

September 2005

REBUILDING IRAQ

U.S. Water and Sanitation Efforts Need Improved Measures for Assessing Impact and Sustained Resources for Maintaining Facilities





Highlights of GAO-05-872, a report to Congressional Committees

Why GAO Did This Study

After security conditions in Iraq began to deteriorate in June 2003, the U.S.-led Coalition Provisional Authority (CPA) included restoring essential services in Iraq, such as water and sanitation, as part of its strategy for establishing a secure, peaceful, and democratic Iraq. From 1991 to 2003, a decreasing number of Iraqis had access to safe drinking water and sanitation services, and water-borne disease rates rose. The United States has made available \$2.6 billion for rebuilding the water and sanitation sector.

As part of GAO's review of Iraq reconstruction under the Comptroller General's authority, we assessed U.S. activities in the water and sanitation sector, including (1) the funding and status of U.S. activities, (2) U.S. efforts to measure progress, (3) the factors affecting the implementation of reconstruction activities, and (4) the sustainability of U.S.-funded projects.

What GAO Recommends

We recommend that the Secretary of State (1) establish and monitor improved indicators and measures that assess how U.S. efforts are improving water and sanitation services in Iraq and (2) work with Iraqi ministries to assess and obtain the resources needed to operate and maintain facilities. State agreed with our findings and recommendations and stated that it has begun taking steps to implement them.

www.gao.gov/cgi-bin/getrpt?GAO-05-872.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Joseph Christoff at (202) 512-8979 or christoffj@gao.gov.

REBUILDING IRAQ

U.S. Water and Sanitation Efforts Need Improved Measures for Assessing Impact and Sustained Resources for Maintaining Facilities

What GAO Found

The United States has made some progress in rebuilding Iraq's water and sanitation sector. As of July 2005, State had allocated \$2.6 billion; of this amount, agencies had obligated \$1.8 billion and disbursed an estimated \$450 million, mostly to support large-scale water and wastewater treatment projects. In addition, about \$384 million in Iraqi and international funds had been obligated for the sector—about 21 percent of U.S. obligations. As of June 2005, 18 of 54 task orders for projects under five major U.S. contracts had been completed. For example, USAID's contractor repaired six sewage treatment plants, two water treatment plants, and an urban water supply in southern Iraq.

State has set broad goals for providing essential services in Iraq, but the lack of sound performance data and measures for the water and sanitation sector present challenges in determining the impact of U.S. projects. State's ability to measure the provision of essential services, such as access to water and sanitation, is limited by a lack of water metering and measures of water quality in Iraq. In the absence of such measures, State tracks the number of projects started and completed, but State was unable to substantiate which projects were included in its reported numbers. Moreover, because these data do not measure the availability or quality of water and sanitation services, it is difficult to determine how U.S. efforts are contributing to the goal of improving access to essential services. However, USAID-funded surveys report that Iraqis experience low levels of access and satisfaction with water and sanitation services. These surveys demonstrate the potential for gathering data over time that could be used to gauge the progress of U.S. reconstruction efforts.

Poor security and management challenges have adversely affected the U.S. water and sanitation reconstruction program, leading to project delays and increased costs. One U.S. agency estimated that the security environment has added an average of about 7 percent to its water sector project costs. Initial cost estimates of 25 to 50 percent below actual costs and delays in funding and awarding task orders also led to a reduced program scope and delays in starting projects. Other factors that impede progress and increase cost include lack of agreement on project scope, staffing turnover, inflation, unanticipated site conditions, and uncertain ownership of project sites.

As of June 2005, projects costing about \$52 million and turned over to Iraqi management were not operating as intended due to looting, unreliable electricity, or inadequate Iraqi staff and supplies. In March 2005, State reallocated \$25 million for additional support at USAID's completed projects, and agencies have begun risk forecasting and planning to address sustainability issues. However, these efforts are in their early stages, and it is unclear if they will address the long-term ability of the Iraqi government to support, staff, and equip remaining large-scale water and sanitation projects for which the United States has obligated more than a billion dollars.

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Abbreviations

AIRP	Accelerated Iraq Reconstruction Program
CERP	Commanders' Emergency Response Program
CH2M Hill/PWI	CH2M Hill and Parsons Water Infrastructure
CHRRP	Commanders' Humanitarian Relief and Reconstruction Program
CPA	Coalition Provisional Authority
DFI	Development Fund for Iraq
DOD	Department of Defense
FluorAMEC	Fluor (U.S. company) and AMEC (British company)
IRMO	Iraq Reconstruction and Management Office
IRRF	Iraq Relief and Reconstruction Fund
IRFFI	International Reconstruction Fund Facility for Iraq
PCO	Project and Contracting Office
PMO	Project Management Office
UN	United Nations
USAID	U.S. Agency for International Development
WGI/B&V	Washington Group International/Black & Veatch

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Congressional Committees:

After security conditions in Iraq began to deteriorate in June 2003, the U.S.-led Coalition Provisional Authority (CPA) included restoring essential services, such as water and sanitation, as part of their strategy for establishing a secure, peaceful, and democratic Iraq. According to a 2003 UN/World Bank assessment,¹ years of conflict, international sanctions, and mismanagement by the prior regime led to deterioration in the infrastructure providing essential services. From 1991 to 2003, a decreasing number of Iraqis had access to safe drinking water and sanitation, and water-borne disease rates rose. As of July 2005, the United States had appropriated about \$24 billion for relief and reconstruction in Iraq, including nearly \$2.6 billion for rebuilding the water and sanitation sector.

As part of GAO's review of reconstruction efforts in Iraq initiated under the Comptroller General's authority, we examined U.S. activities directed at rebuilding the water and sanitation sector. Specifically, we assessed (1) the funding and status of U.S. activities, (2) U.S. efforts to measure progress, (3) the factors affecting the implementation of reconstruction activities, and (4) the sustainability of U.S.-funded projects.

To accomplish our objectives, we reviewed and analyzed U.S. government agency documents and contractor reports. We also met with officials from the Department of State, the U.S. Agency for International Development (USAID), the Department of Defense (DOD) Project and Contracting Office (PCO), and contractors undertaking reconstruction efforts. Although we did not travel to Iraq due to security concerns, we interviewed U.S. officials based in Iraq by telephone and exchanged information through e-mail. We also met with officials from contractors and U.S. agencies in the United States who had returned after tours of duty in Iraq. In addition, we reviewed U.S. government-funded surveys that document Iraqi perceptions of the quality and quantity of water and

¹United Nations Development Group and World Bank Group, *United Nations/World Bank Joint Iraq Needs Assessment* (October 2003).

sanitation services. Appendix I contains a more detailed description of our scope and methodology.

We conducted our review from September 2004 through August 2005 in accordance with generally accepted government auditing standards.

Results in Brief

The United States has allocated resources and made some progress in undertaking and completing activities to rebuild Iraq's water and sanitation infrastructure. U.S. appropriations for this sector were as high as \$4.6 billion in 2004, but this level was subsequently reduced to \$2.6 billion to address other priorities, such as improving security and increasing employment. Of this amount, U.S. agencies had obligated \$1.8 billion and disbursed an estimated \$450 million as of June 2005. U.S. funding was not sufficient—nor was it intended—to address all of Iraq's water and sanitation needs as identified in 2003 condition assessments. As of June 2005, about \$251 million in Iraqi funds and \$133 million in international funds had been obligated for the sector—about 21 percent of U.S. obligations. USAID had awarded 30 task orders for project activities and PCO had awarded 24 task orders.² USAID's contractor had completed 18 task orders, including the repair of six sewage treatment plants, two water treatment plants, and a primary urban water supply in southern Iraq. However, 12 of the completed task orders had been delayed by 6 months or more. PCO's contractors had not completed any task orders, but they plan to complete 9 task orders by the end of 2005 and the remaining 15 by 2008. PCO task orders include the repair of municipal water supplies, sewage collection systems, dams, and a major irrigation project.

It is difficult to determine the overall progress and impact of U.S. efforts because of inadequate performance data and measures. According to State officials, the CPA's April 2004 goal to increase potable water to 90 percent of the population was unrealistic because it was set without baseline data. A senior State official expects U.S. efforts to increase water service access to about 50 or 60 percent. U.S. agencies track progress through the numbers of projects under way and completed and expected gains in water and sewage treatment capacity. However, these measurements are limited in providing a complete picture of progress and the impact of U.S. projects in improving access to water and sanitation services. For

²Task orders are placed against established contracts for the performance of tasks during the period of the contracts.

example, although State reported that 143 projects³ were complete as of early July 2005, it could not document the location, scope, and cost of these projects. Moreover, reporting only the number of projects completed or under way provides little information on how U.S. efforts are improving the amount and quality of water reaching Iraqi households or their access to sanitation services. The availability of data is limited by the lack of water metering and water quality measurements. For example, due to problems in the distribution network, water that is potable at the treatment plant may be lost through leakage or contaminated by the time it reaches users. However, a recent USAID survey found that just under half of respondents rated their water supply as good to very good and fewer than 20 percent rated their sewerage and wastewater disposal as good to very good. These surveys demonstrate the potential for gathering data to gauge the progress of U.S. reconstruction efforts.

Poor security and a variety of management challenges have affected U.S. efforts to improve the water and sanitation sector in Iraq. Security conditions have led to project delays and increased costs for security services. For example, work was suspended at a sewer repair project in central Iraq for 4 months in 2004 due to security concerns. PCO has estimated that the deteriorated security environment has increased water and sanitation project costs by 7 percent. In addition, PCO found initial CPA cost estimates to be 25 to 50 percent below actual costs, contributing to a reduced scope for the water and sanitation program. Agency and contractor officials cited other factors that impeded progress and increased program cost, including a lack of agreement among U.S. agencies, contractors, and Iraqi authorities on project issues; staffing turnover; an inflationary environment that made it difficult for contractors to submit accurate cost estimates; unanticipated project site conditions; and uncertain ownership of project sites.

As of June 2005, U.S.-funded water and sanitation projects representing about \$52 million of the \$200 million in completed projects were either not operating or were operating at lower capacity. One repaired wastewater plant was partially shut down due to the looting of key electrical equipment. In addition, two projects lacked a reliable power supply, one lacked sufficient staff to operate properly, and one lacked both adequate power supply and staff. Repaired water plants in one southern governorate

³We could not determine which of these projects were included in the task orders reported by contractors.

lacked adequate electricity and necessary water treatment chemicals. In late August 2004, USAID's contractor began to identify potential sustainability problems, such as poor operations and maintenance procedures. In late March 2005, nearly 7 months after the initial report of these concerns, State reallocated \$25 million to USAID for up to 1 year of additional on-site operating assistance and supplies at USAID's completed projects. In proposing the reallocation, the U.S. embassy in Iraq stated that it was moving from the previous model of building and turning over projects to Iraqi management toward a "build-train-turnover" system to protect the U.S. investment in Iraq's infrastructure. In March 2005, PCO provided \$10.3 million for a 12-month capacity development initiative that includes baseline service assessments, operations and maintenance planning and other efforts in eight governorates. However, U.S. assistance efforts do not address the long-term ability of the Iraqi government to support, staff, and equip these facilities. Iraqi ministry capacity remains an obstacle to the success of more than \$1 billion in U.S. projects expected to be complete between mid-2005 and 2008.

This report recommends that the Secretary of State should, within the limitations and difficulties of working in an unstable security environment, establish and implement improved indicators and measures that assess how U.S. efforts are improving the quality and quantity of water and sanitation services in Iraq. The report also recommends that the Secretary work with Iraqi ministries to assess the resources needed to operate and maintain new and repaired water and sanitation facilities after they are turned over to Iraqi management and work with the Iraqi government to ensure that Iraq has these resources.

In commenting on a draft of this report, the Department of State and USAID agreed with our findings and conclusions. State concurred with our recommendations and stated that it is taking steps to begin implementing them. The Departments of Defense and State also provided technical comments, which we incorporated where appropriate.

Background

Water and sanitation services in Iraq deteriorated after the 1991 Gulf War due to lack of maintenance, inadequate skilled manpower, international sanctions, and war damage. In 2003, looting at the outbreak of Operation Iraqi Freedom destroyed the equipment and materials needed to operate

water treatment and sewerage facilities.⁴ According to the 2003 *UN/World Bank Joint Iraq Needs Assessment*, Iraq produced enough water before the 1991 Gulf War to supply more than 95 percent of urban Iraqis and 75 percent of rural Iraqis. By 2003, these production levels had fallen to about 60 percent and 50 percent, respectively. At both times, however, the percentage of Iraqis actually receiving an adequate amount of potable water was much lower due to heavy leakage and contamination from the delivery network. The assessment also found that, although 80 percent of Baghdad's population had sewerage access, power outages caused shutdowns and blockages of the sewage system, leading to backups of raw sewage in the streets. Less than 10 percent of the urban population outside Baghdad was served by sewage systems, and rural areas and northern Iraq had no access to piped sewerage. Diseases related to unsafe water and poor sanitation increased significantly between 1990 and 2000. At the time of the 2003 assessment, no sewage treatment plants were operational, and raw sewage was discharged into rivers and waterways. Furthermore, sewage leaked into the water network, which was too damaged to keep contaminants out. These sources of contamination caused levels of water-related diseases to escalate. According to a UN Children's Fund report, the number of typhoid cases rose from 2,240 in the pre-1991 period to 27,000 in 1996.⁵

According to the official who led the 2003 UN/World Bank assessment, steady attrition of human and physical capital was the principal cause of the decline in Iraq's water and sanitation services. Through most of the 1990s, Iraq's water and sanitation sector lacked the funding, staff, equipment, and spare parts needed to keep facilities running. The sector did not have a steady source of operating funds, and salaries were too low to retain trained and educated staff, many of whom left the country. International isolation prevented exposure to outside knowledge and the development of necessary skills and led to spare parts shortages that made routine maintenance difficult.

⁴United Nations Development Group and World Bank Group, *United Nations/World Bank Joint Iraq Needs Assessment* (October 2003). Operation Iraqi Freedom largely spared water and wastewater treatment plants; however, water networks were seriously damaged. Baghdad's water network in particular was subject to severe bomb damage, causing acute water shortages that led residents to tap the network illegally.

⁵UN Children's Fund, *The Situation of Children in Iraq: An Assessment Based on the United Nations Convention on the Rights of the Child* (New York: Reprinted March 2003).

Two 2003 studies, based on limited assessments extrapolated to cover the entire country, provided cost estimates for repairing Iraq's deteriorated water and sanitation infrastructure. The UN/World Bank assessment estimated that more than \$4 billion would be needed through 2007 to restore and expand the water and sanitation infrastructure past pre-1991 levels. Additional capital investments of nearly \$2.8 billion would be required to increase service coverage and reduce water losses. A USAID-funded assessment by Bechtel National, Inc., identified short-, intermediate-, and long-term projects that could address Iraq's water and sanitation needs at a potential cost of \$6.5 billion over the next 10 to 20 years.

From May 2003 until the end of June 2004, the CPA was the UN-recognized coalition authority led by the United States and United Kingdom that was responsible for the temporary governance of Iraq and for overseeing, directing, and coordinating the reconstruction effort. Within the CPA, the Project Management Office (PMO) was established to provide project management, prioritizing, and contract support for U.S.-funded reconstruction projects. The CPA identified the initial U.S. efforts for rebuilding Iraq's water and sanitation, which USAID managed and executed with fiscal year 2003 funds. In May 2004, the President issued a National Security Presidential Directive which stated that after the transition of power to the Iraqi government, the State Department would be responsible for all U.S. activities in Iraq, except for U.S. efforts relating to security and military operations. These efforts would be DOD's responsibility. On June 28, 2004, the CPA transferred power to a sovereign Iraqi interim government, and the CPA was officially dissolved.

To replace the CPA's PMO, the Presidential Directive established two temporary offices: (1) the Iraq Reconstruction and Management Office (IRMO) to facilitate the transition of reconstruction projects to Iraq and (2) PCO to facilitate acquisition and project management support for U.S.-funded reconstruction projects in various sectors, including water and sanitation. IRMO is a State Department organization responsible for strategic planning and for prioritizing requirements, monitoring spending, and coordinating with the military commander. Iraq-based personnel from both offices are under the authority of the U.S. chief of mission in Baghdad, although the U.S. Department of the Army funds, staffs, and oversees the operations of the PCO.

USAID and PCO administer the large-scale projects funded in fiscal year 2004. USAID and PMO awarded five contracts representing the majority of U.S. funds obligated for water and sanitation reconstruction to three firms.

USAID awarded the first of these contracts to Bechtel National, Inc. in April 2003 with fiscal year 2003 funds for work across multiple reconstruction sectors. In January 2004, USAID awarded a second, competitively bid, multi-sector reconstruction contract to Bechtel with fiscal year 2004 funds. In March 2004, PMO used fiscal year 2004 appropriated funds to competitively award three contracts for water and sanitation reconstruction. PMO awarded one contract for improving water resources nationwide to a joint venture between the U.S. companies Washington Group International and Black & Veatch (WGI/B&V). PMO awarded two other contracts to a joint venture between the U.S. firm Fluor and the British company AMEC (FluorAMEC), one each for public works projects in northern and southern Iraq. PMO also awarded a contract in March 2004 to a joint venture between CH2M Hill and Parsons Water Infrastructure (CH2M Hill/PWI) for program management services for water sector activities. For PCO activities, CH2M Hill/PWI performs such duties as developing project task orders, preparing government cost estimates, and preparing reports on water sector status.

The United States Has Completed Some Projects, but Many Large Scale Efforts Were Delayed

As of July 2005, State Department reallocations to other priorities in Iraq had reduced funding designated for water and sanitation by almost half, to about \$2.6 billion, of which U.S. agencies had obligated about \$1.8 billion and disbursed an estimated \$450 million. International and Iraqi funds allocated for this sector totaled at least \$384 million. Most U.S. obligations have gone to long-term, large-scale water and wastewater treatment projects that can take months or years to complete. As of June 2005, USAID's contractor had completed 18 task orders, although with many delays. USAID and PCO expect to complete an additional 36 task orders from 2005 through 2008.

State Reallocated a Portion of Its Water and Sanitation Funds to Address Other Iraq Needs

At its highest level, total U.S. appropriated funding for reconstruction of Iraq's water and sanitation sector was about \$4.6 billion; however, by July 2005, State Department reallocations had reduced funding to about \$2.6 billion, a 44 percent decrease. As of the end of June 2005, agencies had obligated \$1.8 billion and disbursed an estimated \$450 million.⁶ Even at the level of \$4.6 billion, U.S. funding would not have been sufficient—nor was

⁶The disbursement figure for water and sanitation activities is estimated due to limitations in agency reporting. For example, water and other reconstruction activities under USAID's Local Governance Program are reported in the democracy category, and DOD's reporting on some smaller programs stops at the obligation level.

it intended—to address all of Iraq’s water and sanitation needs as identified by the UN/World Bank and Bechtel assessments. After State’s reallocations, U.S. obligations are almost five times greater than Iraqi and international obligations for rebuilding Iraq’s water and sanitation sector.

Congress initially appropriated funding for Iraq reconstruction in fiscal year 2003, and in fiscal year 2004, appropriated an additional, larger amount. In April 2003, Congress passed the Emergency Wartime Supplemental Appropriations Act.⁷ This legislation created the Iraq Relief and Reconstruction Fund (IRRF) and appropriated about \$2.48 billion in fiscal year 2003 funds to the Fund for reconstruction activities in multiple sectors. Of this amount, as of June 2005, USAID had obligated approximately \$270 million to water and sanitation projects. In November 2003, Congress enacted an additional emergency wartime supplemental act, in which \$18.4 billion was provided for the IRRF.⁸ From this \$18.4 billion, Congress specifically allocated about \$4.33 billion for reconstruction of Iraq’s water and sanitation sector. However, the Act also permitted limited reallocation of fiscal year 2004 IRRF funds with congressional notification. This \$270 million in fiscal year 2003 funds and \$4.33 billion in fiscal year 2004 funds total the peak U.S. appropriation for the water and sanitation sector of \$4.6 billion.

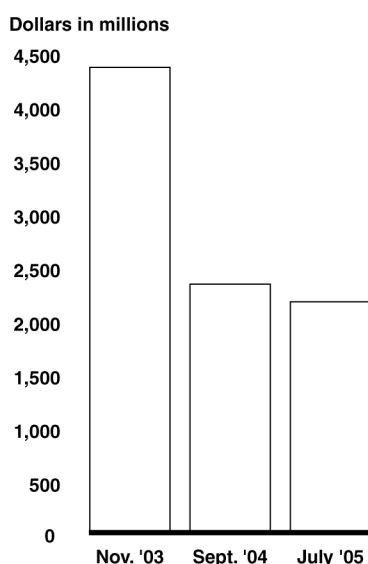
As of July 5, 2005, the State Department had conducted a series of fiscal year 2004 IRRF reallocations to address other priorities, thereby reducing total IRRF funding for water and sanitation by about 44 percent, from \$4.6 billion to \$2.6 billion. The single largest reduction occurred in September 2004, when State shifted \$1.9 billion in fiscal year 2004 IRRF funds from water and sanitation to increase support for security and law enforcement, oil infrastructure enhancements, economic development, debt forgiveness, Iraqi employment, and democracy and governance. Although State’s September 2004 reallocation did not cause cancellation of any water sector projects already in progress, PCO cancelled some projects—most of which were planned to start in mid-2005. Over the next 9 months, State made additional reallocations, transferring a total of \$160 million in fiscal year 2004 IRRF water and sanitation funds to support efforts such as job creation and electrical distribution. Figure 1 shows the overall reduction in

⁷Congress enacted Public Law 108-11, the Emergency Wartime Supplemental Appropriations Act, 2003 on April 16, 2003.

⁸Congress enacted Public Law 108-106, the Emergency Supplemental Appropriations Act for Defense and for the Reconstruction of Iraq and Afghanistan, 2004, on November 6, 2003.

available fiscal year 2004 IRRF funds allocated for water and sanitation. As of June 2005, U.S. agencies had obligated \$1.8 billion of the reduced total of \$2.6 billion. Of the allocated amount, about \$450 million—17 percent—had been disbursed.

Figure 1. Available Fiscal Year 2004 IRRF Funds Allocated for Water and Sanitation



Source: U.S. Department of State.

According to a senior PCO official, U.S. funding was not meant to rebuild Iraq’s entire infrastructure but to lay the groundwork for a longer-term reconstruction effort with anticipated significant assistance from international donors. As of the end of June 2005, at least \$384 million in Iraqi and international funds had been obligated for rebuilding Iraq’s water and sanitation sector, slightly more than 21 percent of the \$1.8 billion in U.S. obligations. Iraqi funding includes at least \$239 million from the Development Fund for Iraq (DFI) and about \$12 million in seized assets from the former regime.⁹ In addition, the International Reconstruction

⁹According to UN Security Council Resolution 1483, the funds deposited into the DFI were to be used to meet the costs of Iraqi civilian administration, humanitarian needs, infrastructure repairs, economic reconstruction, and other purposes benefiting the people of Iraq. The CPA used the term “allocation” to reflect DFI obligations. We used the term “obligations” for consistency of reporting. The 2005 budgets for the Iraqi Ministries of Municipalities and Public Works, and of Water Resources also included funding for capital project costs; however, we were unable to determine the extent to which these funds have been made available.

Fund Facility for Iraq obligated about \$133 million in international donations for water and sanitation projects as of May 2005.¹⁰

Funding Has Been Directed Primarily to Large-Scale Efforts that Are in Progress

Water and sanitation construction projects funded by U.S. agencies in Iraq generally fall into two categories: large-scale projects and smaller-scale, quick-impact projects.¹¹ As of June 2005, five contracts issued by USAID and PCO, representing about 73 percent of all U.S. water and sanitation obligations, supported a variety of large-scale efforts that mostly remain in progress. By the end of June, USAID and PCO contractors had completed 18 of their 54 task orders for large-scale projects; however, these completed projects experienced delays. Smaller-scale, quick-impact efforts are typically less complex, less costly, and have received a smaller share of available U.S. funds. These projects are designed to address local needs and create employment. Iraqi funds have also been used for other water and sanitation projects.

Some Large-Scale Water and Sanitation Projects Have Been Completed but Delayed; Others Are Under Way

As of June 2005, U.S. agencies had obligated about \$1.3 billion of the total \$1.8 billion in available U.S. appropriated funding for large-scale water and sanitation projects performed by USAID contractor Bechtel and PCO contractors WGI/B&V and FluorAMEC. Some task orders have been completed, but most work is still in progress. Table 1 shows the status of these contracts as of June 2005.

¹⁰The International Reconstruction Fund Facility for Iraq comprises two trust funds into which donors can make contributions—the World Bank Iraq Trust Fund and the UN Development Group Iraq Trust Fund. Members of the international community have also made bilateral donations for rebuilding Iraq. As we reported in June 2004, the United States had been working with the Iraqis to develop a database for tracking all bilateral commitments made to reconstruction activities in Iraq. One year later, this database for tracking all donor assistance projects in Iraq remains under development with U.S. and UN assistance and has been transferred to the Iraqis.

¹¹According to PCO reporting, in addition to obligating funds to water and sanitation construction projects, PCO has obligated about \$127 million to nonconstruction activities in the sector as of June 26, 2005. These activities include procurement of trash trailers, sewage trucks, and generators.

Table 1. Status of Major Contractors' Water and Sanitation Task Orders, June 2005

Contract	Date of Contract	Total Task Orders^a	Task Orders in Progress^a	Completed Task Orders	Obligations for Task Orders in Progress	Obligations for Completed Task Orders
USAID						
Bechtel Phase I	4/17/03	17	0	17	\$0	\$199 million
Bechtel Phase II	1/05/04	13	12	1	\$365 million	\$0.7 million
PCO						
WGI/B&V	3/11/04	10	10	0	\$234 million ^b	\$0
FluorAMEC – North and South Contracts	3/23/04	14	14	0	\$639 million ^c	\$0
Totals		54	36	18	\$1.2 billion	\$200 million

Sources: USAID, PCO, and contractor reporting.

^aExcludes 2 cancelled USAID Phase I task orders, 3 USAID Phase I task orders that were combined with other task orders in Phase I or Phase II, 2 cancelled PCO task orders and 3 PCO mobilization task orders.

^bIncludes task orders awarded with both U.S. appropriations (\$169 million) and DFI funds (\$65 million).

^cIncludes task orders awarded with both U.S. appropriations (\$566 million) and DFI funds (\$73 million).

Note: Numbers may not add due to rounding. Status information is as of the end of June 2005; funding information is as of the end of March 2005 for USAID and end of June for PCO.

As of June 2005, Bechtel had completed 18 of its total 30 task orders, but most of these completed task orders experienced delays. Large-scale efforts completed by Bechtel included the repair of six sewage treatment plants, two water treatment plants, and the primary water supply for a city in southern Iraq. Bechtel has completed one task order under its Phase II contract, a design task costing about \$700,000. Twelve task orders remain under the second Bechtel contract, including water treatment plants, sewer line construction, and a rural water supply project. Six of these task orders are expected to be completed in 2005 and six in 2006. Although USAID/Bechtel has completed 18 task orders, all 17 completed Phase I task orders were delayed beyond the original completion date by between 1 and 13 months. Twelve were delayed by 6 months or more.

PCO contractors WGI/B&V and FluorAMEC were awarded contracts nearly 1 year after the initial Bechtel contract, and they had not completed any of their 24 task orders as of June 2005. The contractors expect to complete 9 task orders by the end of 2005, 10 in 2006, 4 in 2007, and 1 in 2008. WGI/B&V's task orders include four dam facilities and a major irrigation project; FluorAMEC's include several municipal water supplies

and three sewage collection systems. PCO contractors have also faced some delays in completing work under the task orders.

U.S. Funds Small-Scale, Quick-Impact Projects

U.S. agencies have also undertaken small-scale, quick-impact water and sanitation projects. DOD, State, and PCO have conducted this work under the following three programs:

- Under the Commanders' Emergency Response Program (CERP), military commanders have undertaken urgent humanitarian relief and reconstruction projects in Iraqi communities in their areas of responsibility. Agency data as of June 30, 2005 indicated that about \$56.1 million in Iraqi and fiscal year 2004 U.S. funds had been obligated to more than 2,800 CERP water and sanitation projects. CERP projects have helped to repair and augment water and sanitation systems and include canal cleanups, well construction, and water purification.
- State established the Commanders' Humanitarian Relief and Reconstruction Program (CHRRP) in September 2004 with \$86 million in response to the perceived effectiveness of the CERP, according to a senior State official. A major CHRRP initiative was to connect large water and sewer infrastructure projects to homes in central Iraq. Agency data as of June 30, 2005 indicated that about \$74.3 million in fiscal year 2004 U.S. funds had been obligated for 60 CHRRP water and sanitation projects in central Iraq. Other planned projects include rehabilitation of irrigation canals and procurement of landfill equipment.
- PCO has provided funds for contracting directly with Iraqi construction firms to conduct small water system repairs. According to PCO reporting from April 2005, PCO has budgeted about \$70 million for this effort and plans to undertake 145 projects.

USAID also has funded small-scale, quick-impact water and sanitation projects. According to our analysis of USAID and contractor data, more than 1,900 projects with an average value of about \$100,000 had been funded as of May 2005. These projects include neighborhood trash cleanups, provision of irrigation pumps, sewer cleanouts, and installation of potable water networks. USAID has implemented this work through contracting partners and nongovernmental organizations. The goals of USAID's quick-impact projects include employing Iraqis and satisfying local needs as identified by community members.

Additional Water and Sanitation Projects Have Been Funded from Iraqi Revenues

In April 2004, the CPA created the Accelerated Iraq Reconstruction Program (AIRP), which, as of mid-June 2005, included 125 quick-impact and large-scale projects funded with a total of \$211 million in Iraqi DFI funds. The AIRP is a “legacy” program of DFI-funded projects that CPA had awarded but not completed before its dissolution in June 2004. PCO administers the AIRP on behalf of the State Department. Although AIRP includes nearly 25 times as many quick-impact water sector projects as it does large-scale water sector projects, the larger projects have received nearly twice as much funding.¹² As of June 2005, Iraqi contractors had received about \$73 million in DFI obligations for 120 water and sanitation projects under the AIRP, and PCO contractors WGI/B&V and FluorAMEC had received about \$139 million for 5 projects. The cost of AIRP projects done by Iraqi contractors ranges considerably, with the lowest at \$5,000, the highest at \$5.6 million, and the median at \$250,000. AIRP projects were developed through consultations with Iraqi governors, engineering teams, and members of local councils, who were asked to identify quick-impact projects that would benefit the local population.

Limited Performance Data and Measurements Make It Difficult to Determine Impact

State has set broad goals for providing essential services in Iraq, but the lack of sound performance data and measures for the water and sanitation sector present challenges in determining the impact of U.S. projects. State’s ability to measure the provision of essential services, such as access to water and sanitation, is limited by a lack of water metering and measures of water quality in Iraq. In the absence of such measures, State tracks the number of projects started and completed, but State was unable to substantiate which projects were included in its reported numbers. Moreover, because these data do not measure the availability or quality of water and sanitation services, it is difficult to determine how U.S. efforts are contributing to the goal of improving access to essential services. However, USAID-funded surveys demonstrate the potential for gathering data over time that could be used to gauge progress of U.S. reconstruction efforts. These surveys report that Iraqis experience low levels of access and satisfaction with water and sanitation services.

¹²According to a PCO official, after the dissolution of the CPA, the United States, per agreement with the Iraqi Finance Minister, manages the AIRP projects but may not award new ones.

U.S. Goals for Improving Iraq's Water and Sanitation Sector Are Broad

In April 2004, the CPA strategic plan quantified targets for increasing Iraqi access to water and sanitation services. The CPA's goals at that time were to increase potable water access to 90 percent of Iraqis, to increase sewerage access to 15 percent of Iraqis, and to reduce water losses from 60 percent to 40 percent. The CPA expected that these targets would be met at the completion of PMO projects in 2 to 3 years. According to State and IRMO officials, however, the CPA goals were unrealistic because they were set without having baseline data on the condition of Iraq's water and sanitation infrastructure and the lack of water metering. According to a State official, the baseline data is not reliable, even if it is available.

State assumed responsibility for managing the U.S. reconstruction effort following the CPA's dissolution and the transfer of power to an interim Iraqi government. The Iraq Reconstruction and Management Office (IRMO), a temporary office within the State Department, is responsible for strategic planning, setting priorities, and monitoring spending. State has set forth seven strategic objectives for Iraq reconstruction in the national security strategy for Iraq. One of these objectives is providing essential services, such as water and sanitation, but details of the water and sanitation objectives are classified. A senior IRMO official expected completion of the U.S. program to increase water access to about 50 or 60 percent of the Iraqi population, far less than the 90 percent CPA initially outlined.

Challenges in Measuring Water and Sanitation Access and Quality

The absence of water metering in Iraq greatly hinders the ability of the United States to assess progress toward the broader goal of providing essential services and improving Iraq's water and sanitation sector. Iraq does not have a comprehensive system of area meters or residential meters that would help determine how much water in the distribution network reaches intended users. Water distribution networks are subject to some water loss or undocumented water usage, which can occur through leakage, unmetered but legitimate use such as in government buildings, or illegal connections. PCO and State officials have estimated water losses in Iraq to be about 60 percent for the country as a whole. By comparison, a 1991 survey cited by the World Health Organization found losses of 25 to 45 percent in developing countries. In the absence of metering, it is difficult to quantify the amount of water reaching users.

Data on treatment capacity and sanitation access do not encompass quality measures and also hinder U.S. ability to gauge progress toward its goal of providing essential services. For example, because of problems with the distribution network, water that is potable at the treatment plants

may be contaminated by the time it reaches users. According to the PCO water sector lead, potable water and sewage lines in Iraq are sometimes adjacent to each other, allowing leaking sewage to enter the water mains when there is insufficient pressure in the lines. Furthermore, while Iraqis in some urban areas may be connected to a public sewer, according to a recent report,¹³ the sewage network may not be sufficient to safely transport waste away from the home and streets.

In the absence of metering and quality measures, State and other U.S. agencies track reconstruction progress using other performance data, but these data have limitations. State tracks and reports the number of projects in progress and the number of projects completed. As of July 3, 2005, State reported that 143 projects were complete. However, State could not document the location, scope, or cost of the projects included in this reporting, thereby limiting an evaluation of the significance of completed projects. We also could not reconcile State's figures with other data from PCO and USAID. For example, as of June 28, 2005, PCO reported that it had completed 43 small projects, and USAID reported the completion of 18 larger-scale task orders and many more small projects. It is unclear how many projects may be included in these task orders. Furthermore, even if these data could be substantiated and reconciled, this type of reporting does not provide information on how U.S. efforts are improving Iraqi access to water and sanitation services or the quality of those services.

Increases in water treatment capacity may help gauge progress, but this measure also has limitations when it comes to understanding the level of access provided. Currently, PCO expects to provide just over a million cubic meters per day of additional water treatment capacity as part of the PCO reconstruction program. PCO has estimated the number of expected beneficiaries from the added capacity by dividing the increased capacity by the estimated volume of water used by the average Iraqi. Although PCO uses what it believes is a conservative demand estimate that attempts to take into account water losses, plant efficiency, and industrial usage, the actual ultimate benefit to Iraqis is uncertain.

¹³Iraq Ministry of Planning and Development Cooperation and UN Development Program, *Iraq Living Conditions Survey 2004* (Baghdad, Iraq: April 2005).

Surveys Can Provide Information on Access to Water and Sanitation Services and Satisfaction with Service Quality

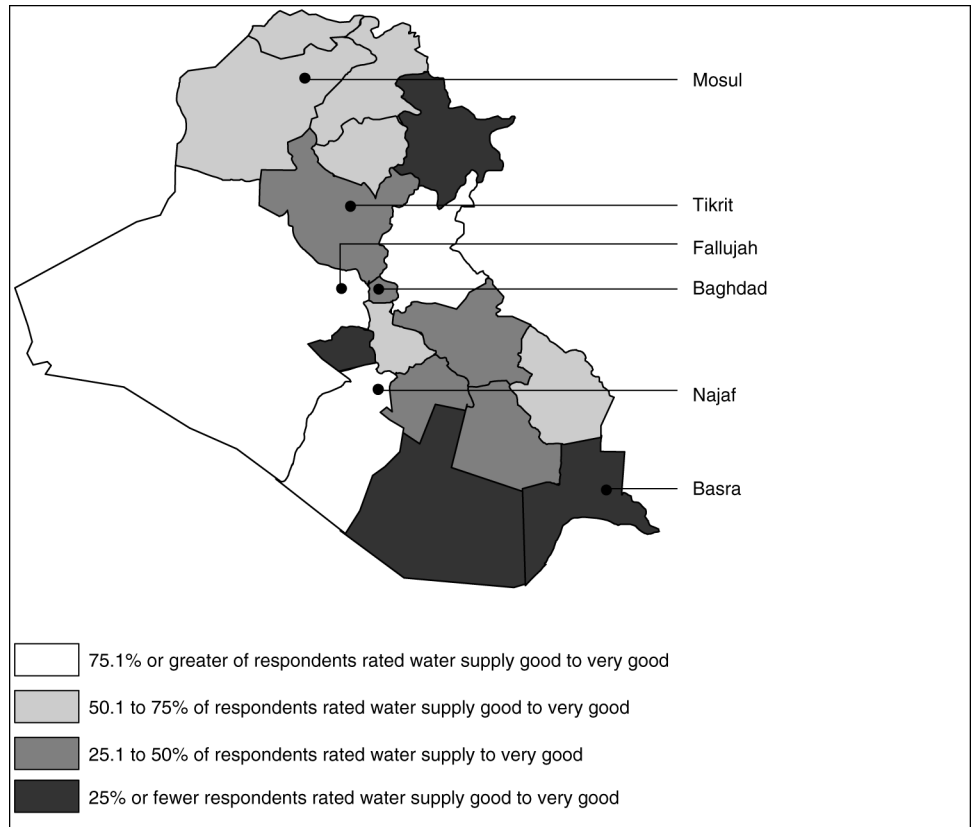
USAID has funded four *Iraq Quality of Life Survey Reports* through its Local Governance Program that provide important information about the level of access to water and sanitation services and Iraqi satisfaction with those services.¹⁴ Contractors, working with local Iraqis as survey enumerators, surveyed Iraqis about a number of issues, including their access to and satisfaction with essential services. Although certain areas could not be surveyed due to security constraints, the survey reports provide data for each of Iraq's 18 governorates, as well as nationwide data.

The most recent survey report, completed in February 2005, found that just under half of respondents rated their level of water supply as good to very good. Fewer than 20 percent of respondents rated the quality of sewerage and wastewater disposal as good to very good. Governorates in southern Iraq in particular showed particularly low levels of satisfaction with the water supply. See figures 2 and 3 for the most recent survey data on satisfaction with water supply and adequacy of sewerage and wastewater disposal at the governorate level.¹⁵

¹⁴Survey reports are dated October-November 2003, June 2004, September 2004, and February 2005.

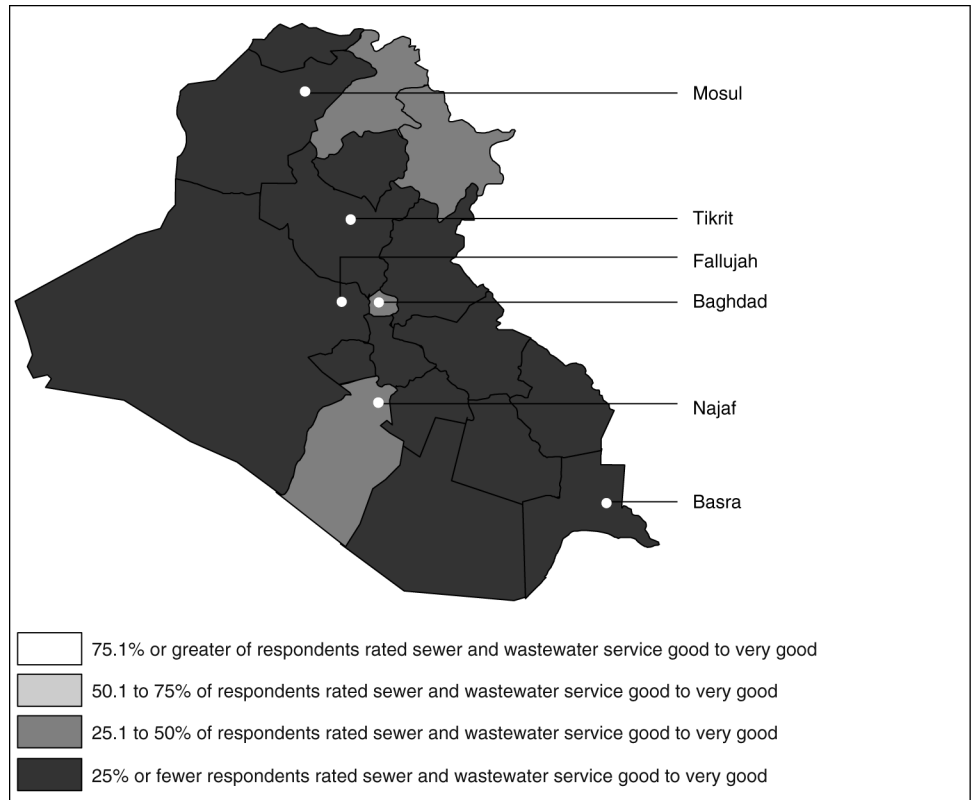
¹⁵The USAID contractor reported a good overall response rate to the survey. However, response rates per governorate and per question were not provided, and sampling errors were not calculated, so the margin of error for the responses is unknown. In addition, the responses were not weighted by governorate, although the samples by governorate were not strictly proportional. For example, while Baghdad contains about a third of Iraq's urban population, its sample represented only about a quarter of the entire sample for Iraq. As a result, it is possible that responses from some governorates are more influential than responses from others.

Figure 2. Iraqi Satisfaction with Water Supply by Governorate, February 2005



Source: USAID, *Iraq Quality of Life 4 Survey Report*, February 2005.

Figure 3. Iraqi Satisfaction with Adequacy of Sewerage and Wastewater Disposal by Governorate, February 2005



Source: USAID, *Iraq Quality of Life 4 Survey Report*, February 2005.

These data provide insight into Iraqi satisfaction with the level of access to water and sanitation services and demonstrate the potential for gathering data over time that could be used to gauge progress of U.S. reconstruction efforts. In commenting on our July 2005 report on Iraq reconstruction, the State Department stated that it has not allocated money for satisfaction surveys because the surveys are expensive and difficult and dangerous to complete in a wartime environment.¹⁶ In contrast, USAID has included surveys as part of the agency's efforts to assess the quality of a variety of essential services provided to the Iraqi people. USAID has completed four surveys since October 2003 and intends to continue periodic surveys.

¹⁶GAO, *Rebuilding Iraq: Status of Funding and Reconstruction Efforts*, [GAO-05-876](#) (Washington, D.C.: July 28, 2005).

Security and Management Challenges Have Adversely Affected Implementation of Water and Sanitation Projects

Poor security and a variety of management challenges have adversely affected the implementation of the U.S. water and sanitation reconstruction program in Iraq. Security conditions have led to project delays and increased costs for security services. Management challenges such as low initial cost estimates and delays in funding and awarding task orders have also led to the reduced scope of the water and sanitation program and delays in starting projects. In addition, U.S. agency and contractor officials have cited difficulties in initially defining project scope, schedule, and cost, as well as concerns with project execution, as further impeding progress and increasing program costs. These difficulties include lack of agreement among U.S. agencies, contractors, and Iraqi authorities; high staffing turnover; an inflationary environment that makes it difficult to submit accurate pricing; unanticipated project site conditions; and uncertain ownership of project sites.

Poor Security Conditions Have Slowed Reconstruction and Increased Costs

According to agency officials and documentation, the ongoing insurgency in Iraq has delayed the U.S. water and sanitation reconstruction program and increased its cost. Attacks, threats, and intimidation against project contractors and subcontractors have led to temporary project shutdowns and disrupted the movement of materials and personnel to and from project sites. The amount of work included in some projects has also decreased due to the poor security conditions.

Although it is difficult to quantify the costs in time and money resulting from poor security conditions, agency and contractor documents and interviews with agency officials cite numerous security-related issues that have resulted in delays in the design and execution of projects and reduced scopes of work.¹⁷ For example:

- Security conditions have limited the ability of contractors to get to project sites and perform site assessments, thus delaying project design. At one project site in northern Iraq, for instance, the contractor cancelled its assessment when its convoy came under attack.

¹⁷While it is apparent from these and other examples that security has affected the progress of reconstruction, it is not always possible to separate delays and cost increases caused by poor security conditions from delays and cost increases caused by other factors. For example, USAID task order amendments list the reasons why a job's schedule is being extended, but several factors may be cited as part of the same extension request. One project in southern Iraq received a 75-day extension due to delays in awarding subcontracts and receiving permits from highway department, issues with relocating illegal roadside markets, as well as deterioration in the overall security situation.

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- Work at a wastewater plant in central Iraq was halted for approximately 2 months in early 2005 because insurgent threats drove subcontractors away and made the work too hazardous to perform.
 - Work was suspended at another sewer repair project in central Iraq from early August to early November 2004, and PCO reported that a sanitation project in central Iraq was halted for the entire month of March 2005 due to poor security conditions.
 - At the time of the Iraqi national election in January, project sites in Iraq were shut down for at least 3 days.
 - Iraqi employees and subcontractors working on water and sanitation projects countrywide have been subject to hostility, violence, and intimidation. At one project, a lead employee received a life-threatening e-mail. The employee was subsequently chased by two armed men and fled the country. The balance of the 12-member team refused to go back to the site for some time. At another location in northern Iraq, a subcontractor withdrew from the job site after receiving threats. It took nearly 2 months for a qualified replacement subcontractor to begin work.
 - A wastewater plant project in central Iraq was subject to looting and to attacks with improvised explosive devices. Iraqi employees sabotaged this plant in November 2004 to protest U.S. operations in Fallujah by walking off the job and leaving the plant running. The untended plant stagnated, leading to damaged equipment and the need for a substantial clean-up operation. As of July 2005, this plant remains closed.
 - Insurgents have destroyed deliveries of needed materials to job sites. At one water project in southern Iraq, death threats against key employees have delayed construction and deliveries to the project site. The same site was subjected to threats of violence and extortion attempts by local tribesmen.
 - USAID greatly reduced the scope of work for two pump station projects due to security concerns and lack of site access permission from the Iraqi ministry. In April 2005, the contractor reported that these projects would be limited to design work, minor repairs, and delivery of equipment, instead of the originally planned full construction. U.S. officials stated that Iraqi ministries would complete construction using materials provided by the United States.

Poor security conditions also have increased the cost of providing security services for contractors and sites. For example, when a project is shut down or delayed due to security conditions, the fixed costs of contractor camps and salaries continue to accrue even though contractors in the field are unable to continue their work. USAID, PCO, and GAO have each quantified some aspect of increased security requirements affecting reconstruction costs; however, none has quantified a cost estimate for the water sector as a whole. The USAID Inspector General found that costs for security subcontractors as a percentage of the costs for USAID's reconstruction effort in multiple sectors went from 4.2 percent of contractor billings between March 2003 and February 2004 to 22.3 percent between March and December 2004. Based on an analysis of a sample of water projects, PCO estimated that the deteriorated security environment added about 7 percent to project costs in the water sector. We have also analyzed the security expenses of multiple reconstruction contracts and found that cost to obtain private security providers and security-related equipment accounted for more than 15 percent of contract costs on 8 of the 15 reconstruction contracts analyzed.¹⁸

Management Challenges Have Adversely Affected Project Implementation

Several management challenges in executing water and sanitation projects have resulted in reduced scopes of work, project delays, and increased costs. Factors affecting the scope and pace of reconstruction have included understated initial cost estimates and delays in receiving allocated funding and awarding task orders. U.S. agencies and contractors have also faced difficulties in completing scopes of work, finalizing associated costs, and executing projects in an unpredictable environment. These difficulties include lack of agreement among U.S. agencies, contractors, and Iraqi authorities; staff turnover; an inflationary environment that makes it difficult to submit accurate pricing; unanticipated project site conditions; and uncertain ownership of project sites.

Underestimated Costs and Funding Delays

According to PCO, initial assessments prepared by the CPA underestimated project costs and contributed to reductions in the scope of U.S. reconstruction efforts. These initial assessments gave rough budget estimates for repairing or constructing water and sanitation facilities and, according to PCO, assumed more benign operating conditions. The CPA

¹⁸GAO, *Rebuilding Iraq: Actions Needed to Improve Use of Private Security Providers*, [GAO-05-737](#) (Washington, D.C.: July 28, 2005).

relied on these estimates in putting together its proposed list of 137 projects to be executed with the original fiscal year 2004 IRRF allocation of \$4.33 billion. Because the estimates were low, the \$4.33 billion allocation was never sufficient to complete the original CPA list of projects. According to a senior PCO official, these estimates were usually very low in comparison to the estimates that contractors developed after more thorough field assessments of project sites. In general, PCO found these initial estimates to be 25 to 50 percent below actual costs. According to a PCO water sector official, the low estimates meant that the PCO construction program was underfunded from the start.

Contractors and agency officials cited delays in receiving funding as challenges to awarding and completing task orders and staying within budgets. PCO reported that the receipt of fiscal year 2005 funding for the sector was delayed by at least 3 months, affecting its ability to award projects in a timely manner. In addition, according to a PCO official, as of June 2005, PCO had not yet received the apportionment for two task orders awarded in January 2005. These task orders are not only delayed and limited in the amount of work that can be done, but they are still accruing overhead costs that may put the projects over budget. One contractor stated that increased overhead costs resulted from delays in receiving task orders from the government immediately after contract award and again following the June 2004 dissolution of the CPA. PCO contractors WGI/B&V and FluorAMEC stated that they began mobilizing staff after receiving their contracts in March 2004 based on the expectation that they would receive close to their maximum contract awards totaling \$1.7 billion.¹⁹ As of June 2005, PCO had obligated about \$873 million in task orders to these contractors.²⁰ Because of the lower amount of funding, mobilized staff who were no longer needed were withdrawn from Iraq.

Challenges in Finalizing Work Terms and Costs and Executing Projects

Following the award of task orders, PCO projects have been subject to delays in the process of developing a final cost, schedule, and scope of work, a process called definitization, and in overall project execution. For 18 of the 24 PCO task orders, the time from initial issuance of a task order to definitization has ranged from 6 to 10 months, with the scope of one task issued in June 2004 for work in Al Anbar province still not finalized as of June 2005. The Federal Acquisition Regulation states that the process

¹⁹The three PCO contracts had ceiling values of \$500 million, \$600 million, and \$600 million.

²⁰This figure includes obligations from appropriated funds and from the DFI.

should be completed within 6 months of signing the contract, or before completion of 40 percent of the work to be performed, although a contracting officer may extend this time in extreme cases and according to agency procedures.²¹ Without a definitized task order, DOD may generally obligate only up to 50 percent of the project's negotiated overall ceiling price.²² PCO has made some funds available to its contractors prior to definitization, enabling limited efforts such as planning and defining the scope of work. However, if the definitization process does not keep pace with the cost of these preliminary efforts, a project may come to a halt once these limited funds are exhausted. Agency and contractor officials cited the following factors as affecting both the definitization process and the overall pace and cost of the U.S. water and sanitation reconstruction effort:

- *Lack of agreement between U.S. agencies and Iraqi authorities:* Agency and contractor officials and reports have cited difficulty in getting agreement among Iraqi authorities, U.S. agencies, and contractors on scopes of work and construction details. For example, at one site, Iraqi officials wanted to repair a water treatment plant whereas the U.S. agency had planned to replace it. At another site, local authorities disagreed with the pipe specified for a particular project. Another project was delayed when local Iraqi officials insisted on using brick instead of concrete block for construction. At a wastewater project, local officials wanted a certain type of sewer design that increased the project's cost. In addition, U.S. agencies and Iraqi staff have had to overcome security and communication constraints to coordinate agreement on the scope of work. For example, one PCO official stated that only half of the Iraqis invited to a scheduled project meeting were able to attend—the others were absent due to the danger of traveling, being stopped in traffic, or for other reasons.
- *Frequent Staff Turnover:* One PCO contractor cited discontinuity in key U.S. government contacts, such as new contracting officers rotating in and out of Iraq, as disrupting both cost and schedule. New

²¹Federal Acquisition Regulations 16.603-2. To meet urgent operational needs, as is the case in Iraq's reconstruction, agencies may authorize contractors to begin work before contracts or task orders have been definitized—that is, before key terms and conditions, including price, have been defined and agreed upon. While this approach allows agencies to initiate work quickly, it also can result in potentially significant additional costs and risks for the government.

²²See 10 U.S.C. § 2326; Defense Federal Acquisition Regulations Supplement subpart 217.74.

contracting officers had to be brought up to speed on work and issues and would sometimes ask the contractor to resubmit information in formats different from those previously required. A PCO official agreed that turnover in contract staff impacted project progress, and another noted that the contracting office in Iraq lacked sufficient staff and equipment, including computers, contract-writing software, and filing cabinets. This official also noted that some of the staff assigned as contracting officers lacked experience with the type of projects PCO awarded.

- *Unpredictable costs:* According to PCO officials, inflation in Iraq has led to a situation where local labor and materials are in high demand and short supply. Contractors have stated that the number of qualified Iraqi contractors capable of undertaking some reconstruction work is limited. Additionally, PCO officials noted that inflation in the cost of labor and basic materials such as concrete and pipe had raised projected project costs. For example, a U.S. contractor cited increases in the cost of camps, transportation, and specialized labor such as experts in unexploded ordnance investigation and disposal. The contractor expected costs to increase because the demand for these specialized services likely exceeded the supply.
- *Poor site conditions:* Contractors found some project sites inadequate or unusable. For example, one proposed site in northern Iraq for a new water treatment plant was flooded as a result of a break in a nearby irrigation dike. The project was delayed while the site was drained. One contractor had to redesign a proposed project when it found newly constructed houses and a school near the proposed project's right of way. Contractors also encountered unanticipated sewer blockages and additional treatment equipment requiring repair.
- *Unclear site ownership:* Unclear ownership has delayed projects. In some cases, Iraqi ministries have proposed sites where contractors subsequently found squatters with competing property claims. In these situations, U.S. contractors halted work until the ministry could provide a usable site. For example, a water treatment plant in central Iraq was delayed until a junkyard and squatters were removed. In southern Iraq in March 2005, a PCO contractor was working to relocate families living in water pump stations. A landfill project in central Iraq encountered site selection difficulties stemming from both unclear land ownership and environmental concerns. Two proposed sites had ownership issues, and the third proposed site was environmentally infeasible due to a high groundwater level. USAID cancelled the project, estimated to cost \$20 million if completed, as a result of these

site issues. In all, about \$4.1 million was budgeted for this project as of June 2005. These funds include costs to design the landfill for the ultimately unusable site, but were also used for equipment that will be stored and used at other projects.

Iraq's Lack of Capacity to Operate and Maintain U.S.-Funded Projects Led to Inoperable Facilities and Greater U.S. Focus on Improving Project Sustainability

As of June 2005, U.S.-funded water and sanitation projects representing about \$52 million of the approximately \$200 million in completed projects were either not operating or were operating at lower capacity. In late August 2004, U.S. contractors and agencies identified several areas in which Iraqi capacity to maintain and operate reconstructed facilities needed improvement. U.S. concerns included problems with staffing, unreliable power to run treatment plants, insufficient spare parts, and poor operations and maintenance procedures. In late March 2005, State allocated \$25 million for up to 1 year of additional on site operations assistance and supply procurement at USAID's completed projects. In addition, U.S. agencies have begun risk forecasting and interagency planning efforts to address current and potential problem areas. However, the large-scale construction projects yet to be completed remain at risk due to staff and resource shortages.

Completed Projects Lack the Resources to Operate at Intended Capacity

As of June 2005, USAID's contractor Bechtel had completed approximately \$200 million in projects under its two contracts; however, projects costing about \$52 million could not be commissioned or their capacity had been diminished due to the theft of key equipment, inadequate Iraqi staff, or inadequate supplies of electricity and treatment chemicals. For example, one wastewater plant repaired at a cost of \$5.8 million was partially shut down due to the theft of key electrical equipment from the plant. Two wastewater treatment plants costing about \$11 million lacked reliable supplies of electricity and diesel fuel for generators. These two plants had lacked these supplies since December 2004. An additional two wastewater plants, for which about \$24 million had been obligated, lacked adequate Iraqi staff to function continuously or had inadequate supplies of reliable electricity. Finally, all the water plants repaired in one southern Iraq governorate lacked the water treatment chemicals and supplies needed for proper operation. The United States obligated \$10.4 million for repairs to these plants in southern Iraq.

U.S. Agencies Included
Training and Capacity
Development
Requirements in Contracts
and Identified
Sustainability Issues

The United States incorporated training programs and capacity development into its reconstruction program beginning in 2003. USAID's Phase I reconstruction contract required Bechtel to involve government ministries in implementing reconstruction projects and to provide technical assistance and training to build Iraqi capacity. In addition, PCO contract provisions require WGI/B&V and FluorAMEC to provide operations and maintenance training and manuals and be available for additional support for 90 days following project completion. PCO also awarded two task orders that more explicitly include capacity development efforts. In July 2004, PCO awarded a task order for water conservation and network repair to address the numerous leaks in Iraq's water mains. As part of this effort, the contractor is surveying training needs, providing on-the-job and classroom training to Iraqi ministry staff, and improving management tools and systems. In January 2005, PCO awarded another task order to provide systems development, professional mentoring, and technical training to the Iraqi Ministry of Municipalities and Public Works in eight governorates.

Bechtel began to report concerns about institutional strengthening in Iraq beginning in August 2004 and provided a detailed assessment of the issue in December 2004. In August 2004, Bechtel noted to USAID that the sustainability of water projects was a critical concern in its reconstruction efforts. In December 2004, Bechtel submitted a paper to USAID that provided detailed information on areas it considered crucial to ensuring the sustainability of water and sanitation projects being completed under its Phase I contract. These include:

- *Staffing:* Bechtel estimated that water and wastewater plants had only about one third of the staff needed. These plants lacked the staff to operate 24 hours per day and were shut down at night. Day staff included a significant number of temporary employees and "day laborers."
- *Lack of electrical power and diesel fuel:* The unreliable Iraqi electrical grid required some plants to run on backup generators. However, generators needed diesel fuel to power them, and the fuel was not always available.
- *Spare parts:* Bechtel's Phase I contract with USAID did not provide funding for spare parts for rehabilitated plants. Without these spares or the funds to buy them, Iraqi staff would likely have to cannibalize parts of the facility, borrowing parts from one machine to repair others.

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- *Poor operating practices:* Equipment was not being operated or maintained correctly. For example, filters were not cleaned, and chlorine and alum dosing equipment was available but not used.
 - *Lack of maintenance programs:* Iraqi staff did not undertake repairs until a situation became critical. One facility, a key pumping station for a city in southern Iraq, had to be taken completely offline to allow for repairs.

In early 2005, a working group of State, USAID, PCO, and U.S. Army Corps of Engineers officials assessed operations and maintenance problems in the water sector. According to the group, much of the Iraqi workforce was comprised of day laborers with little operations capability, and operations managers were often political appointees with little or no water sector experience. According to the working group's assessment, most water and sewage treatment plants were the joint responsibility of the Ministry of Municipalities and Public Works and the local municipalities or governorates, which complicated the division of responsibility for the plants. Further, procurement and supply issues led to severe capacity limitations due to shortages of electricity, diesel fuel, and chemical supplies.

U.S Agencies Have Increased Efforts to Support Iraqi Operations and Management, but Future Sustainability Is Unclear

In response to problems with completed water and sanitation projects, U.S. agencies undertook efforts to provide additional support for Iraqi operations and management. First, State increased funds to support the operation of water and sanitation facilities after their turnover to Iraqi authorities. In late March 2005, nearly 7 months after the initial USAID contractor report of sustainability concerns, State reallocated funding from an electrical generation project and provided \$25 million to USAID to support the operations, maintenance, and logistics at USAID's recently completed water and sanitation projects for up to 1 year. According to USAID, Bechtel will hire local Iraqi companies to provide these services. In proposing the reallocation, the U.S. embassy in Iraq noted that it was moving from the previous model of building projects and turning them over to Iraqi management toward a "build-train-turnover" system to protect the U.S. investment in Iraq's infrastructure. State has not committed funds for similar support at other USAID and PCO water and sanitation projects.

Second, in March 2005, PCO provided \$10.3 million to CH2M Hill/PWI for a capacity development initiative, a 12-month effort in eight governorates that will include workshops, courses, and hands-on training. Areas addressed will include baseline service assessments, operations and

maintenance planning and budgeting, project management, planning and design, finance and administration, water quality, and communications. The initiative also requires CH2M Hill/PWI to work with Iraqi ministry staff on management efforts such as strategic planning, facility design processes and standards, and international donor coordination.

Third, in April 2005, PCO began using a formal risk matrix to evaluate the potential risk of failure for strategic and high-cost projects after their handover to Iraqi management and to direct support to where it is needed. Prior to project completion, PCO's sector contractors will assess five factors and calculate a score that estimates the probability a reconstruction project will not function as intended. Two of the five factors are the quality of PCO's construction activities and the completion of PCO's required operations and maintenance training and documentation. PCO officials consider these factors to be under their direct influence and therefore the least susceptible to failure. According to PCO officials, the remaining three factors present the greater risks: (1) the ability and commitment of Iraqi facility operators and management to perform required operations and maintenance procedures, (2) management support of operations and maintenance efforts, and (3) adequate funding and direction from Iraqi ministries. PCO has not set a threshold score whereby a high risk factor would delay the handover.

Finally, in May 2005, State/IRMO, USAID, PCO, and the U.S. Army Corps of Engineers formed an interagency working group to identify ways of addressing Iraq's capacity development needs. The working group is in its early stages, and it is unknown what direction their recommendations may take. PCO has identified potential future steps: (1) provide a year of additional operations and maintenance support similar to what USAID will provide for its Phase I projects, (2) expand its training effort with the Iraqi Ministry of Municipalities and Public Works to all Iraqi governorates, and (3) extend the capacity development initiative beyond the 12 months currently planned.

Despite these efforts, the long-term outlook for sustaining reconstructed Iraqi facilities remains unclear. USAID's \$25 million program provides initial support for capacity development, but many of these efforts are in their early stages. In addition, facilities at risk of failure could still be handed over to Iraqi management. The initial U.S. experience with projects completed under USAID's Phase I contract and PCO's risk assessment have shown that Iraqi ministry capacity remains an obstacle to program success. U.S. agencies have obligated about \$1.2 billion in U.S. appropriated funds for projects they expect to complete between mid-2005

and 2008. These projects will require more trained staff, skilled managers, spare parts, and supplies to function effectively.

Conclusion

The United States has obligated about \$1.8 billion in appropriated funds to restore Iraq's water and sanitation infrastructure and has made some progress in a challenging security environment. However, it is difficult to determine the overall progress and impact of U.S. efforts because of limited performance data and measurements. These limited performance data and measurements in turn make it difficult to assess the effectiveness of U.S. water and sanitation reconstruction efforts. State has primarily reported on the numbers of projects completed and the expected capacity of reconstructed treatment plants. However, these data do not provide information on the scope and cost of individual projects nor do they indicate how much clean water is reaching intended users as a result of these projects. Information on access to water and its quality is difficult to obtain in an insecure environment and without water metering facilities. However, opinion surveys assessing Iraqis' access and satisfaction with water and sanitation services have the potential for providing important data to measure the impact of U.S. reconstruction efforts. Moreover, the United States has funded most water and sanitation reconstruction assistance in Iraq to date. As a result, progress and benefits measured through the use of surveys and other data collection methods are more easily attributed to U.S. efforts.

Iraqis have been unable to operate and maintain U.S.-funded water and sanitation facilities due to a lack of reliable power, trained Iraqi staff, and required chemicals and supplies. In response, U.S. agencies have taken initial steps to improve Iraqi capacity to operate and maintain water and sanitation facilities. However, these efforts are just beginning. It is unclear whether the Iraqis will be able to maintain and operate both completed projects and projects expected to be completed through 2008 for which the U.S. has obligated more than a billion dollars. Without assurance that Iraqis have adequate resources to maintain and operate completed projects, the U.S. water and sanitation reconstruction program risks expending program funds on projects with limited long-term impact.

Recommendations for Executive Action

To more accurately report the results of U.S. reconstruction efforts in water and sanitation, we recommend that the Secretary of State establish indicators and measures to assess how the U.S. efforts are improving the quality and quantity of water and sanitation services in Iraq. For example, State could include information on project scope and cost in its reporting

on numbers of projects under way and completed. State could also include surveys that measure Iraqis' access to water and sanitation facilities and their satisfaction with these services in selected geographic areas that are served by larger-scale U.S. reconstruction efforts. Efforts to develop performance measures should take into account the challenges in collecting data in a difficult security environment.

To help ensure that projects funded by U.S. appropriations operate at their intended capacity and provide benefits to the Iraqi people after their completion, we recommend that the Secretary of State work with Iraqi ministries to assess the resources needed to operate and maintain new and repaired water and sanitation facilities before they are turned over to Iraqi management and, afterwards, work with the Iraqi government to ensure that Iraq has these resources.

Agency Comments

We provided a draft of this report to the Departments of Defense and State and the U.S. Agency for International Development.

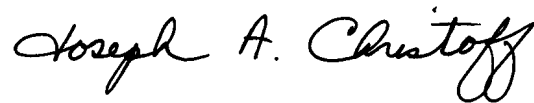
The Department of State provided written comments, which are reprinted in appendix II. State agreed with our recommendations and stated that it is refining its performance metrics and working with the Iraqi government to assess the resources needed to sustain water and sanitation facilities. State also endorsed our main findings and provided additional comments to elaborate on its water and sanitation efforts in Iraq. State also provided technical comments, which we incorporated where appropriate.

The U.S. Agency for International Development also provided a written response, which is reprinted in appendix III. The agency stated that it is pleased that the report prominently mentions the importance of operations and maintenance in the water sector. USAID added that the report contributes to the discussion of next steps in Iraq reconstruction by clarifying the economic and social context of the management of public utilities in Iraq.

The Department of Defense did not provide written comments on our report; however, it provided technical comments, which we incorporated where appropriate.

We are sending copies of this report to interested congressional committees. We will also make copies available to others on request. In

addition, this report is available on GAO's Web site at <http://www.gao.gov>. If you or your staff have any questions, please contact me at (202) 512-8979 or christoffj@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix IV.



Joseph A. Christoff
Director, International Affairs and Trade

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United States Senate

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Appendix I: Objectives, Scope & Methodology

As part of GAO's review of reconstruction efforts in Iraq initiated under the Comptroller General's authority, we examined U.S. activities directed at rebuilding the water and sanitation sector. Specifically, we assessed (1) the funding and status of U.S. activities, (2) U.S. efforts to measure progress, (3) the factors affecting the implementation of reconstruction activities, and (4) the sustainability of U.S.-funded projects. To accomplish our objectives, we relied primarily on U.S. agency and contractor reporting. We also met with agency and contractor officials in the United States. Although we did not travel to Iraq, we interviewed U.S. officials based in Iraq by telephone, exchanged information through email, and met with contractor officials in the United States who had spent time in Iraq. We also reviewed U.S. government-funded surveys that document Iraqi perceptions of the quality and quantity of water and sanitation services.

In assessing resources supporting the reconstruction of Iraq, we focused on the sources and uses of U.S., Iraqi, and international funding. U.S. agencies provided us with electronic data files for appropriated funds, the Development Fund for Iraq (DFI), vested assets, and seized assets. These files generally included objective or project descriptions with allocated, obligated, and disbursed amounts. We assigned each of the funding line items to broad categories based on the descriptive information available in the data files. To assign the data to a category, we relied on project descriptions from agency data files.

In addressing the amount of U.S. funds that have been appropriated, obligated, and disbursed for the Iraq reconstruction effort, we collected funding information from contractors, the Department of Defense (DOD), including the Project and Contracting Office (PCO); Department of State; and the U.S. Agency for International Development (USAID). Data for U.S. appropriated funds are as of end June 2005. We also reviewed Special Inspector General for Iraq Reconstruction reports, and Office of Management and Budget documents. Although we have not audited the funding data and are not expressing our opinion on them, we discussed the sources and limitations of the data with the appropriate officials and checked them, when possible, with other information sources. We determined that the data were sufficiently reliable for characterizing water and sanitation projects. To address international assistance for rebuilding Iraq, we collected and analyzed information provided by the State Department's Bureau of Economic and Business Affairs. We also collected and reviewed reporting documents from the International Reconstruction Fund Facility for Iraq (IRFFI). To assess the reliability of the data on the pledges, commitments, and deposits made by international donors, we interviewed officials at State who are responsible for monitoring data

provided by the IRFFI and donor nations. We determined that the data on donor commitments and deposits made to the IRFFI were sufficiently reliable for the purposes of reporting at the aggregate level.

To determine the status of U.S. activities in the water and sanitation sector, we reviewed documents obtained from the former CPA, the State Department, PCO, USAID, and agency contractors. Specifically, we reviewed contracts, task orders, status reports, and planning documents prepared by USAID, the former CPA, State, PCO, and contractors. We also interviewed USAID, State, and PCO officials and their contractor representatives. We focused on the five major USAID and PCO contracts for water and sanitation implemented by U.S. contractors because they received the majority of U.S. appropriated funds. We report progress data as of the end of June 2005. Funding data for the major contracts has been reported as of the end of March for USAID contracts and end of June for PCO contracts.

To assess U.S. efforts to measure progress we reviewed planning documents from the CPA and State, and agency reporting documents from PCO, USAID, and State. We also contacted agency officials for clarification of some of this data and further information in evaluating its effectiveness in determining the impact of the U.S. program. We reviewed the methodology of the *Iraq Quality of Life Survey* and contacted contractor officials to review the methodology and survey limitations. The USAID contractor did not conduct cross-checks for the internal consistency of responses on water supply, but the satisfaction data reported in the survey are analogous to the findings on access reported in the earlier UN/World Bank and USAID/Bechtel assessments. We determined that the survey data was sufficiently reliable to report in the quartile bands used in this report.

To determine the factors affecting the implementation of reconstruction activities, we reviewed contractor and agency reporting and interviewed agency officials in the United States and Iraq. Specifically, we reviewed agency and contractor reports, and we interviewed USAID, State, and PCO officials and contractor representatives in the United States and in Iraq. We reviewed the data for discrepancies, interviewed officials familiar with the data collection, and determined that the information from these sources was sufficiently reliable to meet our reporting objectives.

To determine the sustainability of U.S.-funded projects, we reviewed agency contracts, contractor reporting, and agency reporting. Specifically, we reviewed USAID, PCO, and contractor reports, and we interviewed USAID, State, and PCO officials and contractor representatives in the

United States and in Iraq. We determined that the information from these sources was sufficiently corroborated and reliable to meet our reporting objectives.

We conducted our review from September 2004 through August 2005 in accordance with generally accepted government auditing standards.

Appendix II: Comments from the Department of State



United States Department of State
Assistant Secretary and Chief Financial Officer
Washington, D.C. 20520

SEP - 6 2005

Ms. Jacquelyn Williams-Bridgers
Managing Director
International Affairs and Trade
Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548-0001

Dear Ms. Williams-Bridgers:

We appreciate the opportunity to review your draft report, "REBUILDING IRAQ: U.S. Water and Sanitation Efforts Need Improved Measures for Assessing Impact and Sustained Resources for Maintaining Facilities," GAO Job Code 320316.

The enclosed Department of State comments are provided for incorporation with this letter as an appendix to the final report.

If you have any questions concerning this response, please contact Tom Gramaglia, Desk Officer, Bureau of Near Eastern Affairs, at (202) 647-4065.

Sincerely,

A handwritten signature in black ink, appearing to read "S. Kaplan".

Sid Kaplan (Acting)

cc: GAO – Michael Simon
NEA – David Welch
State/OIG – Mark Duda

**Department of State Comments on GAO Draft Report
REBUILDING IRAQ: U.S. Water and Sanitation Efforts Need
Improved Measures for Assessing Impact and Sustained Resources for
Maintaining Facilities
(GAO-05-872, GAO Code 320316)**

Thank you for the opportunity to comment on your draft report entitled “REBUILDING IRAQ: U.S. Water and Sanitation Efforts Need Improved Measures for Assessing Impact and Sustained Resources for Maintaining Facilities.”

The Department of State welcomes the GAO report on the U.S. reconstruction program in Iraq’s water and sanitation sector and endorses its main findings. Over the past several months, the staff of the Iraq office in the Department’s Bureau of Near Eastern Affairs (NEA/I) worked closely with the GAO team to assist in the latter’s efforts to evaluate our progress in this sector. We are grateful for the cooperative relationship that resulted between the GAO team and NEA/I.

The Iraq Relief and Reconstruction Funds (\$20.9 billion) are designed to assist in the emergence of an independent, stable, and prosperous Iraq, with a freely-elected representative government, at peace with its neighbors, whose people can enjoy the freedoms denied under Saddam Hussein while benefiting from the rewards of a market economy. This strategy requires assistance to help Iraq develop the capability to provide for its own security, improve its economy and begin to establish justice and the rule of law.

In the water and sanitation sector, the U.S. reconstruction program includes the following activities:

- We are completing water treatment plants and sewage treatment plants to benefit millions of Iraqis, and we have begun training Iraqis to operate and maintain them. For example, USAID has completed rehabilitation or expansion on 5 large-scale water treatment plants and 14 compact water treatment plants.
- Prior to reconstruction, over 70% of all sewage flowed untreated into rivers and streets. USAID has rehabilitated all three sewage treatment plants in Baghdad and plants in Hillah, Najaf, Diwaniyah and Basrah,

benefiting millions of Iraqis. We are also rehabilitating a major sewage treatment plant in Karbala.

- USAID's Rural Water Supply Initiative will provide wells, treatment plants, or storage facilities for 550,000 Iraqis living in rural areas where water is scarce or brackish.
- The U.S. is assisting Iraq's development of a national plan for the management of water resources for consumption, irrigation, hydroelectric power generation, and restoration of the Iraqi marshes, which were deliberately drained by Saddam.
- Capacity development of the Iraqi water ministries is a priority. USAID has commenced a training program in operations and maintenance of reconstructed water treatment plants; in addition, the Department of Defense's Projects and Contracting Office has commenced two capacity development programs for ministry and plant personnel.

Despite our progress in the water and sanitation sector, we agree with the GAO's recommendations and have already begun to implement them:

Recommendation #1: The State Department is currently refining performance metrics in the water and sanitation, as well as other sectors, to track reconstruction progress in greater detail and accuracy. We are implementing several metrics especially related to how our projects affect the Iraqi population (such as access to potable water).

Recommendation #2: The State Department is currently working with the Iraqi government to assess the additional resources needed to operate and maintain water and sanitation facilities that have been constructed or repaired by the U.S.

As the GAO report illustrates, poor security, inflation, unanticipated site conditions, uncertain ownership of project sites and other factors have adversely affected the U.S. water and sanitation reconstruction program. Despite these challenges, the Department of State is committed to working closely with the Iraqi government for successful and sustainable implementation of the program.

Appendix III: Comments from the U.S. Agency for International Development



USAID
FROM THE AMERICAN PEOPLE

August 30, 2005

Mr. Joseph A. Christoff
Director, International Affairs and Trade
U.S. Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Christoff:

Thank you for this opportunity to provide the U.S. Agency for International Development's (USAID) formal response to the draft GAO report entitled *Rebuilding Iraq: U.S. Water and Sanitation Efforts Need Improved Measures for Assessing Impact and Sustained Resources for Maintaining Facilities* [GAO-05-872].

USAID is pleased that the report prominently mentions the importance of operations and maintenance (O&M) in the water sector. The resources required for O&M are indicative of the challenge of reconstruction in any country. The GAO report contributes to the discussion of next steps in Iraq reconstruction by clarifying the economic and social context around the management of Iraqi public utilities.

We appreciate this opportunity to respond to the GAO draft report and for the courtesies extended by your staff in the conduct of this review.

Sincerely,

A handwritten signature in black ink, appearing to read "S. G. Wisecarver".

Steven G. Wisecarver
Acting Assistant Administrator
Bureau for Management

U.S. Agency for International Development
Office of Iraq Reconstruction
1300 Pennsylvania Ave. N.W.
Washington DC 20523

Tel: 202-712-0448
Fax 202-216-3872

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

Joseph A. Christoff, Director (202) 512-8979

Staff Acknowledgments

John Hutton (Assistant Director), Monica Brym, Aniruddha Dasgupta, Charles D. Groves, B. Patrick Hickey, Sarah Lynch, Michael Simon, and Audrey Solis made key contributions to this report. Sharron Candon, Lynn Cothorn, Martin De Alteriis, Judy McCloskey, and Judith Williams provided technical assistance.

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