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THE ROLE OF THE GENERAL ACCOUNTING OFFICE IN PUBLIC WORKS AUDITS

PRESENTED BY

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BEFORE SENIOR OFFICIALS OF THE OFFICE OF THE COMPTROLLER GENERAL OF VENEZUELA AND PUBLIC WORKS AGENCIES

CARACAS, VENEZUELA

Good morning. I am very pleased to have been asked to address such a distinguished group of officials from the Comptroller General's office and from the public works area. Although the audit work done by the U.S. General Accounting Office is perhaps different from that of the Venezuelan Comptroller General's Office, I believe there are some experiences which would be helpful to share.

As you might expect, our audit work is a function of the way our Government is organized. That is, the Federal Government often partially funds projects such as highway or hospital construction and, at times, will even undertake construction itself. One of the U.S. Government's most predominant roles in the public works area is that of

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environmental monitor. Therefore, our audits tend to involve only certain aspects of projects, namely quality control procedures, management of the funding process or adherance to environmental standards.

Most of our energy industry is privately owned, so GAO is not involved in this area as much as the Venezuelan Comptroller General would be. But, since our Government regulates some pricing, distribution, and environmental aspects of the private companies' operations, GAO may look at a particular project or issue from one of these perspectives.

I would like to discuss our involvement in several areas of the public works arena, including construction, transportation, and energy projects. First, the construction area, in which I understand you are most interested.

Much of our work here is the result of direct requests from committees or Members of the United States Congress, and often these requests deal with measuring the costs and benefits of particular projects. Generally, the Congress compares cost/benefit analysis with the analysis of the group building the project. I'd like to spend some time illustrating what is involved when GAO does such a cost/benefit study and this leads me to a discussion of the sewer overflow and flooding problems of the metropolitan Chicago, Illinois, area.

The Metropolitan Sanitary District of Greater Chicago oversees the Chicago Tunnel and Reservoir Project which, if completed, will result in 131 miles of tunnels built 200 to 300 feet underground with three open-pit reservoirs. Often referred to as the "Deep Tunnel", the concept behind it is to "bottle a rainstorm" by capturing all the rainwater and holding it in the tunnels until it can be treated. After being treated it will be relatively clean, thus eliminating pollution problems. The complex system is also supposed to dramatically reduce flooding.

This project is a good illustration of the problems of modern living. Its goals are admirable - who can oppose eliminating pollution and flooding? Yet, we must ask, "Are the benefits to be achieved worth the cost to achieve them?" Senator Charles Percy, of Illinois, thought this question should be reviewed more thoroughly than it had been, and asked GAO to undertake such a study. He was increasingly concerned with the cost of the project and wondered whether there were lower cost alternatives to the massive tunnel project. The report prepared at Senator Percy's request was actually GAO's second on the project. The first, issued in 1978, centered on construction delays, escalating costs, and the serious funding uncertainties which made it appear doubtful that full results of the tunnel project would be achieved. The study was done at GAO's own initiative as one

of several major civil projects selected for review of cost and performance.

As we began the second review in 1979, 37 percent of the contracts for the first phase had been awarded. This phase called for constructing 110 miles of tunnel to store 2 billion gallons of water after rainstorms, and was to cost $2 billion. Phase II was being studied by our Army's Corps of Engineers. It was to result in 22 miles of additional tunnel and three open-pit reservoirs designed to hold 42 billion gallons of water, and was to cost $900 million. Total cost estimates were thus almost $3 billion.

GAO planned a two-segment study of the project. First, we would review the validity of its goals, find out exactly where flooding was occurring in the Chicago metropolitan area and what damage it was causing, assess major environmental and other concerns expressed about the project, and evaluate lower cost alternatives. Secondly, GAO was to assess the significance of sewer overflow problems nationwide and conduct a worldwide search for other solutions. Obviously this was a formidable task - I might add that the resulting report comprised seven volumes.

Existing data (even that compiled by the U.S. Corps of Engineers) was not sufficient to determine where flooding occurred and the amount of damage it caused. To answer this

question, GAO staff visited the 54 communities in the area with combined sewer systems. They spoke with officials there and later mailed a questionnaire to 7,000 single-family homes. The effective 97-percent response rate from the questionnaire, combined with information obtained from officials, enabled GAO staff to show flooding locations on detailed community maps. To determine whether lower cost alternatives were available, we asked two consultants to search the literature. GAO staff interviewed officials in the research and development office of the U.S. Environmental Protection Agency, plumbers, engineering professors, and members of a citizen advisory panel established by Senator Percy. When alternative technology was known or in use, our staff visited these locations (some of which were in other countries) to learn about results achieved and problems encountered.

To fully relate the cost of the project to its expected benefits, staff decided it was important to clearly define the sewer and flooding problems. They spoke with officials and reviewed documents in the Chicago area water department, local health departments, and park authorities.

Perhaps the biggest difference between our review and earlier assessments of the project was GAO's inclusion on the cost side of all costs which needed to be incurred

before the tunnel project could achieve its results. GAO's position was that if benefits were to be attributed to the project, all costs pertaining to the benefit had to be determined. For the project to achieve its results, many other things had to be done which the Metropolitan Sanitary District did not consider in its $3 billion estimate. In considering these factors, GAO estimated the cost at $11 billion. Obviously this is quite a difference, so I would like to take a minute to tell you some of the other items GAO staff included.

Given that the way the completed project was to meet its objectives was to hold water until the treatment plants could treat it, GAO believed the cost of adding onto or building treatment plants to handle the water should be included. The more water treated, the more sludge produced (Sludge is the byproduct of treated water.) Thus, the sludge handling capability in the area would have to be increased. This process would mean more water would pour into the Chicago River, and since that is a navigable stream, certain sections would have to be dredged and enlarged. Also, since it is not a fast-flowing stream, simply treating the water would not be enough to meet Illinois' water quality standards - it would need to be aerated by huge fans designed to stir up the water and create more oxygen. Finally, flooding in many parts of the Chicago area is caused by inadequate sewers

within individual communities, a problem the tunnel project would not address. Thus, the project could not achieve its objectives without numerous other projects being completed, and costs of these (plus an inflation factor) added another $8 billion to the initial $3 billion estimate. You can see that our staff, with some aid from consultants, had to acquire quite a bit of technical knowledge.

In addition to the other costs GAO believed should be included in the estimate, our report showed there was quite a bit of doubt that the completed project would fulfill its goals. The U.S. Environmental Protection Agency and the State of Illinois disagreed as to whether Phase I of the project would meet Illinois waterway standards. The Environmental Protection Agency said it would, with treatment plant expansion and aeration of the river. It saw no value to the additional tunnel and open pit reservoir work, which was Phase II of the project. Taking exception to the environmental agency's opinion of Phase II, the State of Illinois said that Phase I would provide a good basis but that Phase II tunnels and reservoirs would also have to be built if State standards were to be met. GAO could not determine who was correct, but we did strongly recommend that the Environmental Protection Agency (which was to fund 75 percent of the project) suspend funding until Phase I was reassessed. Interestingly, about 18 months after our report was issued,

Senator Percy's distinguished citizens task force reached essentially the same conclusions.

Finally, whether the project was completed or not, many of the local communities needed to upgrade their sewer systems, but they were generally unable to locate funding for this from Federal or State agencies. GAO identified a number of less expensive measures that communities or individual homeowners could take to alleviate flooding.

I intended for this example to give you an idea of how thoroughly GAO tries to approach a cost/benefit analysis of a public works project. We do not do too much of this type of work, and even when doing it we would rarely look at the construction itself. Quality control factors are, however, built into the contracting process by those who issue the contracts. For example, the Army's Corps of Engineers thoroughly inspects the projects for which it contracts or builds itself. That's not to say they do so perfectly, so one of the things GAO does is review the Corps' procedures.

For example, after the Teton Dam, located in the U.S. State of Idaho, burst in 1976, GAO reviewed dam-building procedures and practices its builder, the Bureau of Reclamation (now called the Water and Power Resources Service) and the Corps, which built other dams. Our staff reviewed records, instructions, guidelines, and other data on the site selection, design, construction, and monitoring

process in the Corps and Bureau. They visited Teton and other dams and talked with project people at these sites.

GAO also identified procedures and practices of other organizations that design and construct major dams in the United States and visited some of these groups, which included State governments and private contractors. As with most of our technical studies, we used consultants; in this case two who were highly qualified in dam siting, design, and construction.

A June 3, 1977, report on dam safety showed questionable design practices relating to safety and certain aspects of constructing the Teton Dam which did not carry out the intent of the design. In this case, the Corps of Engineers was found to have better practices in some areas, and we were careful to note this. GAO recommended a number of actions and supported many others being undertaken by the now more safety-conscious agencies. A June 29, 1977, report presented information on the 1972 National Dam Inspection Act, which was enacted to protect life and property and require information on a comprehensive national dam safety program. We reported the act was not being fully implemented and recommended to Congress and the Corps ways to do so.

As we sometimes do with particularly important issues, GAO reviewed the progress of implementing the Act and reported its findings to Congress in 1979. We found much improvement

in the inspection process, but much left to be done. Again, we suggested ways to improve, and we may at some point review the situation again.

Sometimes the cost/benefit studies we do are undertaken early in the planning process. One area in which we do a fair amount of work has to do with the need for or appropriate size of public medical facilities. As you probably know, most U.S. health care is privately provided, but the Federal Government does have hospitals for veterans, Indian reservations, and active-duty military personnel.

One of our reports addressed the proposed construction of a new naval hospital in San Diego, California. The Navy planned to construct a hospital with a capacity of about 900 acute care beds. GAO's analysis which, among other things, considered the availability of other Federal health care facilities in the area, showed that the planned hospital exceeded expected needs. We recommended that the Department of Defense implement a different planning methodology for determining naval hospital care needs. The Department adopted our recommendations and requested funding for a new San Diego hospital containing only 560 acute care beds--a 38-percent reduction from that originally proposed.

It is difficult to think of public works projects without discussing transportation issues. GAO looks at most aspects of ground transportation. When the U.S.

was building its vast interstate highway system (the 1950s and early 1960s), GAO actually examined the adequacy of some of its construction. Now that system is nearly completed, and other highway systems are built and audited largely by State governments. The States generally have Federal funds to cover much of the project costs, and GAO audits deal more with how the Federal Highway Administration manages the highway programs than with the actual construction.

Now that much of the interstate highway system is complete, much attention has turned to maintaining this network. Part of our work in this area included examining State enforcement of limitations on truck weight. Since this is one of the factors affecting highway conditions that can be controlled somewhat, we wanted to see how States approached it. Through a questionnaire, we compiled data on all 50 States - truck weight legislation, enforcement efforts, and general highway data. We also reviewed the Federal Highway Administration's weight enforcement program and visited Federal, State, and city highway officials in a number of States. Our auditors found that weight limits vary by State and that these limits are not strictly enforced. Even Federal weight requirements for interstate highways were not enforced by the States,

some of whom had exemptions to these limits because they had higher limits in effects when the Federal weight limits were imposed.

Two of the recommendations our 1979 report made were that Congress make Federal weight limits also apply to noninterstate Federal-aid highways in all States and end current exceptions that allow higher limits on some interstate highways. In the report to the Congress, we included proposed draft legislation which would implement the recommendations.

Six months later we examined the efforts underway by the U.S. Department of Transportation in studying the truck size and weight problem and recommended a number of changes which we thought would improve the study's design and, thus, results. Results of the Transportation Department study are due to Congress later this year.

Recently, in a congressional request, we were asked to assess the cost of a New York State highway project, one which is part of the interstate highway network. In this area, GAO has an advantage, because the Federal Highway Administration collects and reviews the States' interstate highway costs estimates. The Administration also issues an annual composite construction index which can be used in projecting costs. Using a more recent index than those

used in earlier estimates prepared by the State, GAO was able to give Congress an updated estimate. We pointed out that actual construction costs would be even larger than those we cited, given that the projected construction period was 10 years and current cost estimates did not reflect inflationary costs beyond 1979.

Again, environmental factors entered into the analysis. The Environmental Protection Agency and the U.S. Fish and Wildlife and National Marine Fisheries Services opposed the issuance of a U.S. Corps of Engineers' permit needed for one aspect of the New York highway construction. Since all projects being built with any Federal funds must comply with our 1969 National Environmental Policy Act, it is not uncommon for two U.S. agencies to oppose one another along these lines.

Most of the major U.S. mass transit projects being built or modernized use Federal funds to pay for up to 85 percent of the construction. Generally, the U.S. Department of Transportation monitors the technical progress, such as assessing engineering design adequacy. GAO can be asked to assess this, but more likely would report on, for example, the process for developing cost estimates, as we did recently in a report issued on the Washington Metropolitan Rapid Rail Transit System. Most often we would deal with

the management of the funding process itself, for example, whether grants from the U.S. Urban Mass Transit Administration were being used efficiently.

More often done than project reviews are those which pertain to management practices or processes. These are done in all areas, but for public works, we turn to our National Railroad Passenger Corporation (better known as AMTRAK), which operates intercity passenger service in the Northeastern part of the United States. As one of the relatively few Government-owned corporations in our country, it receives much congressional attention; in fact, GAO annually reports to the Congress on aspects of AMTRAK's activities. The 1979 report assessed weaknesses in the Corporation's inventory and property controls. In fact, details of how the staff approached this were published in the October 1980 issue of the International Journal of Government Auditing, which most of you know we co-publish with the Venezuelan Comptroller General's office.

Given Venezuela's oil resources, I know you are interested in the work we do in the energy area. Our energy work is extensive and quite varied. GAO believes the United States should strive to balance its energy program to include conservation, renewable energy sources, nuclear power, conventional oil and gas, coal, and synthetic fuels. Consequently, much of our energy work is focused toward evaluating the results

of the Government's ongoing energy programs and assessing the costs and benefits of alternative approaches to solving our energy problems. This work has resulted in improvements in the operations of a number of energy programs and it has helped sharpen the focus of energy legislation.

For example, our accomplishments include emphasis on the Federal Government's involvement in constructing high cost, complex energy facilities, Federal in-house conservation, safer transportation of liquefied energy gases, and improvements in leasing Outer Continental Shelf lands.

As I mentioned earlier, most commercial energy facilities in the United States are privately owned. Our Government does, however, provide extensive support to private industry in that it conducts energy research and development, acts as a partner with industry in constructing facilities that demonstrate the technical feasibility of new energy technologies, and co-sponsors projects that prove the commercial viability of new technologies.

For example, our work on the joint Government-industry effort to develop a liquid metal fast breeder reactor disclosed that, despite the fact that the program cost hundreds of millions of dollars, it is making little progress because it lacks direction. Consequently, GAO recommended that the Executive Branch and the Congress provide the needed focus and direction by reaching agreement on the

future role of nuclear power in the United States' energy supply mix. Without it, the U.S. may not be able to have a commercially viable breeder reactor technology if and when it is needed.

We have also reviewed the inspection practices of our Nuclear Regulatory Commission for licensing and monitoring nuclear power plants. As you might expect, this has attracted a great deal of interest since the Three Mile Island Nuclear accident, and we have suggested a number of ways the inspection process can be improved.

As with the nuclear program, much of the research and development for using coal more effectively is done under joint Government-industry sponsorship. Our audits in this area generally pertain to cost and program management issues. For example, in 1980, we reported on the Government's research and development program to advance the production of liquid fuels from coal. In this report we provided a useful overview to the Congress on the program and its many technical options. Further, in an ongoing effort, we are examining the costs, construction schedules, and management performance of four multi-million dollar coal liquefaction research plant. These reports are expected to assist in assuring the efficient and effective management of these projects as well as other energy facilities.

GAO has also reviewed Federal efforts to construct energy facilities as part of broader reviews of a Federal program to develop new energy technologies. During a review of the Department of Energy's program to develop one advanced technology for burning coal more effectively and economically (the "fluidized bed" combustion process), GAO questioned whether a $49.8 million test facility was being constructed too late to be of maximum value to the program. After our review, the Department of Energy stopped construction efforts on this facility. During our review of another program to develop a more efficient technology for generating electricity from coal, using improved combustion technologies and highly efficient magnets, GAO reported delays on the Government's construction of a key test facility. The report also discussed the advantages and disadvantages of several approaches which could be used to accelerate the facility's construction, or to modify other facilities to meet the program's test schedules.

GAO has also examined solar energy efforts undertaken or funded by the Federal Government. One of our reports last year examined the way the Federal Government, particularly the U.S. Department of Energy, was pursuing the President's stated goal of using solar energy to meet 20 percent of the Nation's energy needs by the year 2000. GAO was critical of some of the specific projects undertaken, but the report's

primary concern was with the lack of a comprehensive plan to attain the goal. We recommended that the Secretary of Energy develop such a plan and periodically review its implementation.

Effective implementation, of course, is a key to successful attainment of the 20-percent goal. In this connection, GAO examined hundreds of solar energy projects funded by the U.S. Government and placed in the private sector, including residences, schools, and commercial buildings. GAO has found that much of this money has been wasted, i.e., the primary objectives of demonstrating solar's practicality and therby stimulating investments in solar were never achieved. In fact, one of GAO's major concerns relative to these federally supported projects is that they tend to discourage--rather than encourage--such investments. GAO made a number of recommendations to the Congress and the supporting Federal agencies aimed at turning around this situation.

Another major project undertaken by the U.S. Government is to create a Strategic Petroleum Reserve. In this program the Government is authorized to develop storage capacity for up to 1 billion barrels of oil so that the country's vulnerability to the effects of a severe interruption of energy supplies will be diminished. Currently the construction of this capacity is expected to cost about $2.4 billion.

GAO has conducted a number of reviews of the construction of the storage capacity for Strategic Petroleum Reserve. For example, in 1978 we found that some of the underground storage facilities the Government planned to use had a high degree of risk because of their structure, stability, or location. This resulted in the Department of Energy altering its plans for using some of these facilities. The program is still receiving a considerable amount of criticism. With acceptable storage areas now established, however, this criticism is directed at the progress being made in procuring oil and placing it in storage. As of December 1, 1980, only 102 million barrels of oil had been stored.

Another energy area in which major construction takes place with Government support is hydroelectricity. Our work in this area includes general assessments of its use as a power resource and examinations of Federal programs and policies and their impact on hydroelectricity development and use. In January 1980, we urged the Department of Energy to place more emphasis on demonstration projects. In a more recent effort, we examined the possibility of installing electric generating equipment in Federal dams which do not currently produce power. In this instance, we recommended that the Government encourage private industry to develop this hydroelectric resource.

In addition to examining federally funded programs, we have also audited other privately financed major construction

projects. One such project is the Trans-Alaska Oil Pipeline which, while privately owned, crosses Federal land and has to meet Federal environmental requirements.

The Trans-Alaska Pipeline System delivers 1.5 million barrels of oil a day. It has transported over 1 billion barrels in the 3 years of its existence. With few exceptions, the operation has gone smoothly.

The pipeline will continue to be a major transporter for much of the rest of this century, and possibly into the next. The Alyeska Pipeline Service Company (the operator) and Department of the Interior monitors must assure that pipeline and environmental integrity are maintained.

To see how well the pipeline monitoring effort is being carried out, GAO evaluated several technical and environmental stipulations imposed on Alyeska as conditions for the pipeline's right-of-way across Federal lands. A number of these stipulations were unprecedented; some involved state-of-the-art technology. Compliance with some is still forthcoming.

We found that the Department of Interior monitors have not determined whether variances from some requirements are justified and that their ability to do so is hindered by key staff vacancies. Spot checks along the pipeline indicated that environmental problems identified by Interior monitors

were being corrected. However, additional research is necessary to determine the long-term environmental impact of pipeline activity.

Our reviews of the various programs implementing Federal energy policies can lead us into some very technical areas, but as you can see from my remarks, our energy work has been extensive and beneficial. Actions taken on these reports have made our Government's operations more efficient and saved millions of dollars.

Thank you for the opportunity to address you today and I would be pleased to answer any questions you might have. I hope this brief discussion of some of GAO's efforts has been helpful.