by the National Water Commission based on water availability and existing water quality.

municipal waste water is used to irrigate crops. Because the waste water may contain heavy metals, solvents and other compounds, this practice may be causing ground-water contamination.

In an attempt to improve water pollution control, the Mexican government published a new law in the December 26, 1990 Official Gazette, which taxes waste water discharges unless they have been treated to meet certain prescribed standards known as Technical Ecological Norms. The law has been nicknamed the Polluter Pays Law, since it is intended to complement SEDESOL's existing enforcement powers with taxes on dischargers.

This law, which went into effect on October 1, 1991, became a major landmark in Mexico's environmental protection legislation because for the first time it started using taxes rather than a watchdog policy to improve and protect the quality of Mexico's surface and ground-water.

The law will be enforced by the National Water Commission, but all

payments will be made to the Treasury Department. It provides that all waste water discharged into the ocean, bodies of water, soil or ground-water above certain technological standards will have to pay a tax for the privilege of continuing to discharge. The amount of the tax varies from region to region and is based on quantity, dissolved organics and total suspended solids (see Table).

In many cases, industry does not discharge directly into an aquatic ecosystem but rather to a municipal sewer. In this case it is the municipality that will have to pay the discharge tax and in turn collect the money from the industrial discharger.

Mexican officials are not only planning to use this law to force construction of needed waste-water treatment facilities, but also plan to turn over to private enterprise the sampling and analysis of waste-water discharge rather than continuing to try to perform this function with their own limited resources and personnel.

Environmental impact assessment requirements for new plant construction

Environmental regulators believe that one of the best planning tools for preventing environmental damage is the preparation of environmental impact assessments. They evaluate and mitigate damage to the environment and human health before it can occur.

The Mexican government has published instructions for the preparation of environmental impact assessments in Articles 9, 10 and 11 of the General Ecology Law Regulations (*Gaceta Ecológica* Vol. 1, No. 3, September 1989).

The basic structure of an environmental impact assessment contains the following:

- General information on the company.
- Description of the project.
- General aspects of the natural and socioeconomic setting.

- Applicable norms and regulations.
- Identification of potential environmental impact.
- Prevention and mitigation of the environmental impact identified.
- Conclusions.
- References.

In addition, all new projects—private or public—are required to present SEDESOL a written Preventive Report describing the project's basic characteristics and advising that the environmental impact assessment will be performed by a consultant registered with SEDESOL.

NAFTA's probable impact on operations in Mexico

The main concerns over NAFTA's environmental implications have been loudly stressed by several groups: the location of American investments in Mexico where there is less stringent environment legislation, waste export from one country to another, and cheaper production of goods and services in Mexico where wages are lower and investment required for pollution control is lower than in the United States.

NAFTA however opens up a vast new field of opportunity when responsible and profit-oriented enterprises decide to work with binational logic, understand that there is no real reason to pollute one country more than another, and work to try to avoid extremely difficult situations.

An example of the latter is the illegal transfer of toxic waste from the US to Tijuana, where it is dumped in the sewage that goes into the Tijuana River, crosses the border back to the US and is finally released at Imperial Beach, San Diego County, where for public health reasons the beach has been closed.

NAFTA's thrust is that member nations have similar environmental controls to prevent one nation gaining trade advantages over another.



About 40% of hazardous waste is dumped in barren areas.

The Integrated Border Environmental Plan (IBEP) and how it will affect border industries

The border area between the US and Mexico extends for nearly 2,550 kilometers from the Pacific Ocean to the Gulf of Mexico. Though dry desert conditions exist over most of it, demographically and economically it is the fastest growing area in both the US and Mexico.

Its population has grown from 3,000,000 in 1980 to 6,000,000 in 1990, concentrated in six principal "sister cities" located across the border from each other.

Recent Mexican industrial growth in the border area has been led by in-bond plants that receive raw materials and machinery from the US duty-free and return them as finished products.

SEDUE and EPA identified a wide variety of serious water and air quality-related environmental problems in the area caused by waste handling and response to chemical and radioactive accidents.

Formal Mexican and US efforts to protect and improve the border area environment began in 1983 with the adoption of the Agreement Between the United States and the United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area, signed by Presidents James Carter and Miguel de la Madrid at La Paz, Baja California Sur.

On November 27, 1990, Presidents Carlos Salinas and George Bush met in Monterrey, Nuevo León. Their joint communique emphasized the need for ongoing cooperation in the area of environmental protection, and instructed their respective authorities responsible for environmental affairs to prepare a comprehensive plan designed to periodically examine ways and means of reinforcing border cooperation in this regard, based on the 1983 Bilateral Agreement.

The plan was to cover an area extending 100 km on both sides of the border.

In October 1991, Presidents Salinas and Bush presented a working draft of the Integrated Border Environmental Plan for the Mexico-US Border (first stage 1992-1994).

Following joint meetings between EPA and SEDUE, a first draft of the proposed plan was made by a consultant with input from both EPA and SEDUE and selected state, regional, and local officials. The plan was then published and distributed for public comment. A series of public meetings were held along both sides of the border to collect testimony in addition to the written comments received by EPA and SEDUE.

The draft plan was not well received along the border, particularly in the United States. It was characterized as poorly written, short-sighted, lacking local and regional expertise and input from the border area, and providing no real plan for handling environmental problems related to air, ground-water, surface water, or hazardous waste management along the border.

It lacked any real detail of the need to develop an appropriate infrastructure to handle environmental problems stemming from the population and industrial growth now occurring and that will accelerate with the pending development and implementation of NAFTA.

More important, the plan was completely silent on the matter of funding. A plan with no funding was seen as no plan at all, since significant funding will be required for implementation. In addition, communities along both sides of the border are characterized as among the poorest in both countries and the border communities made it clear that they had neither the tax base nor the local infrastructure in place to implementing such a program with local resources.



Fabrizio León.

We know where we need to go and what we must do.

The plan is presently being revised and we hope its final version will delve more deeply into tough questions such as development of infrastructure, particularly on the Mexican side where, for example, there are essentially no industrial or municipal waste-water treatment plants. It must recognize that such resources as air, surface water and ground-water interact and do not stop at geographic boundaries.

Conclusions

Mexico stands today at the forefront of an era of industrialization and revitalization that may well make it a fully industrialized nation. However, with the development of in-bond industries, the tremendous potential for growth under NAFTA, and the continued growth of the Mexican economy, major environmental problems will continue to grow.

Mexico is a country intent on development and growth to provide jobs and to increase the standard of living for its people but not at the expense of its environment. We will continue to work toward environmentally sound management of our resources, but many problems that exist today will take a significant amount of time and funding to correct. We have seen the progress made in the US and other countries and we know where we need to go and what we must do. ❧