

GAO

Report to the Chairman, Committee on  
Commerce, Science and Transportation,  
U.S. Senate

May 1991

# U.S.-MEXICO TRADE

## Information on Environmental Regulations and Enforcement



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**National Security and  
International Affairs Division**

B-243997

May 13, 1991

The Honorable Ernest E. Hollings  
Chairman, Committee on Commerce, Science  
and Transportation  
United States Senate

Dear Mr. Chairman:

In considering a potential free trade agreement between the United States and Mexico, you asked us to review Mexican environmental protection standards and enforcement. This report discusses (1) Mexico's environmental problems, (2) Mexican environmental protection laws and regulations, (3) Mexico's resources and efforts to implement and enforce its environmental protection program, and (4) U.S.-Mexico cooperative efforts to enhance environmental protection.

For this report, we relied on information provided by U.S. and Mexican government officials. We plan to issue a more comprehensive report at a later date that will more fully explore these issues.

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**Background**

In September 1990 President Bush notified Congress of his intent to negotiate a free trade agreement with Mexico. A key issue to be considered is the difference in environmental protection laws and regulations and enforcement activities in Mexico and the United States. Mexico currently lacks sufficient resources and infrastructure to support its rapid population growth and industrialization and to implement and enforce its environmental protection program. U.S. environmentalists have expressed concern that economic development and the expansion of markets that may result from a free trade agreement may create environmental problems for Mexico and border areas of the United States. Supporters of a free trade agreement believe that it will help Mexico grow economically and help the country accomplish its environmental goals.

Much of the rapid industrialization Mexico experienced along the border in the last decade resulted from the growth of maquiladora<sup>1</sup> industries. In November 1990 the Secretary of Urban Development and Ecology (SEDUE), Mexico's environmental protection agency, reported that there

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<sup>1</sup>Mexico established the maquiladora program in 1965 that allows duty-free imports of manufacturing components to Mexico for processing or assembly.

were 1,963 maquiladora plants in Mexico, about 3 times as many as the 620 reported in December 1980. The maquiladora program and the Mexican economy contributed to a tremendous increase in population along the border because of the employment opportunities. The infrastructure in Mexican border communities is not adequate to support this growth. The maquiladoras, which are generally assembly rather than smoke-stack industries, contribute to air and water pollution by stimulating population growth along the border without sufficient roads, sewers, and wastewater treatment facilities necessary to support this rapid development.

U.S. and Mexican officials are concerned that maquiladoras may not be properly disposing of hazardous waste. We will be addressing this issue in a separate report. It is hoped that future development will be controlled by environmental protection legislation, regulation, and enforcement and several programs that emphasize planned growth.

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## Results in Brief

Mexico faces numerous environmental problems caused by air and water pollution and by hazardous waste contamination. Mexico's air pollution problems are primarily caused by vehicle and industrial emissions. The country's water pollution problems are caused by an inadequate infrastructure, including insufficient sewage collection and wastewater treatment facilities to support the growing population and industrialization. Mexico does not have a sufficient number of hazardous waste treatment and disposal facilities and is unable to quantify and ensure the proper handling of hazardous waste.

Mexico passed its first comprehensive environmental law in 1988 but is still developing the implementing regulations and technical norms that provide the basis for inspection and enforcement actions. According to an Environmental Protection Agency (EPA) preliminary report, Mexico's laws and regulations are in many respects similar to U. S. laws and regulations. They are based on U.S. and international standards.

SEDUE's budget has increased significantly in recent years. Some of this budget increase has funded development of regulations and hiring new inspectors for Mexico City and the U.S.-Mexico border area. Both SEDUE and EPA officials agree that additional financial resources and staff are needed to effectively implement Mexico's environmental program and ensure that all facilities are in compliance. A major World Bank loan still under negotiation is intended to provide funding to strengthen SEDUE's efforts.

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The United States and Mexico have entered into several cooperative efforts and agreements to address border environmental problems and Mexico City pollution. These activities include construction of wastewater treatment facilities by the International Boundary and Water Commission, as well as efforts made under the 1983 Border Environment Agreement and other cooperative agreements. In November 1990, President Bush and Mexican President Carlos Salinas de Gortari directed the EPA and SEDUE, respectively, to review existing cooperative efforts and develop an integrated master plan to deal with continuing border environmental problems.

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## Mexico's Environmental Problems Are Extensive

Mexico has extensive air, water, and hazardous waste pollution problems. Mexico recognizes and is taking some actions to address these problems, which have resulted from rapid population growth, urbanization, and industrialization without sufficient resources and infrastructure to support this growth.

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## Air Pollution

Mexico's air pollution problems have resulted primarily from vehicle and industrial emissions. Other sources of air pollution are unpaved roads and the burning of trash, tires, and other items for energy and heat. Although air pollution problems are widely recognized, not enough monitoring equipment is available to identify the specific types of air pollution and to determine which companies and activities are causing the pollution, according to EPA's Region IX Air Division Director. A monitoring network operates in the larger Mexican cities, according to the American embassy in Mexico City, but the border regions only have a limited amount of monitoring equipment to measure the levels of key contaminants.

Severe health problems due to air pollution have been identified in Mexico City and towns along the border, as reported in the Congressional Record in the fall of 1990. In Mexico City, hundreds of deaths are attributed to atmospheric pollution annually. The American consulate in Ciudad Juarez, across the border from El Paso, Texas, cited poor air quality as the reported cause of increasing respiratory problems among local children.

Mexico is seeking to improve air quality in several ways. The Program Against Pollution in Mexico City is expected to require an investment of approximately \$2.5 billion over the next 4 years. International financial

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organizations and the Export-Import Bank of Japan have a share in funding this program, which involves developing cleaner fuels, restructuring public administration, and installing emissions control systems in vehicles. In addition, a World Bank credit will help to improve air quality monitoring in Mexico City and the other main metropolitan areas. Ciudad Juarez plans to adopt a local ordinance similar to an ordinance passed by El Paso mandating the use of oxygenated fuels, which is expected to greatly reduce carbon monoxide emissions. Ciudad Juarez is helping more than 500 local brick manufacturers convert from burning tires and other rubbish to natural gas, and Mexico's national petroleum company is offering low interest loans to finance the conversion.

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## Water Pollution

According to EPA and SEDUE officials, Mexico's water pollution problems primarily result from insufficient sewer systems and wastewater treatment facilities to support the growing population and industrialization, and industrial waste pollution. On the national level, only 16 percent of municipal and industrial wastewater is treated before being released. Mexico has experienced surface and ground water contamination problems.

Water quality surveys conducted in the border area by EPA, the International Boundary and Water Commission, and three states show extensive surface water contamination by bacterial, human waste, industrial wastewater, pesticides, and solvent contamination. The state of Texas listed six stretches of the Rio Grande River along the border as unswimmable due to high levels of human waste. A ground water quality assessment conducted by EPA and Arizona found extensive human waste contamination and evidence of industrial wastewater and solvents in ground water in the Nogales border area. Raw sewage and industrial wastewater released into the ocean near Tijuana washes up on beaches on both sides of the border.

Construction projects are planned or are in progress to begin to correct these water pollution problems. According to SEDUE's Director of Water Pollution Control, Mexico's National Water Commission plans to construct wastewater treatment facilities in 22 major cities throughout Mexico. Facilities will be built with the help of World Bank funding to treat 50 percent of the country's wastewater over the next 4 years.

## Hazardous Waste Pollution

Mexico does not have a sufficient number of waste treatment and disposal facilities and is unable to ensure the proper handling of hazardous waste. Evidence has mounted in the past 3 years indicating the presence of hazardous waste in ground water, surface water, and sewage.

SEDUE's Waste Director stated that additional hazardous waste treatment and disposal facilities are needed to handle the volume of waste generated. Mexico produces about 13,000 tons of hazardous waste each day, according to the American embassy in Mexico City. Currently, Mexico has only 3 facilities to treat hazardous waste and 10 facilities for final disposal of hazardous waste. The SEDUE Waste Director told us that the agency is working to complete establishing the technical norms needed for designing and constructing facilities.

## Mexican and U.S. Environmental Laws and Regulations Are Similar, but Many Mexican Regulations Have Yet to Be Developed

In 1988 Mexico issued its first comprehensive environmental law.<sup>2</sup> It is still developing many of the regulations and technical norms needed to effectively implement and enforce this law, and expects to have completed them by 1994. Mexico's law, when supplemented by the regulations and technical norms, will be similar to the U.S. regulatory regime.

Mexico's first comprehensive environmental law was written by SEDUE and became effective in March 1988.<sup>3</sup> The Federal Law of Ecological Equilibrium and Environmental Protection gives SEDUE lead agency responsibility for coordination within the federal, state, and local government. This one law governs both environmental protection and natural resource conservation, as compared to numerous individual U.S. laws on air, water, hazardous waste, toxic substances, pesticides, and several different natural resource protection laws. Mexico's environmental protection provisions address air, water, and hazardous waste pollution and pesticides and toxic substances. They also establish a framework for environmental impact appraisals.

EPA concluded that the air, water, hazardous waste, and environmental impact assessment aspects of Mexico's law, when supplemented by regulations and norms, will be in many respects similar to the U.S. regulatory regime. They are based on U.S. and other international standards.

<sup>2</sup>The information presented in this section, except for the discussion of Mexico's plans to develop environmental regulations and norms, is based on EPA's report entitled Mexican Environmental Laws, Regulations and Standards: Preliminary Report of EPA Findings, May 3, 1991, and discussions with the legal team that prepared this report.

<sup>3</sup>Three earlier, more limited, environmental laws were enacted in 1971, 1982, and 1984.

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Although the law is not as detailed as the U.S. laws, the related regulations and technical norms<sup>4</sup> have or are expected to provide the needed degree of specificity that will make them comparable. While most of the major concerns of U.S. pollution control are addressed, at least three areas—cleanup of abandoned hazardous waste sites, restrictions on land disposal of hazardous waste, and regulation of leaking underground storage tanks—are not yet covered by the Mexican regulatory regime.

Mexico is in the process of developing the environmental regulations and norms needed to effectively implement the 1988 law. As of April 17, 1991, 5 major regulations and 59 technical norms had been issued. The regulations provide general policy on air pollution, environmental impact assessment, hazardous waste disposal, preventing and controlling automotive pollution in Mexico City and the suburban area, and sea contamination. A sixth regulation on water pollution was awaiting signature by Mexico's President as of April 17, 1991, according to SEDUE's Director of Norms and Regulations. The Director stated that through 1994 SEDUE plans to issue a limited number of additional regulations and approximately 171 additional norms establishing more specific control standards. A major World Bank loan is expected to play a role in funding this effort.

Cleanup of abandoned hazardous waste sites is not currently provided for under the Mexican law. In the United States cleanup is addressed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, known as the Superfund law. However, SEDUE has established a program to solicit voluntary contributions from industry for cleanup of hazardous waste sites. SEDUE's role in implementing the voluntary program is to make a systematic effort to identify sites, select the needed cleanup action, and oversee the cleanup action. Owners and/or operators of the sites would be responsible for arranging for and financing the cleanups. To date, however, SEDUE has not identified the sites where releases pose a significant risk to human health or the environment. The Mexican law also does not impose restrictions on land disposal of hazardous waste and regulate leaking underground storage tanks. The United States has only recently imposed treatment standards under the Resource Conservation and Recovery Act for hazardous waste prior to land disposal. Underground tanks used for storage of gasoline

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<sup>4</sup>Mexican regulations are designed to provide specific nonnumeric criteria and policy guidance under the law, while the technical norms are designed to provide numeric criteria. As such, the norms are similar to U.S. regulations that specify numeric criteria for emissions.

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and other hazardous substances are also regulated under this law. SEDUE plans to address these issues in the near future.

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## Mexico's Environmental Implementation and Enforcement System Still Being Developed

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### Environmental Protection System

Mexico's system for implementing and enforcing its environmental protection program varies for new and existing facilities. The primary components of the system are permits specifying the operating requirements and inspections to ensure compliance. These components are similar to those used in the United States.

Mexican law requires owners and/or operators of new facilities to submit an environmental impact appraisal (EIA) and a risk assessment if they involve hazardous risk activities or dangerous substances,<sup>5</sup> prior to obtaining an operating permit. Owners and/or operators of existing facilities planning new modifications that may adversely affect the environment are also required to submit an EIA and risk assessment, if applicable, according to the EPA Associate General Counsel. After approval of the EIA and risk assessment, a permit to construct the facility is issued. Before beginning operation, owners and/or operators of new facilities must also obtain separate permits or authorizations for air emissions, water discharges, and handling of hazardous waste, as applicable. Upon completion of this process, they receive an operating license or permit and are subject to future inspection to ensure that they remain in compliance.

The owners and/or operators of existing facilities, according to EPA's Associate General Counsel, are required to register with SEDUE and to apply for separate air, water, and hazardous waste permits, as applicable. They are not required to go through the EIA and risk assessment process, however.

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<sup>5</sup>Risk assessments provide for the comprehensive evaluation of each project in which activities are considered high risk owing to the seriousness of the effects that they may have on the environment.

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If, upon inspection, either a new or existing facility is not in full compliance, various administrative sanctions and/or criminal penalties may apply. Administrative sanctions include fines, temporary or permanent partial or total closure, and administrative detention. They are intended to encourage companies to sign compliance agreements to take corrective action within a specified time. The closures have also encouraged companies to approach SEDUE to negotiate voluntary compliance agreements. Criminal penalties are rarely imposed, according to the EPA Associate General Counsel. If a facility disagrees with an enforcement action and the SEDUE corrective action requirements, an administrative grievance procedure is available.

The Mexican law mandates that the 31 Mexican states enact comparable legislation and designates the responsibilities of the states and local authorities. As of April 16, 1991, 18 states had done so, including 3 states along the U.S.-Mexico border. Just as in the United States, according to EPA's Associate General Counsel, the state laws and regulations must be equivalent to or more stringent than the federal laws.

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## SEDUE's Implementation and Enforcement Resources and Efforts

Both SEDUE and EPA officials agree that additional financial resources and staff are needed to effectively implement Mexico's environmental program and ensure that all facilities are in compliance. The SEDUE Director of Pollution Control estimated that the number of facilities subject to regulation is approximately 120,000.<sup>6</sup> However, progress has been made since enactment of the comprehensive law in 1988. SEDUE's environmental budget increased from \$5 million in 1988 to \$38.9 million<sup>7</sup> in 1991 and is expected to continue to increase, according to the Director of Pollution Control. In addition, the states and municipalities have been asked to assume some responsibility for implementing and enforcing environmental compliance.

SEDUE environmental staffing data was available for only one of the two units involved in air, water, and hazardous waste pollution control. Data available on staffing in SEDUE's Pollution Control Unit indicates that staffing increased slightly in the last 2 years. This data shows that staffing has increased from 353 in December 1989 to 408 as of April 1991. Statistics were not available on SEDUE's Norms and Regulations staff, however.

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<sup>6</sup>This estimate does not include mobile sources of air pollution, such as automobiles, or nonpoint sources of water pollution such as agricultural runoff.

<sup>7</sup>Figures include both environment and natural resource funds.

SEDUE is increasing the size of its inspection staff significantly in 1991. Until recently, SEDUE had a total of 19 inspectors responsible for evaluating air, water, and hazardous waste compliance. SEDUE plans to hire 100 additional inspectors by the end of 1991. Fifty new inspectors were on duty in Mexico City by April 1991, and 50 were in the process of being hired for the border area, according to the SEDUE General Counsel.

Mexico's ability to continue the increased level of environmental expenditures by SEDUE is predicated on continued economic development and a major World Bank loan, according to the U.S. embassy Science Officer. Mexico is currently negotiating a loan from the World Bank that would, among other things, strengthen SEDUE's capacity to analyze and implement national environmental policies and to monitor and control pollution. The loan would provide funds to develop regulations and norms, review and approve EIAs and risk assessments, enhance inspections, enhance air and water quality monitoring, and strengthen regional laboratories. Although the amount of the proposed loan has not yet been finalized, the World Bank Alternate U.S. Executive Director estimated that the total project costs would probably range from \$70 million to \$90 million over 4 years, and the World Bank would loan about \$35 million to \$45 million. The Director does not expect the loan to be approved until at least December 1991.

Statistical data on SEDUE implementation and enforcement activities, such as EIAs, permits, inspections, and enforcement actions, was requested from SEDUE but had not yet been provided at the time of this report. There have, however, been an increasing number of SEDUE inspections and temporary and permanent plant closures.

SEDUE's enforcement priority is to improve its inspection capacity, according to the SEDUE General Counsel. It is planning to enlarge its inspection staff, delegate responsibility to the states and municipalities, and establish a system for private inspections. Private organizations would be licensed to perform inspections and would be subject to monitoring. SEDUE views this as a way to increase the government's inspection presence and pass the cost to the regulated facilities. However, it will take time, according to SEDUE's Director of Pollution Control, to develop programs to provide qualified staff, and industry needs to be prepared. A major World Bank loan, as previously discussed, is expected to play an important role in funding this effort, according to SEDUE's Director of Pollution Control.

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## U.S. and Mexico Are Cooperating to Address Environmental Problems

The United States and Mexico have initiated several joint agreements and cooperative efforts to protect the environment along the border and in Mexico City. The International Boundary and Water Commission, in its current form, was established as a result of a 1944 treaty between the United States and Mexico. The Commission focuses on cross-border water pollution issues and coordinates with EPA and SEDUE. It has approved a number of projects to address border sanitation and water quality problems and is either constructing or expanding wastewater treatment facilities at Tijuana-San Diego, California; Mexicali-Calexico, California; Nogales-Nogales, Arizona; Naco-Naco, Arizona; and Nuevo Laredo-Laredo, Texas.

The 1983 Border Environment Agreement between the United States and Mexico designates specific responsibilities for EPA, the Department of State, SEDUE, the Secretary of Foreign Relations in Mexico, and the International Boundary and Water Commission. The objectives of this agreement are to (1) establish the basis for cooperation for the protection, improvement, and conservation of the environment and the problems that affect it and (2) provide the framework for development of a system of notification for emergency situations. The agreement includes provisions for each country to adopt appropriate measures to prevent, reduce, and eliminate sources of pollution in its respective territory that affect the border area of the other.

The Border Environment Agreement has five annexes. These annexes (1) address the Tijuana-San Diego water pollution problem, (2) create a joint contingency plan for responding to accidents such as hazardous waste spills in the border area, (3) regulate the transborder shipment of hazardous waste and substances, (4) ensure that effective measures are taken to limit sulfur dioxide emissions from copper smelters, and (5) set up a system for air pollution study areas along the U.S.-Mexico border. El Paso-Ciudad Juarez is the first study area, and San Diego-Tijuana was recently designated as a second study area, according to a Department of State official.

The U.S. Department of Energy and the Mexican Petroleum Institute signed a memorandum of understanding in July 1990. They agreed to exchange technical information and cooperate in an analysis of Mexico City's air quality and alternative energy strategies. The agreement establishes a framework for cooperation and requires separate implementing technical agreements for each specific collaborative effort.

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The United States and Mexico entered into an agreement on Mexico City pollution in October 1989. The agreement committed the two governments to find ways to resolve Mexico City's problems of air and water pollution, hazardous waste, and environmental health.

In November 1990, President Bush and President Salinas directed EPA and SEDUE to develop an integrated master plan to deal with continuing border environmental problems. Based on a review of post-1983 accomplishments, the plan will reevaluate priorities to ensure a better focus and a more integrated bilateral effort for resolving border environmental problems. In addition, it will examine the cause, location, type, and severity of environmental problems on the border; review air, water, and hazardous waste problems; develop new commitments by both countries to adequately enforce, administer, and monitor environmental laws and issues; and institute an integrated, comprehensive, continuing border area environmental planning process.

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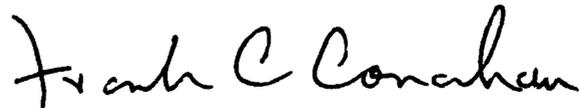
Appendix I provides details on the objectives, scope, and methodology of this report.

As requested, we did not obtain formal agency comments on a draft of this report; however, we discussed our findings with appropriate officials from the Department of State and EPA and incorporated their comments where appropriate.

Unless you announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to the Secretary of State, the Administrator of EPA, and other interested parties. We will make copies available to others upon request.

This report was prepared under the direction of Allan I. Mendelowitz, Director, International Trade, Energy, and Finance Issues, who can be reached on (202) 275-4812 if you or your staff have any questions. Other major contributors are listed in appendix II.

Sincerely yours,

A handwritten signature in black ink that reads "Frank C. Conahan". The signature is written in a cursive style with a large, stylized initial "F".

Frank C. Conahan  
Assistant Comptroller General



# Objectives, Scope, and Methodology

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The Chairman of the Senate Committee on Commerce, Science, and Transportation requested that we review (1) Mexico's environmental problems, (2) Mexican environmental protection laws and regulations, (3) Mexico's resources and efforts to implement and enforce its environmental protection program, and (4) U.S.-Mexico cooperative efforts to enhance environmental protection.

To identify the nature of and reasons for Mexico's environmental problems, we held discussions with and reviewed documents from the Department of State; the Environmental Protection Agency's (EPA) headquarters and regions VI and IX; the International Boundary and Water Commission; Mexico's Secretariat for Housing and Urban Development headquarters and Ciudad Juarez staff; U.S. environmental groups; Mexican environmental groups; the Border Trade Alliance; the Office of the Governor of California; the city of San Diego; the El Paso City-County Health Department; and academicians in San Diego, El Paso, and Ciudad Juarez.

Because of the complexity of Mexico's environmental protection law and regulations, we relied extensively on the work of an existing EPA legal team. After collecting and analyzing Mexico's environmental laws and regulations since January 1991, a 10-member team of 9 EPA attorneys and 1 Department of State attorney held discussions with SEDUE officials in Mexico the first week in April 1991. The purpose of this effort was to obtain and share information concerning the U.S. and Mexican environmental programs and foster good working relationships. The team issued a preliminary report on May 3, 1991, and expects to issue its final report in late May 1991, according to the EPA Associate General Counsel who served as Chairperson of the legal team. We discussed the results of this effort with the team Chairperson and various team members and reviewed the preliminary report and relevant documents.

Although we relied extensively on the work of the EPA legal team, we also met with the SEDUE Director of Norms and Regulations to discuss the schedule for development of SEDUE's remaining regulations and norms.

To the extent possible, we obtained SEDUE budget and staff resource data from the EPA legal team and held discussions with the Chairperson and key members of the team. We also met with the General Counsel to the SEDUE Minister and SEDUE's Director of Pollution Control and Director of

Enforcement to discuss SEDUE's budget and staff resources and enforcement priorities. We discussed the impending World Bank loan with SEDUE's Executive Coordinator and a World Bank official.

To identify U.S.-Mexico cooperative efforts, we held discussions with officials from the Department of State, the International Boundary and Water Commission, and EPA headquarters and regions VI and IX. We also obtained and reviewed the agreements and related documents. However, we did not analyze the adequacy or effectiveness of these efforts.

We conducted our work between March 18 and May 3, 1991, in accordance with generally accepted government auditing standards.

# Major Contributors to This Report

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