



Special Inspector General for Iraq Reconstruction

Iraq Reconstruction

Lessons in Inspections of U.S.-funded Stabilization and Reconstruction Projects

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*The official version of this report, including any corrections, is available on the SIGIR website: www.sigir.mil.

Part I: Background

The early phase of the U.S. reconstruction effort in Iraq emphasized the construction of large capital projects to help restore infrastructure and return service delivery to pre-war levels. To provide independent and objective oversight of these efforts, the U.S. Congress, in November 2003, established the Coalition Provisional Authority (CPA) Inspector General (IG). In October 2004, the Congress redesignated the CPA-IG as the Special Inspector General for Iraq Reconstruction (SIGIR), subsequently giving it oversight of all reconstruction funding in Iraq.

During his initial visits to Iraq in the early months of 2004, the Inspector General heard conflicting stories about U.S.-funded stabilization and reconstruction projects. On the one hand, U.S. agencies and private construction companies reported that renovation and construction projects were already improving the lives of millions of Iraqis. But many Iraqis and some U.S. military and civilian personnel registered numerous complaints about the program. They pointed to unfinished or unwanted projects and to equipment that was either too sophisticated or of very poor quality.

Over the next year, SIGIR auditors uncovered many projects that were inadequately designed, constructed, or sustainable. With billions of taxpayer dollars at stake, the Inspector General took action to address these manifold deficiencies and to inform the Congress about the tenuous status of the overall reconstruction program.

In June 2005, the Inspector General created the Inspections Directorate to provide rapid reporting on reconstruction work being performed at project sites. The new Inspections Directorate would complement and augment SIGIR's Audits and Investigations Directorates.

Over the succeeding five years, SIGIR inspection teams visited 158 project sites throughout the country to determine the following:

- Were projects properly designed?
- Were projects built in accordance with contract specifications?
- Were adequate contractor quality control (QC) and government quality assurance (QA) in place?
- Was Iraqi sustainability considered and planned for?
- Were projects likely to meet their stated objectives?

SIGIR's inspectors focused on whether the projects they visited would provide the GOI the results anticipated in the original contract. SIGIR's inspectors selected projects from across the various reconstruction sec-

tors, from large and small contractors (including U.S., Iraqi, and third-country contractors), from different geographic areas, from each of the major U.S. agencies, and from different funding sources. SIGIR also inspected projects at the direct request of Department of State officials, military commanders, and Iraqi officials.

Security conditions on the ground sometimes limited SIGIR's capacity to conduct on-site project assessments. For example, because of security threats, SIGIR had to cancel visits to 18 project sites between June 2005 and August 2008. In 2008, General David Petraeus, the Multi-National Force-Iraq Commanding General, authorized SIGIR inspectors to travel under fragmentary orders, which ensured access and transport to all sites selected for inspection.

In all, SIGIR issued 170 reports, providing detailed snapshots of a wide spectrum of reconstruction projects valued at \$2.1 billion. Of these projects, 116 were ongoing at the time of the site visit, while 54 were completed. SIGIR also issued two summary reports covering 96 limited inspections performed for SIGIR by contractors and one summary report of SIGIR inspections issued from July 2005 through April 2008. These reports are all found at www.sigir.mil. Appendix A of this report provides details on SIGIR's inspections by location, reconstruction sector, funding source, and type of inspection. Appendix B lists all of the projects SIGIR inspected.

SIGIR referred design, construction, QC and QA, and sustainability deficiencies identified in its inspections to the appropriate relief and reconstruction agencies for corrective action. Potentially fraudulent matters were referred to SIGIR investigators for analysis, investigation, and possible action by the Department of Justice. In 2008, for example, SIGIR's inspections at the Sarwaran Primary School and the Binaslawwa Middle School revealed illegal activity on the part of two Korean Army officers who had authorized terms in a contract to require the use of prohibited Iranian plumbing parts. The matter was referred to SIGIR Investigations, and the two officers were eventually prosecuted and convicted in a Korean military court.

Part II: Best Practices Developed from SIGIR's Inspections Program

Much of the reconstruction program in Iraq was carried out literally under fire. Projects were frequently inhibited by the violent agenda of those who wanted the fledgling democracy in Iraq to fail.

Project sites and Iraqi workers throughout the country were targeted by Shia extremists, Saddam loyalists, terrorists, al-Qaeda, rogue militias, and wanton criminals. The project site for the Basrah Children's Hospital became a locus for threats, intimidation, kidnapping, and murder. At least 24 Iraqi construction workers were killed while building what was intended to be a pediatric oncology hospital.

Like many of the war-zone reporting systems that SIGIR developed, the Inspections Directorate was without precedent in the U.S. Inspector General community. The following are some best practices identified by SIGIR for conducting inspections in a contingency environment.

1. Provide reconstruction officials with near real-time reporting.

Traditional audit agencies generally perform audits at the completion of a program or project. Consequently, these reports document past problems without providing an opportunity for in-progress solutions. Time moves fast in war zones. Reconstruction officials cannot wait long for published reports to correct deficiencies. SIGIR sought to meet this need by rapidly producing a high volume of inspection reports.

At the beginning of the Iraq reconstruction effort, the U.S. emphasis was on putting Iraqis to work and completing projects quickly. But reconstruction officials benefited little from being told, after a building was completed and turned over to the GOI, that the design was inadequate or that construction deficiencies existed. With this in mind, SIGIR sought an approach that provided nearly real-time reporting, requiring its inspectors to give on-the-spot guidance to management as soon as problems were discovered.

SIGIR's inspection reports identified deficiencies, but also included details of corrective actions already taken as a result of the interactions between SIGIR and reconstruction managers. For example, at the time of SIGIR's first site visit at the Abu Ghraib Dairy project, inspectors identified serious design and construction deficiencies (when work was only about 30% complete). SIGIR immediately raised the issues with the officials overseeing construction, and they quickly issued a stop-work order, requiring the contractor to correct the deficiencies.

SIGIR conducted a follow-up site visit, documenting the contractor's corrective actions.

2. Team engineers with auditors.

A comprehensive review of contingency brick-and-mortar reconstruction projects requires experienced engineers and auditors. Within SIGIR's project inspection regime, engineers were responsible for the technical aspects of the project—reviewing statements of work and contractor design submittals and evaluating the adequacy of construction quality—while auditors focused on contract costs and project status.

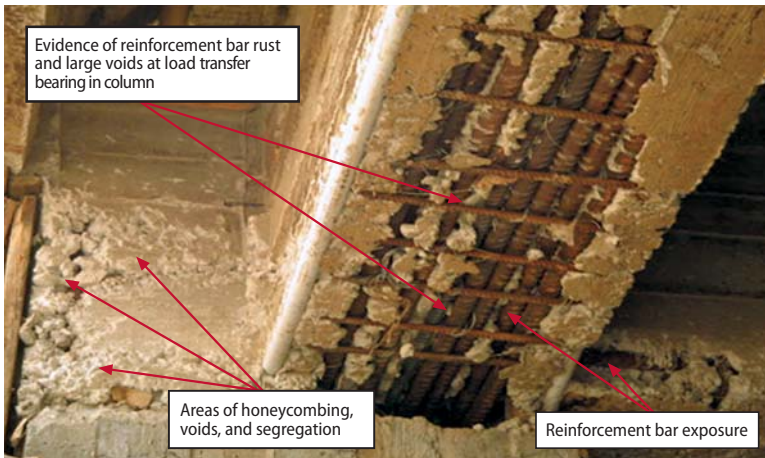
Because Iraq's reconstruction program presented a wide spectrum of projects—including hospitals, police stations, schools, prisons, dams, and water treatment plants—SIGIR sought professional engineers with construction backgrounds who understood design drawings, construction practices, and the interdependencies of building systems. Auditors needed expertise in contract management and administration—including specific experience with various contracting vehicles (such as firm-fixed-price and cost-plus contracts), the Federal Acquisition Regulation requirements, and contractor QC programs. The teaming proved quite effective.

3. Report on complex technical topics in accessible language.

Reports must be written for readers who do not have an engineering or construction background. Most people, for example, would need an explanation for construction terms such as “honeycombing,” which refers to the formation of air pockets in concrete because of poor placement technique—specifically, the lack of proper vibration during and immediately following the actual pour. Engineers and auditors should write assessment reports in a non-technical manner, with editors providing a readability check. Real-time reporting is not of much use if text is inscrutable.

4. Use graphics to explain complex engineering issues.

Project photographs and diagrams can help document the quality of construction and aid in the explanation of complex engineering terms. For example, SIGIR identified concrete quality as a significant issue with several Iraqi contractors and subcontractors, especially at the five Kirkuk primary healthcare centers and the Baghdad Police College project site. In addition to providing descriptions of construction terms, such as honeycombing, segregation, voids, and reinforcement bar



An example of SIGIR report illustrations: honeycombing, segregation, voids, and reinforcement bar exposure within the central laundry facility at the Baghdad Police College.

exposure, inspection reports included photos of potentially significant structural concerns, clearly illustrating the problems being described.

5. Prepare for rapid but effective inspections.

Inspectors in the United States can spend weeks performing assessments of construction projects, but contingency operations require faster work and quicker production. In most cases, because of the security situation, SIGIR inspectors had between 30 minutes and 2 hours on site to perform expedited inspections. Instead of searching every nook and cranny, inspectors focused on ensuring that a facility was structurally sound and constructed according to the established design. SIGIR used its time at the project site to speak to the contractor, tour the facility, and ask pertinent, project-specific questions. Prior to visiting the project site, SIGIR engineers created detailed checklists of specific features to be inspected (such as generators; heating, ventilating, and air-conditioning systems; and completed concrete pours), which increased the efficiency of the site visit.

6. Whenever possible, visit project sites in person.

To report fully on the condition of a construction project, an actual visit to the project site is essential. Physical inspection can reveal potential problems that cannot be determined simply from an examination of the project file. For example, according to the project file documentation

and representatives of the U.S. Army Corps of Engineers (USACE) Gulf Region Division, the Baghdad Police College was a successful project with thousands of satisfied police cadets living in the barracks. SIGIR's site visit, however, identified a very poorly constructed project that exposed cadets to diluted urine and fecal matter flowing from floor to floor, presenting a serious health risk.

7. Visit as many projects as possible early in the construction phase.

The Inspections Directorate focused on promoting effective change in at-risk, ongoing projects. Therefore, SIGIR determined that it could provide high value by assessing projects still being constructed. Projects in the design and early construction phase (approximately 30% complete) were the ideal choices because there was still time for reconstruction officials to take corrective actions to resolve critical problems.

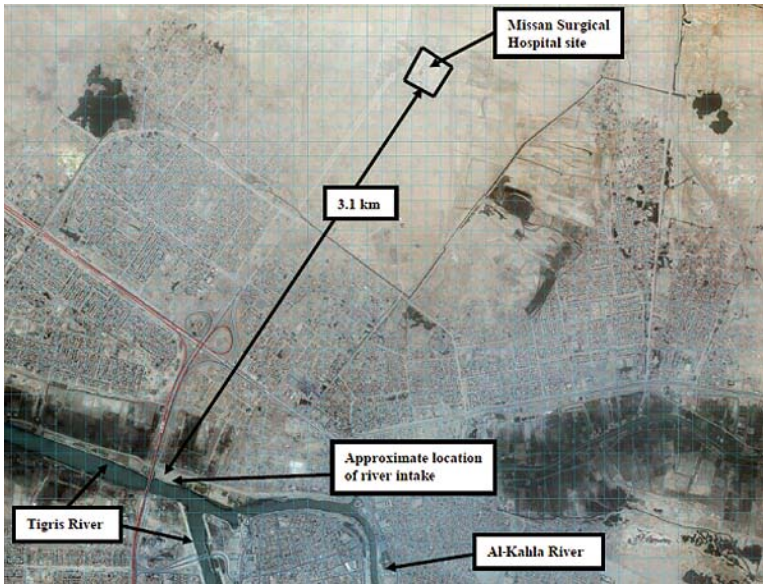
8. Develop alternative approaches to executing inspections.

Some of the projects SIGIR chose to evaluate were located in remote or dangerous areas. The Inspections Directorate established a small unit to assess these projects through use of aerial imagery. SIGIR worked with the National Ground Intelligence Center and National Geospatial-Intelligence Agency to obtain imagery, imagery analysis capability, and equipment, and to establish its own capabilities. SIGIR commonly employed satellite imagery to document the location of a specific project in relation to a village, town, or city to visually demonstrate the benefit of the project to the local community. In some instances, SIGIR used satellite imagery to show the lack of proper planning for a project.

Satellite imagery can also illustrate the condition of a specific project before, during, and after construction, providing:

- maximum coverage, with limited oversight resources
- ability to triage high-risk targets
- increased safety, minimizing the amount of in-country travel and the risk to contractors from hostile action that could result from high-visibility site visits by inspection teams and their accompanying security details

To ensure the broadest possible coverage of all construction sites in Iraq, SIGIR also used local Iraqi engineers to visit remote project sites. Because of their familiarity with the country, the Iraqis could visit project sites in an unobtrusive or clandestine manner. They conducted 96 limited on-site inspections of remote and dangerous project sites



Aerial view of the water lines to be run from the river intake to the Missan Surgical Hospital. (National Geospatial-Intelligence Agency photo)

nationwide and identified and documented plumbing, electrical, finishing, and other types of construction deficiencies. The Iraqi engineers also conducted general inspections of project construction sites, noting deficiencies, assessing progress, and taking photographs. SIGIR engineer-auditor teams then reviewed this documentation for contract compliance and construction quality.

9. Support the host government's IG system.

From its origin, SIGIR has been a key supporter of the Iraqi Inspector General system. Prior to 2003, Iraq lacked an independent IG system. Thus, the new IGs came to their posts without any prior experience. To familiarize them with the roles and responsibilities of an IG, SIGIR's Inspections Directorate provided mentoring and training to the staffs of IGs from the Ministries of Defense, Interior, Oil, and Health. SIGIR also met with Ministry of Defense IG staff to explain its project assessment methodology and, together with ministry IG officials, conducted a "co-inspection" of a U.S.-funded renovation of a Ministry of Defense facility. In addition, SIGIR attended and made training presentations at monthly Iraqi IG meetings.

10. Always consider sustainability in assessing reconstruction projects.

A host nation's capacity to operate and sustain projects is key to the overall success of a reconstruction program. In late 2006, as the Iraq reconstruction program matured and thousands of projects were being turned over to the GOI, SIGIR began conducting sustainment assessments of completed projects to determine whether the GOI was adequately operating and sustaining them. SIGIR inspected completed projects to determine if the projects were at full capability or capacity when accepted from the contractor by the U.S. government, when transferred to the GOI, and when observed by SIGIR inspectors during site visits.

SIGIR performed 54 sustainment assessments with a total contract value of approximately \$900 million. Of these 54 projects, SIGIR identified 42 projects with deficiencies, including 14 having what SIGIR considered "major" deficiencies that—if left unaddressed—placed the projects in jeopardy of failure.

11. Engage with host-country end users and government officials when developing the reconstruction program.

GOI officials repeatedly expressed to SIGIR frustration that the U.S. government had constructed facilities that Iraq did not want or need or that training, operation manuals, and spare parts were not provided. SIGIR interacted regularly with GOI officials to determine the Iraqi government's interest and satisfaction levels with specific projects. A lesson learned from this exercise was the need to have GOI officials involved in the decision-making process. The U.S. government needed to better coordinate with the GOI on the types and locations of facilities to be constructed and on the planning to provide training and equipment to operate and sustain the projects.

12. Establish working relationships with all parties involved in the reconstruction effort.

SIGIR established good working relationships with the Department of State, Department of Defense, USACE, and other Coalition forces. Ambassadors Ryan Crocker, Christopher Hill, and James Jeffrey; Commanding Generals David Petraeus and Raymond Odierno; and various USACE commanding generals supported SIGIR by providing transport to and security at construction sites. General Petraeus went so far as to tell SIGIR, "you pick the project and we [the U.S. military] will get you there."



Construction official briefs Inspector General Bowen on the status of construction at the Nassiriya Prison.

Over the course of visiting hundreds of project sites, SIGIR received logistical support in strategic locations throughout Iraq from the U.S. military and also from Coalition partners, such as the British forces in the southern locales of Basrah and Umm Qasr. These relationships fostered a sense of community and saved U.S. taxpayers a significant amount of money.

13. Become an informational resource for reconstruction officials.

Multiple U.S. ambassadors in Iraq utilized SIGIR's capacity to get information on projects. For example, in late 2008, Ambassador Crocker became increasingly frustrated about the lack of progress with the Missan Surgical Hospital. Considering the cost and significance of this project, Ambassador Crocker was concerned about the contractor's commitment to complete the project on time and the GOI's ability to properly equip, operate, and maintain the facility once it was transferred to GOI control.

The Ambassador requested that SIGIR perform an assessment, including visiting the project site to determine construction progress and quality and meeting with U.S. and GOI officials to determine the ability of the GOI to operate and maintain the facility. SIGIR's assessment identified critical shortcomings, including lack of construction progress, construction deficiencies, significant design deficiencies and omissions, and the GOI's inability to equip and operate the facility once construction was completed. SIGIR's analysis provided reconstruction officials the opportunity to take corrective actions to save this critical project from failure.



SIGIR inspection team with British escort for project inspections in Basrah and Umm Qasr.

14. Perform assessments in all sectors throughout the country.

The United States spent billions of dollars attempting to rehabilitate and reconstruct Iraq's critical infrastructure, especially the electrical, water, health, and educational sectors. Instead of focusing attention on one specific sector, SIGIR diversified its selection of sites for assessment to deliver real-time information on all sectors to reconstruction staffs and officials. This approach also allowed engineers to improve the usefulness of inspection observations through greater familiarization with overall Iraqi and Middle Eastern design and construction practices.

15. Complement and augment existing audit and investigative functions.

Project assessments can play a key supporting role in audit and investigative work. For example, in 2004, SIGIR initiated an audit to determine if disbursing officers in the South Central Region of Iraq complied with applicable guidance and properly accounted for reconstruction funds. SIGIR auditors visited two project sites in late 2004 and early 2005, documenting contractor performance at a library in Kerbala and a police academy in Babylon.

SIGIR auditors identified indications of potential fraud and referred the matter to the Investigations Directorate. One of the areas of potential



Plastic chairs provided to the Kerbala Library in place of metal, upholstered chairs required by the contract.



Empty site at the Babylon Police Academy where a 1-megawatt generator was required to be installed by the contractor.

fraud included the contractor billing the U.S. government for work not performed or products not delivered.

SIGIR Investigations requested that the Inspections Directorate perform an assessment of the contractor's projects to determine if the contractor performed to contract requirements. SIGIR inspectors conducted follow-up reviews of these two project sites in December 2005 and found that the contractor had not met contract requirements. The collaborative efforts of SIGIR's Audits, Investigations, and Inspections Directorates resulted in the conviction for fraud of eight individuals associated with the award, construction, or oversight of these projects and forfeiture of approximately \$14.9 million.

Part III: Lessons Learned from Inspecting Projects in a Contingency Environment

During the course of its 170 project assessments, SIGIR's Inspections Directorate identified 13 essential lessons about project planning, execution, and oversight in a stabilization and reconstruction operation. For more details on many of the specific projects mentioned in this section, see Part V of this report. All projects are listed in Appendix B.

1. Achieve a secure environment before initiating major reconstruction activities.

In 2003, the United States initiated an ambitious reconstruction program in post-war Iraq. But large-scale construction projects began before the country was stabilized. This forced the U.S. military to simultaneously confront a growing insurgency while also supporting a burgeoning reconstruction operation.

Iraq's security environment posed lethal challenges for U.S. and Iraqi contractors. It sometimes was difficult or impossible for contractors to carry out projects in conflict areas. For example, aside from the more than \$165 million spent to construct and equip the Basrah Children's Hospital, the human cost of the project was grievous. More than 20 contractors were killed during the course of the project. The project's senior Bechtel Iraqi engineer resigned after his daughter was kidnapped. Numerous threats and intimidation, as well as poor security, led to the resignation of other workers and the boycotting of the project site by subcontractor personnel. The working environment became so dangerous that one subcontractor believed it necessary to use local militia-controlled gangs to protect his travel to and from the project site.

Crafting well-defined statements of work often was stymied because contracting personnel could not safely visit sites. For instance, the U.S. government awarded the Falluja Waste Water Treatment System project in June 2004, during the middle of intense military conflict between Coalition Forces and insurgents in the city of Falluja itself. Initial Coalition attempts to control the area had failed, and the city fell into lawlessness. This complex project required the design and construction of a comprehensive sewer network throughout the entire urban setting, but the contractor responsible for conducting geotechnical and survey work for the initial design repeatedly confronted local resistance. Moreover, the volatile security situation prevented U.S. quality assurance personnel from effectively monitoring construction progress and quality. The text



Condition of the city streets in Falluja in November 2004. (USACE photo)

from one of USACE's Construction Quality Assurance Operating Plans reported the situation candidly:

The difficulty with providing QA services within a war zone is recognized. Safety and security for our employees must come first, and access to some sites is not possible. Therefore, the extent of QA activities that can be performed at a site may be limited due to these factors.

SIGIR's 2006 inspection of five primary healthcare centers in Kirkuk revealed similar QA limitations. SIGIR found that, from December 2004 to February 2006, the USACE QA representative made only one visit to the five project sites because of security problems. SIGIR's assessment report of the projects identified numerous construction quality shortfalls, cost overruns, and schedule delays resulting from ineffective on-site management and the lack of adequate government oversight.

The escalation of violence in Iraq forced the U.S. government to mask evidence of any project's U.S. provenance. But this conflicted directly with one of the objectives of the U.S. reconstruction program—namely, to win the “hearts and minds” of Iraqis by providing essential services. The U.S. government's main goal for the primary healthcare program was to increase Iraqi access to good healthcare services and thereby garner the appreciation of Iraqi citizens. But in 2006, when SIGIR visited the Kirkuk project sites, a Sadrist flag, associated with Shia revolutionary cleric Muqtada al-Sadr, flew outside each facility. According to

USACE Gulf Region North District personnel, “if the locals knew the USG funded this project, they would blow it up. We let Sadr take credit for these projects in order for them to be built without incident.”

In areas where security was not a factor, projects were generally well constructed. Specifically, SIGIR found some of the best-constructed projects in provinces in the Kurdistan Region: Erbil, Dahuk, and Sulaymaniyah. The Erbil Orphanage and Senior Assisted Living Center was, without question, the best project SIGIR inspected. U.S. and GOI representatives directly credited the higher construction quality of projects in the Kurdistan Region to the low security threat in the area as well as to the Kurds’ strong work ethic.

The lesson learned is that reconstruction in a stabilization environment cannot proceed on a large scale without the requisite security needed to protect those carrying out the projects. If that security is either unavailable or too expensive, then large-scale reconstruction ought not to occur until the setting is stabilized.

2. Enforce contracts to reward good performance and hold poor performers accountable.

SIGIR found many instances in which contractors were rewarded—instead of penalized—for poor performance. For example, SIGIR’s assessments of the Baghdad Police College project identified myriad construction deficiencies by the contractor, Parsons Delaware, Inc., whose construction practices were so poor that water and other waste materials continually drained through the top floor down into second-floor and ground-floor rooms.

Parsons performed this construction under a cost-plus-award-fee contract and thus was eligible to receive a base fee and an award fee for the project. Under cost-plus contracts, the base fee is always awarded, while the merit-based award fees are granted for performance that exceeds contract expectations. For the police college project, the contract established a base fee of 3% and a merit award fee pool of 12%.

Award fees are determined based on an Award Fee Determination Official’s evaluation of the contractor’s performance at regularly scheduled intervals. For the period October–December 2004, the U.S. government oversight official noted that:

Schedule was not adhered to as well as it should be. The milestones slipped on the major structure schedule... Parsons’ critical activities have not met established milestones deadlines. Parsons has been



Urine-filled light fixture in cadet barracks bathroom at the Baghdad Police College.

slow in mobilizing utilities... The DFAC [dining facility] was going to be delivered as a warm lit shell and not a usable facility...

Drawings submitted generated major comments from the technical staff. For example, Parsons was to design a DFAC that will service hundreds of soldiers. Yet, the layout seemed to have been designed without much thought or consideration for flow or traffic. Essentially, they designed to sub-par standards.

Daily reports met minimal expectations.

Even though the written justification documented many deficiencies, the U.S. government awarded Parsons 85% of the available merit-based award fee (approximately \$1.3 million), which equated to an overall rating of “Above Average.”

At the time of SIGIR’s assessment of the Baghdad Police College, the U.S. government had already awarded Parsons more than \$5.3 million in fees for this severely deficient project—a base fee of \$1,777,185, and an award fee of \$3,568,303.

3. Design projects in accord with the host nation’s capacity to maintain and sustain them.

During the early stages of the Iraq reconstruction program, the Coalition Provisional Authority—the post-war governing authority established under the United Nations’ mandate—adopted a strategy that

envisioned building state-of-the-art, large-scale capital projects. But these projects often turned out to be too sophisticated for the existing Iraqi capacity.

For example, one of the largest U.S.-funded projects in Iraq was the \$277 million Nassiriya Water Treatment Plant, which was designed to produce 10,000 cubic meters of potable water each hour. Although the project was well constructed by FluorAMEC, the Iraqis could not sufficiently sustain its operation. In December 2007, SIGIR visited the Nassiriya Water Treatment Plant and found it operating at just 20% of capacity. In addition, the plant staff had removed the flow meters—critical equipment for measuring actual total water output—because they did not know how to operate them. During a 2010 follow-up visit to the plant, SIGIR determined that Iraqi personnel had disconnected the Supervisory Control and Data Acquisition System because they did not know how to operate or maintain it.

4. If a project requires sophisticated equipment, encourage the host nation to contract for operations and maintenance with a qualified contractor until organic capacity is established.

The United States planned the Basrah Children’s Hospital as a state-of-the-art pediatric oncology hospital. This required the procurement, delivery, and installation of 8,000 pieces of equipment, including six pieces of very sophisticated medical equipment. Before delivery and installation of this advanced and very expensive equipment, the U.S. government and Project HOPE (Health Opportunities for People Everywhere)—the charity donating the equipment—required the Iraqi Ministry of Health to meet specific conditions, including establishing service and maintenance contracts and ensuring a dedicated power supply, a wastewater treatment plant, and suitable training for all staff. The absence of any of these conditions could result in significant damage to technical equipment, valued in the millions of dollars. At the time of SIGIR’s inspection, the U.S. government and Project HOPE refused to provide the equipment until the Iraqi Ministry of Health met the pre-established conditions. Although the ministry failed to meet this requirement, the equipment was eventually delivered.

5. Base project reporting on actual construction progress and not on the amount that the contractor has been paid to date.

The U.S. and Iraqi governments identified the 50-kilometer petroleum product pipeline from Kirkuk to Baiji as a critical project. The project’s objective was to replace the existing (and leaking) 40-inch-diameter

pipeline. This project involved three canal crossings (Kirkuk Irrigation Canal, Zegeton, and Riyadh). The U.S. government awarded the contract to Kellogg Brown & Root Services, Inc. (KBR), but terminated it before project completion. Subsequently, the U.S. government awarded another contract to Parsons Iraq Joint Venture to complete the horizontal-directional drilling for the pipe under the Tigris River at al-Fatah and the three canal crossings.

During SIGIR's assessment, U.S. representatives stated that the Kirkuk Irrigation Canal was almost complete and that the Riyadh and Zegeton Canal Crossings were both 80% complete. However, according to the USACE's Resident Management System, the Riyadh and Zegeton Canal Crossings were only 40% and 38% complete, respectively. According to personnel at USACE's Kirkuk Area Office who had recently visited the Zegeton Canal Crossing, that project was only 10% complete.

The USACE representative stated that the report of 80% complete was based on the amount of money expended, not the amount of work completed. Reporting of actual construction progress is critical for reconstruction officials to make informed decisions about the further use of limited financial resources.

6. Ensure that contractor invoices are reviewed by U.S. construction management before payment is made.

SIGIR inspectors visited projects where contractor invoices had been submitted for payment without being reviewed by the construction



Example of poor block laying at primary healthcare center in Kirkuk. (USACE photo)

manager. USACE representatives told SIGIR that the contractor of a cost-plus-award-fee contract is “entitled to reimbursement for all costs plus their base and award fee. Payment is not dependent on percent complete, but cost incurred,” and “all invoices are reviewed by the Project Manager, who compares the invoices to the submitted backup documentation, prior to payment.” But SIGIR found that this sort of invoice review was commonly not done.

SIGIR inspection reports noted many instances in which contractors were paid for work that did not meet contract standards. For example, the contractor for the Baghdad Police College was paid for plumbing that was so poorly constructed that sewage drained through the floors, while the contractor for the Kirkuk primary healthcare centers was paid for work that had to be redone. In addition, in both cases, USACE representatives responsible for the projects stated that they never reviewed any invoices prior to payment.

7. Do not allow construction activities to begin before detailed drawings have been prepared and approved.

According to U.S. government documents, the Missan Surgical Hospital project was 26% complete at the time of SIGIR’s site visit in January 2009. However, SIGIR found the project lacking complete design drawings showing how water would be provided to the hospital and how wastewater generated by the hospital would be discharged. Both the water supply and wastewater system designs lacked important details. At best, they were conceptual designs, without detail or cohesion.

USACE responded to SIGIR’s concerns, saying that the contractor was coordinating with the local municipality for water and electricity. However, the fact remains that the U.S. government allowed the contractor to begin construction on a major hospital project without first identifying a water source for it. Axiomatically, planning for a water source, locating the river intake, and routing the water pipelines must be done at the outset of a project like this—not 20 months into it.

8. Design projects that anticipate potential limitations of electrical power and potable water sources.

In countries that do not have access to reliable power or potable water, design considerations must address alternative sources for these utilities. Water supplies can come from raw water, municipal water lines, or on-site water tanks. In the case of power, projects should be designed with backup generator capacity to operate the entire facility continuously.

This requires planning for an adequate supply of fuel necessary to operate those generators.

From the early days of the reconstruction program, the U.S. assumed Iraq possessed a reliable power supply system for all newly constructed projects. For example, in 2004, the CPA awarded the contract for the Nassiriya Water Treatment Plant believing that it could be adequately supported by the national grid. The CPA thus approved a design that required only limited backup power. During SIGIR's 2007, 2008, and 2010 site visits to the plant, reliable power was still not available from the national grid, causing the plant to operate at levels well below design capacity. In addition, electrical surges from the national grid had degraded the electrical induction motors of the expensive operational equipment.

SIGIR similarly found that the U.S. government awarded a contract for construction of the Basrah Modern Slaughterhouse, assuming that permanent, reliable power and access to water supply would be available. This facility required a significant amount of electricity to operate the new equipment and a consistent supply of potable water for cleaning. The lack of either service would render the slaughterhouse inoperable. As of April 2010, more than 19 months after the awarding of the contract, neither USACE nor the contractor had found a potential source of permanent power or potable water for the slaughterhouse.

9. Require oversight managers to regularly visit sites as part of a project's quality assurance program.

SIGIR's inspection work revealed a simple axiom: effective QA programs carried out by the U.S. government, complemented by effective QC programs performed by contractors, usually yield successful projects.

For example, USACE's vigorous QA program at the Anbar Rule of Law Complex produced an excellent result. The single most important aspect of a good QA program is the simple assurance that the project engineer visits the work site regularly. For the Anbar Rule of Law Complex, the project engineer visited the site three or four times per week for approximately six hours per visit. The routine visits to the project site allowed the project engineer to interact with the contractor and mentor the local national QA representatives. In one instance, the contractor submitted incomplete design drawings. The project engineer visited the project site to discuss the designs directly with the contractor. These visits corrected the incomplete designs, which ultimately led to resolution of the issue and the successful completion of the project.

When SIGIR found severe deficiencies at project sites, a weak QA program was usually the culprit. For example, the U.S. government had no effective QA program for the Baghdad Police College. USACE had assigned two QA representatives to perform construction oversight of the \$73 million project, but they were assigned simply to track the progress of a project rather than to identify quality issues. The QA representatives failed to identify any construction deficiencies in their daily QA reports, though such problems manifestly were there. According to USACE personnel, the daily QA reports given to the QA representatives did not even contain a block for reporting quality issues. Consequently, USACE was left unaware of significant construction deficiencies.

10. When designing projects, work with host-nation users to create effective, usable, and culturally sensitive facilities.

SIGIR inspected various reconstruction projects in which the U.S. government and contractor failed to interact with the eventual end user during the planning and design phase, which inadvertently resulted in the construction of culturally insensitive facilities. For example, neither Parsons nor the U.S. government requested input from Iraq's Ministry of Interior when designing the Baghdad Police College. As a result, urinals were installed in the bathrooms of every cadet barracks in a semi-enclosed area just outside the toilet and shower area. However, GOI officials told SIGIR that Iraqis do not use urinals. While inspecting the bathrooms, SIGIR observed urinals used as ashtrays and trash dumps instead of their intended purpose. In one particular bathroom, the entire urinal area was full of discarded water bottles.

11. Enhance coordination and decision making by consolidating all project data in a unified information management system.

In the early stages of the reconstruction program, at least 62 offices and agencies played some role in planning and managing projects. However, no interagency project management and information system existed to integrate the activities of the hundreds of firms operating at thousands of sites across Iraq. Contracting entities in Iraq thus developed ad hoc operating systems and procedures, limiting efficiency and leading to inconsistent contracting documentation. Integrated systems could have helped to ensure that programs and projects were planned and completed with effective communication, control, and cooperation.

In late 2004, the USACE Gulf Region Division and the Project and Contracting Office developed the Iraq Reconstruction Management

System (IRMS) to provide a unified information technology system that all U.S. agencies could use to track and manage U.S.-sponsored reconstruction projects. The shared information within the IRMS was meant to provide a common operating picture of the reconstruction program, to avoid duplication of effort, to assist decision making, and to meet Embassy and congressional reporting requirements. However, reconstruction program officials did not adopt a proactive role in ensuring that all government implementing agencies input project and funding information into the IRMS. As a result, the IRMS was incomplete (and thus inaccurate), took longer than necessary to develop, and did not meet its full potential.

When SIGIR used the IRMS database to select projects for future assessments, it often found information, such as the grid coordinates identifying the location of the project and project completion percentage, was inaccurate. For example, SIGIR selected several projects in Basrah that IRMS identified as 100% complete. However, after announcing the project, USACE informed SIGIR that the projects had been terminated before completion. When SIGIR inquired why the projects were listed in IRMS as 100% complete, U.S. reconstruction officials stated the U.S. government paid 100% of the terminated contract cost; therefore, the project was “technically” 100% complete. SIGIR believed this reporting misrepresented the actual number of projects completed by the U.S. government.

12. Do not underestimate the importance of relatively small “last-mile” projects to the success of large-scale reconstruction projects.

The results of large reconstruction projects often depend on much smaller “last-mile” projects to provide services to the people. Power generation plants and water treatment plants are only as good as the distribution network that carries the electricity and water to homes and businesses where they are used. Without the “last-mile” completed, larger capital projects will not be able to benefit the end users and thus will not provide a positive and measurable impact on their lives.

The Falluja Waste Water Treatment System project comprised several components, such as the treatment facility, pump stations, trunk lines, and collection areas. Wastewater travels from individual houses through the neighborhood collection areas, pump stations, and trunk lines to reach the treatment facility for proper treatment and disposal. House connection pipes were placed within one meter of the property, with the Ministry of Municipalities and Public Works responsible for making the connections from each house to the collection system. However, during

SIGIR's 2008 inspection, the ministry did not have available funding to perform the work. Without house connections to the collection systems, there was no method of transferring wastewater from individual houses to the treatment facility. Until house connections were made, the U.S. investment of \$98 million to design and construct the remainder of the system provided no benefit to Falluja residents.

13. Minimize use of “nested tiers” of subcontractors in stabilization and reconstruction operations.

SIGIR often inspected work on reconstruction sites that was performed by subcontractors to the prime contractors or to other subcontractors. From a construction management perspective, the system of “nested tiers” of subcontractors proved to be problematic for both the contractor and the U.S. government. For example, SIGIR's assessment of five Kirkuk primary healthcare centers determined that Parsons (the primary contractor) subcontracted the work to an Iraqi firm that subsequently subcontracted the work to other local Iraqi companies. Arguments resulted between the subcontractor and the local Iraqi companies regarding payment for work performed. The local Iraqi companies accused the subcontractor of not paying for materials and work performed, and they refused to continue working. Neither Parsons, the subcontractor, the local Iraqi companies, nor the U.S. government moved expeditiously to resolve this issue, resulting in numerous delays. For these five health facilities, SIGIR determined that the multiple tiers of contractors were the principal reason for construction falling behind schedule and significantly exceeding projected costs.

Quality control in these cases becomes more challenging and accountability is more difficult to achieve because the layering of subcontractors makes it difficult for oversight agencies to determine with assurance which tasks are the responsibility of which contractors.

Part IV: Effects of SIGIR Inspections

Identifying Deficiencies and Fostering Improvements

SIGIR's Inspections Directorate identified 94 projects (cumulatively valued at \$1.27 billion) that had either significant or minor deficiencies and 76 projects (cumulatively valued at \$0.82 billion) that met contract specifications and project objectives.

Of the 116 in-progress projects that SIGIR inspected, 52 (45%) did not meet the contract specifications and had major deficiencies. Of the 54 completed projects assessed, 42 (78%) had deficiencies, with 14 having major deficiencies that, if left unaddressed, would place those projects in jeopardy. Figure 1 displays the number of in-progress (construction) projects with deficiencies and the number of completed (sustainment) projects with deficiencies. Figure 2 summarizes deficiencies identified by reconstruction sector.

A common theme among projects with deficiencies was the failure of contractors to meet contract specifications. Inadequately trained or unqualified contractor personnel, inferior materials, and the lack of oversight on the part of the contractor and government led to substandard project results. In some instances, SIGIR's inspectors found indications of potential fraud, and those matters were then turned over to SIGIR's Investigations Directorate for further action.

FIGURE 1
BREAKDOWN OF CONSTRUCTION AND SUSTAINMENT PROJECT ASSESSMENTS, BY SEVERITY OF DEFICIENCIES

Number of Projects

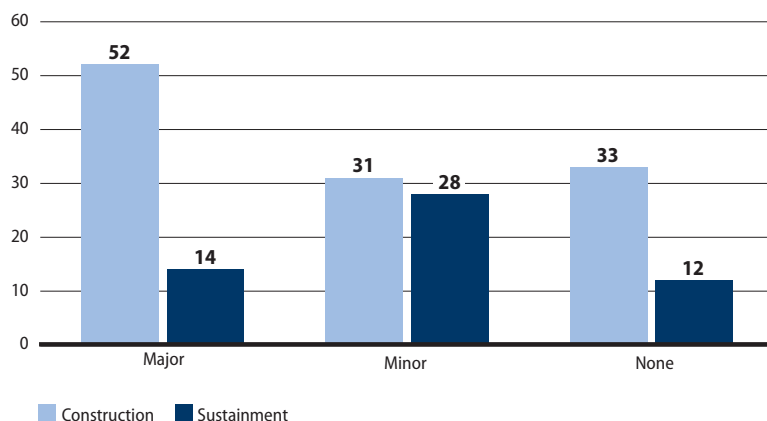
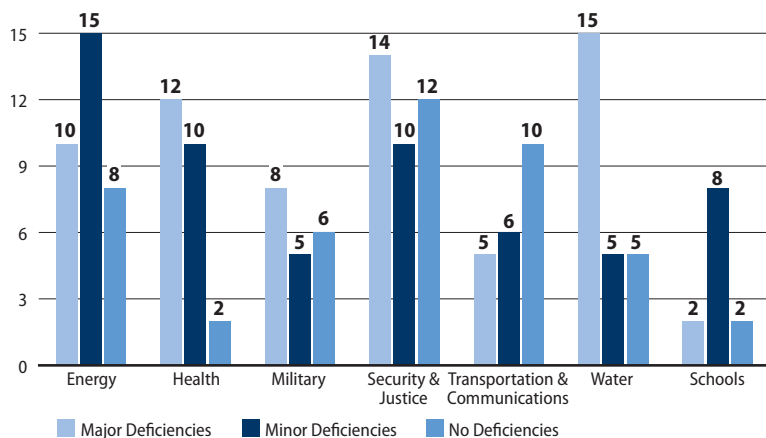


FIGURE 2
DEFICIENCIES FOR PROJECTS SIGIR ASSESSED,
BY RECONSTRUCTION SECTOR



SIGIR’s early identification of deficiencies during the course of its inspections frequently enabled reconstruction officials to implement corrective actions prior to completing these projects. SIGIR also provided reconstruction officials information that was used to improve the design, construction, quality assurance, sustainability, and achievement of project objectives for other Iraq relief and reconstruction projects. By highlighting deficiencies and recommending corrective action, SIGIR helped improve performance in each of the objectives included in its assessments.

Ensuring Design Adequacy

Design deficiencies identified in various SIGIR inspection reports included the lack of:

- required design drawings
- electrical plans and diagrams
- schematic diagrams identifying the electricity, water, and sewage flows
- diagrams providing clarity on the location and function of specific pieces of equipment

In the U.S.-funded Basrah Courthouse project, the contractor was provided with a preliminary design in the form of government-furnished drawings. The U.S. government wanted the contractor to use the drawings to create a model courthouse that could be duplicated

in provinces throughout Iraq. SIGIR identified a design error in the government-furnished drawings with regard to the spiral staircase. The overhead clearance between the steps and the ceiling was not sufficient and resulted in a potential hazard to people using the stairs. SIGIR concluded this occurred because the drawings did not take into account the loss in headroom due to the false-ceiling installation. Before issuing its draft report, SIGIR brought this design error to the attention of reconstruction officials, resulting in the correction of the design.

Ensuring Construction Quality and Contract Compliance

Construction-quality and contract-compliance problems identified by SIGIR included:

- contractor substitution of roof braces with substandard material
- poor quality concrete work, such as honeycombing, segregation, voids, and reinforcement bar exposure
- concrete anchorages for fence posts not dug to the depth required by contract specifications
- foundation bolts not properly secured
- beams not constructed in accordance with approved design drawings and not sufficient to brace the associated columns

In October 2005, SIGIR performed assessments of four border denial posts (border forts), located in Sulaymaniyah province. The contract for the border forts required specific security measures be put in place:

New perimeter security structures shall be built to a height of 2 meters. Installation of barbed wire or concertina wire in one to three rows angled toward the exterior shall be standard. Perimeter wall should be built on the property line, or as reasonably far away from the central building as practical. The goal of the perimeter wall is to provide a space buffer between the high value target and an intruder or threat at the wall.

In addition, the contract required a four-meter-wide solid (plate steel) locking vehicle gate and guard towers placed on the corners of the perimeter wall.

During the site visit, SIGIR found that the contractor had failed to construct the contract-required perimeter security walls, berms, concertina wire, and entrance gates at the four border forts. The Iraqi Border Patrol Director General listed perimeter security as a mandatory requirement for force protection. Reconstruction officials told SIGIR that the contractor did not plan on installing perimeter security at these border forts. In

addition, the contractor's designs required the installation of metal front entrance doors with dimensions of 78.7 inches by 108.2 inches. During the site visit, SIGIR measured the entrance doors at the four border forts and found them to be 59 inches wide by 108 inches tall. The doors installed were 20 inches narrower than the design required. SIGIR recommended changes to the reconstruction officials responsible for the border forts, and those changes were implemented.

Promoting Contractor Quality Control and Government Quality Assurance

SIGIR reports identified contractor QC and government QA problems, including:

- The contractor failed to identify safety issues at a project site.
- The contractor's weekly progress reports and construction inspection reports provided did not document significant construction activity.
- The contractor's QC reports did not identify inferior workmanship at a project site.
- QA reports did not document dangerous electrical installation practices.
- The QA representative was unaware that contractor performance had been overstated by as much as 80%.
- The QA representative did not enforce contractor QC reporting requirements.

SIGIR's assessment reports included recommendations meant to improve oversight, such as the need for increasing staff levels at project sites, annotating deficiency logs, and documenting corrective actions taken. By 2010, several U.S. government QA programs had implemented many of SIGIR's recommendations, which resulted in improved QA and better constructed projects.

Improving Project Sustainability and Operational Effectiveness

SIGIR reports identified project sustainability and operational effectiveness issues, including:

- not obtaining advance assurance of GOI funding to maintain facilities
- not providing Iraqi personnel with training in operating and maintaining equipment
- using fixtures more appropriate for limited-use environments in heavily used projects
- installing Western-style toilets initially that were damaged when used by individuals accustomed to Eastern-style toilets

- not planning for a project's power needs

For example, each primary healthcare center was to include medical and dental equipment, such as x-ray machines. At four centers inspected in 2008, SIGIR observed that the x-ray equipment had been installed. However, because the contractor did not provide training and each facility's staff did not have the capability to operate the x-ray equipment, none of these facilities offered x-ray services to its patients. The USACE Transatlantic Programs Center responded by initiating a \$16.5 million contract for the sustainment of healthcare projects funded by the U.S. government that included training on equipment such as x-ray machines.

Achieving Project Objectives

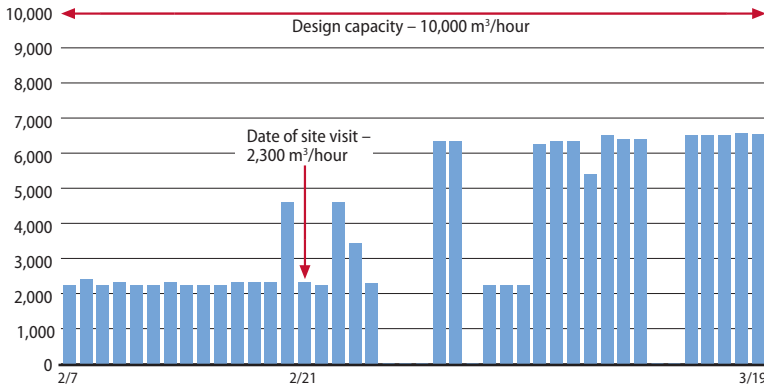
SIGIR reports identified instances in which achievement of project objectives was not assured at the time of the site visit because of deficiencies identified in project design, construction quality, and planning for sustainability. SIGIR notified reconstruction officials of these concerns both verbally during the course of its inspections and in its draft and final reports, often enabling corrective actions to be taken before the final reports were issued. For example, after twice visiting the Nassiriya Water Treatment Plant, SIGIR determined that the plant was operating at approximately 20% of its design capacity. SIGIR brought this to the attention of reconstruction officials and recommended corrective actions to increase finished water production. Within four weeks of SIGIR's second site visit, the Nassiriya Water Treatment Plant had tripled its finished water production (Figure 3). By implementing corrective actions, the U.S. government protected its \$277 million investment.

Highlighting Best Practices

During the course of SIGIR inspections, several projects stand out as successful examples of well-designed and well-planned projects, with good quality construction, effective quality oversight by the contractor and the U.S. government, proper sustainment planning, and effective cooperation between the United States and GOI:

- The **Ministry of Defense Building** project was successful because the design was adequate prior to construction, quality and detailed workmanship was accomplished, and adequate quality management oversight was performed. In addition, post-turnover operations and maintenance management and building-maintenance practices were effective.

FIGURE 3
FINISHED WATER PRODUCED AT THE NASSIRIYA WATER TREATMENT PLANT,
2/7/2008–3/19/2008
 Cubic Meters per Hour



Note: The chart shows the average of the daily finished water output claimed on the daily process acceptance reports. For most days, output was measured at two-hour intervals, four times per day. SIGIR assumed output was constant during each two-hour interval throughout the day.

Source: USACE data.

- The **Kirkuk-to-Baiji Pipeline Exclusion Zone** project was designed and constructed in accordance with contract requirements and verified that the Infrastructure Security Program—a collaborative effort between the Iraq Transition Assistance Office, USACE’s Gulf Region Division, and the Energy Fusion Cell—provided protection and security to critical oil pipeline corridors.
- The **Kurdistan Ministry of Interior Complex** exhibited good project planning, design, and construction. The partnership between the U.S. government, the Kurdistan Regional Government, and the contractor provided an effective management team that resulted in quality contract execution.
- The **Thi-Qar Bee Farm** project demonstrated good construction that was in compliance with the design. Success of the project was driven by the GOI’s active participation—providing local farmers with beehive management training, supplying training materials, and distributing beehives to the five districts within Thi-Qar province.

Part V: Selected Project Inspections

At the inception of the Inspections Directorate in 2005, hundreds of individual projects had been completed and turned over to the GOI, and thousands more were completed over the five-year life of the Directorate.

The following are summaries of SIGIR's most significant and notable project assessments. For a listing of all SIGIR project assessments, see Appendix B.

Al Fatah River Crossing

Pipeline River Crossing, Al Fatah, Iraq (SA-05-001), 1/27/2006

The purpose of the Tigris River crossing project, located near the town of al-Fatah, was to replace 15 oil and gas product pipelines that were contained in a bridge over the Tigris River. Coalition bombing attacks on the bridge during the war severed the lines. The CPA identified the repair of the severed pipelines as critical to Iraq's oil production because they provide crude oil and gas products to the Baiji refinery and the Iraq-Turkey pipeline.

Based on their June 8, 2003, site visit to the bridge, USACE engineers, in coordination with KBR, the U.S. Agency for International Development (USAID), and Bechtel, Inc., recommended repair of the bridge and re-routing of the pipelines across it. Engineers from all of the entities agreed that USAID would contract with Bechtel to repair the bridge and KBR would accomplish the pipe repairs. Completion of the repairs and routing of the pipes was expected to take two months.

The Iraqi Ministry of Oil and CPA representatives believed that routing the pipes across the bridge created an unacceptable security risk. The CPA's subject matter expert for oil transportation suggested the temporary repair of critical lines over the damaged bridge and the use of horizontal directional drilling (HDD) as a permanent solution. The CPA believed that HDD was the best permanent solution because the pipelines would be routed safely under the river, would require minimal long-term maintenance, and could be installed quickly. At the time the HDD concept was being considered, the CPA had no available information indicating issues with soil or geology.

SIGIR responded to a Hotline referral that questioned USACE's decision to use HDD for routing the pipelines under the Tigris River despite predictions from a geologist that soil conditions underneath the Tigris River might not be conducive to drilling. SIGIR performed this special assessment to determine why the HDD project achieved only 28% of the



Cross section of al-Fatah bridge showing melted oil pipes. (USAID photo)

planned pipeline throughput. SIGIR focused on the processes used by the CPA and USACE to arrive at the HDD decision, award the subcontract, develop the construction design, and manage project performance.

SIGIR determined that this project failed because subsurface geologic conditions—such as loose, unconsolidated gravels and cobbles—made it impossible to retain open boreholes for large-diameter pipelines. Porous soils—such as sand, gravel, and cobble—pose structural problems, which become more significant as the granularity of the soil becomes coarser and the size of the hole becomes larger. In addition, the hole was highly unstable and difficult to maintain while it was being drilled.

SIGIR believed the geological complexities that caused the project to fail were foreseeable. Important engineering studies and analyses, recommended by a geological consultant hired by KBR, were not performed. KBR and USACE ignored recommendations made by



HDD rig with backreamer.

the consultant in order to meet unrealistic completion goals. Neither USACE nor the contractor acted on the consultant's recommendation to perform additional research, which would have prevented failure.

SIGIR also identified other contributing factors to the project's failure:

- flawed construction design
- a subcontract that had no performance requirements
- a compartmentalized project management structure that impeded communication
- inadequate oversight by USACE and KBR

As a result of the government and contractor's failure to adequately research, plan, design, and manage the project, \$75 million allocated to the project was exhausted after only 28% of the drilling scope was completed. The U.S. government discontinued the HDD project in August 2004 and subsequently replaced it with a task order to Parsons Iraq Joint Venture at a cost of \$29.7 million.

Primary Healthcare Centers

Primary Health Care Centers Numbered KE-01, KE-02, KE-03, KE-04, and KE-05, Kirkuk, Iraq (PA-06-042, PA-06-043, PA-06-044, PA-06-045, and PA-06-046), 4/25/2006

On March 25, 2004, the CPA awarded Parsons Delaware, Inc., a cost-plus-award-fee contract to construct 150 primary healthcare centers across Iraq for approximately \$243 million. The original objective was to provide



Improper support for a load-bearing lintel at a primary healthcare center during construction. (USACE photo)

public health facilities and employment to the Iraqi people and, more specifically, to increase health care to the Iraqi population.

In February 2006, SIGIR assessed five partially completed primary healthcare centers in Kirkuk. Although the contract required Parsons to complete these five centers by January 2006, the centers were between 38% and 58% complete at the time of SIGIR's site visit. During the course of the inspection, the U.S. government decided to terminate the primary healthcare center contract with Parsons, with only 20 health centers to be completed under the original contract.

SIGIR's inspection determined that the five facilities were poorly constructed and raised questions about the safety of occupancy of the structures. For example, reinforced concrete did not appear to be constructed according to contract specifications and needed to be evaluated to determine if corrective actions were required. In addition, SIGIR documented several indicators of poor construction—including concrete segregation and voids; rebar exposure on the surface of load-bearing, reinforced concrete ceiling beams; and columns with chipped concrete. Inadequate QC on the part of the contractor and inadequate QA on the part of the U.S. government prevented the identification and correction of such construction deficiencies.

SIGIR found that the completion percentages entered into the tracking database for each of the five inspected centers were grossly overestimated. Because only a fraction of the original number of primary healthcare centers were to be completed, accurate completion percentages would have been essential to choosing the best candidates for completion.

The USACE field office did not review the contractor's invoices before payment. USACE Kirkuk Area Office personnel responsible for the construction management of the primary healthcare centers were not requested to review or approve the invoices to validate work claimed by the contractor. As a result, the potential existed for payment to go to the contractor for work that was not performed, or as in the case of these five primary healthcare centers, payment for work that did not meet contract specifications.

Baghdad Police College

Quick Reaction Report on the Baghdad Police College, Baghdad, Iraq (PA-06-078.1 and 079.1), 9/27/2006; Baghdad Police College, Baghdad, Iraq (PA-06-078.2 and 079.2), 1/29/2007

In 2004, the CPA wanted to usher in a new era for the Iraqi police and determined that 135,000 “trained and equipped” policemen were required to restore law and order. However, Iraq's only existing training facility, a three-year college in downtown Baghdad, was deemed insufficient to meet the CPA's officer-training goal. Constructed more than 50 years earlier, the old Baghdad Police College was in decay, with the capacity to house and train only about 1,200 to 1,500 cadets.

On March 26, 2004, the CPA awarded a cost-plus-award-fee contract to Parsons Delaware, Inc., to renovate the existing facilities and also to design and construct new facilities for the Baghdad Police College on the grounds of the old academy. The goal of the project was to provide housing and training facilities—including classrooms, dormitories, dining facilities, administrative offices, and firing ranges—for approximately 4,000 cadets and 500 instructors. Parsons completed construction of the new college in June 2006 at a total cost of approximately \$73 million: \$29 million in Iraqi funds from the Development Fund for Iraq and \$44 million in U.S. funding from the Iraq Relief and Reconstruction Fund. U.S. military leaders declared 2006 the “year of the police” and called the Baghdad Police College the “most essential security project” in Iraq.

After receiving a Hotline complaint alleging poor construction, SIGIR performed a site inspection of the college on August 22, 2006. SIGIR immediately observed that diluted feces and urine drained from the ceilings in the cadet barracks, light fixtures were filled with urine, and floors bowed inches off the ground, cracking apart.

The seriousness of the plumbing problems identified during the initial visit prompted SIGIR to issue a Quick Reaction Report in Septem-



Effluent leaking from pipes at the newly constructed Baghdad Police College.

ber 2006. In that report, SIGIR recommended that an independent assessment of all wastewater plumbing installations in the newly constructed buildings be performed and that critical studies of the concrete floor slabs of the cadet buildings be carried out to determine their structural integrity, load-carrying capacity, and the potential environmental and health hazards posed by rust, mold, and the presence of urine and fecal matter.

USACE's Gulf Region Division, the construction manager of the Baghdad Police College project, tasked Stanley Baker Hill, LLC, to conduct a comprehensive assessment of Parsons's construction practices. Stanley Baker Hill's October 2006 assessment described Parsons's method of joining pipes—"abnormal fittings connected by drilling holes in polyvinyl chloride pipes and connecting them with another pipe"—as "not an acceptable method of construction." In addition, the assessment concluded that the "concrete slabs under the bathrooms are structurally sound," but recommended the repair of any sewer leakage to "accommodate the structure's intended use and to maintain the overall structural stability with time." The U.S. government terminated Parsons for "convenience" in May 2006; Parsons promised to repair the plumbing issues at no additional cost to the government.

SIGIR subsequently re-inspected the Baghdad Police College five times between September and December 2006, identifying a host of remaining construction issues throughout the entire campus. SIGIR issued a final, comprehensive report on the entire project, which concluded that the "construction and renovation results were not consistent with the original contract objectives and task order objectives because

the project was poorly designed and constructed, and the contractor and USACE Gulf Region Central Project Engineer and QA representatives did not effectively manage the project.” Specifically:

- Not all project components were adequately designed prior to construction. The contractor did not provide and the government did not review the required number of design drawings. Of the design drawings that were reviewed, the government determined the submittals were generally incomplete and inadequate.
- The construction and equipment installation was of low quality and did not comply with the international standards required by the contract. Significant construction deficiencies were identified, such as poor plumbing installation, expansion cracks, concrete segregation and honeycombing, reinforcement bar exposure, and poor brickwork. The improperly fabricated wastewater plumbing within the student barracks could potentially result in a reduction in the structural slabs’ load-carrying capacity as well as present environmental and health hazards to the students, instructors, and workers at the college.
- The contractor’s QC program implementation failed to identify significant construction deficiencies, such as poor plumbing installation practices and substandard expansion joints. The government’s QA program was essentially nonexistent in monitoring the contractor’s QC program. Neither the project engineer nor the QA representative reviewed the contractor’s daily reports.
- Sustainability was addressed in the contract requirements but not adequately administered by the U.S. government. Most buildings were transferred to the GOI without being tested for adequacy and functionality of the basic utilities installed. At the time of the transfer, the electrical, fire alarm, and communication systems, as well as the plumbing for the potable and the wastewater systems, were not tested in several of the buildings.

SIGIR inspectors found the construction of the Baghdad Police College so egregiously poor that they referred the matter to SIGIR’s Investigations Directorate.

Qudas Power Plant

Qudas Power Plant Turbine Restoration Project and Qudas Power Plant Expansion Project, Baghdad, Iraq (PA-07-101 and PA-07-104), 10/19/2007

Iraq’s government invested heavily in electric power generation in the 1980s. By 1990, the total installed generating capacity in Iraq was about



Frame 9E and LM-600 generator units at the Qudas Power Plant.

9,295 megawatts (MW), with a peak demand of approximately 5,100 MW. Approximately 87% of the population had access to electricity.

During the 1991 Gulf War, the generation stations were severely damaged, and generation capacity was reduced to 2,325 MW. Subsequent repairs to the system raised the capacity to 4,500 MW just before the Coalition invasion in 2003.

In 2006, the U.S. government awarded two contracts—the Qudas Power Plant Turbine Restoration and the Qudas Power Plant Expansion, worth a combined \$238 million—to restore and start up two General Electric (GE) combustion-turbine units and to manufacture, deliver, and turn over two new GE turbine units. The objective was

not only to strengthen the “Baghdad Ring” by increasing the supply of available electricity by as much as 584 MW, but also to ensure the ability to sustain operations and maintenance of the restored turbines and the expanded capacity of the Qudas Power Plant.

SIGIR visited the plant in May 2007. Prior to the site visit, SIGIR reviewed the contractor’s design package for the turbine restoration, which was sufficiently detailed for the contractor to perform the required work. In addition, the contract requirement to expand Qudas capacity by more than 200 MW (by installing two new GE units) was consistent with the objectives. As a result, approximately 584 MW of additional electricity would be available to the power grid.

SIGIR’s review determined that sustainability for the applicable contracts was adequately planned. The U.S. government demonstrated a strong commitment to programs designed to mentor GOI Ministry of Electricity personnel and to sustain operations in the short term. However, SIGIR noted that the long-term sustainability of power-generating assets would depend primarily on whether the GOI could implement and fund an effective operations and maintenance program at the Qudas Power Plant. Otherwise, the U.S. government’s significant investment could be wasted.

Mosul Dam

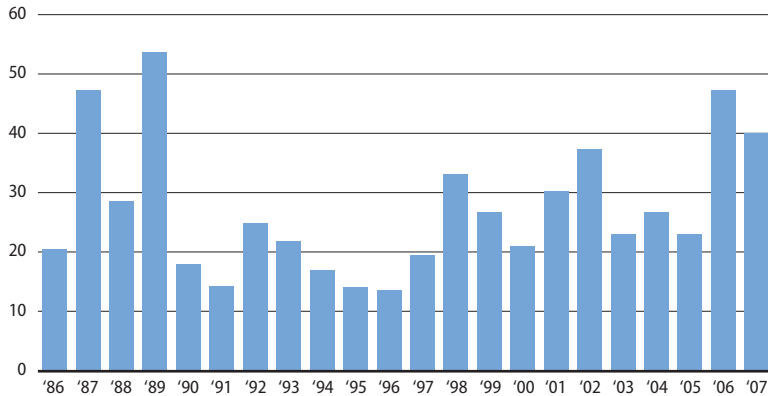
Relief and Reconstruction Funded Work at the Mosul Dam, Mosul, Iraq (PA-07-105), 10/29/2007

Mosul Dam, located on the Tigris River in northern Iraq, was completed in June 1984. It is the largest dam in Iraq and the fourth largest in the Middle East. The dam provides flood control and serves the irrigation and power-generation needs of approximately 9.3 million people living along the Tigris River valley from Mosul to Baghdad. The main dam is a 113-meter-high, 3.4-kilometer-long zoned earthen-filled embankment with concrete reinforcement. The embankment contains graded filters on the upstream and downstream side of the central core with an inclined chimney and blanket drain.

According to experts, the “decision to locate such a major and important dam on the foundation rock mass which exists at the Mosul Dam site was fundamentally flawed.” The dam’s foundation geology is a layered sequence of rocks (including calcium carbonate mudstone, chalky limestone, gypsum, and anhydrite rocks) below the dam, which is susceptible to the development of cavities within the gypsum and anhydrite layers. Since 1988, significant voids have continued to be located

FIGURE 4
DRILLING AT MOSUL DAM, BY YEAR, 1986–2007

Thousand Meters



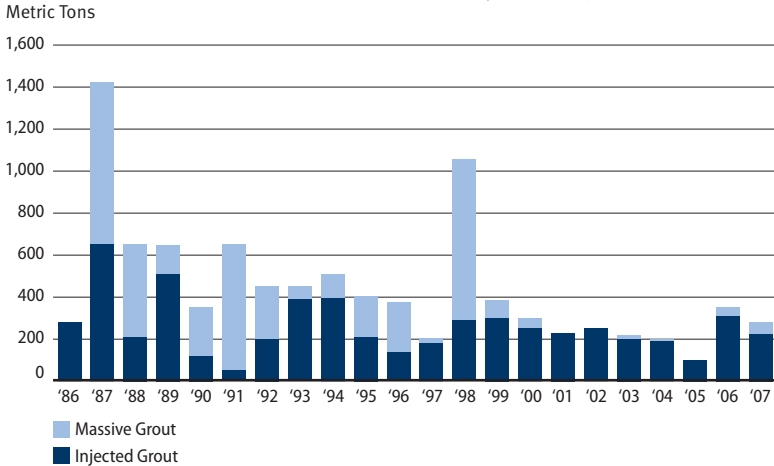
Source: Data provided by Mosul Dam management.

within the foundation, requiring large volumes of cement-based grout. The dissolution and erosion of gypsum by water seeping under the dam is believed to be the main cause of the development of voids requiring continuous grouting. Since the 1980s, a continuous grouting program—implemented 24 hours per day, six days per week—has constituted the primary and ongoing measure for mitigating risk.

Figures 4 and 5 provide monthly drilling and grouting production from 1986 to 2007. Figure 4 indicates that the average drilling production over the years is generally less than one-half of that attained in 1987. Figure 5 appears to show a general trend of decreasing grout injection over the years. Although Figure 5 seems to indicate that grouting may have some success in sealing karst channels and reducing erosion or solution, a significant amount of grout and massive grout are required to fill large voids.

USACE expressed concern about a catastrophic failure of the Mosul Dam. Its Board of Experts determined that a total failure would result in a wave of water measuring approximately 23.2–24.2 meters reaching the city of Mosul in about three hours. This wave would sweep across hundreds of small towns and villages en route to Baghdad. USACE predicted the loss of basic services along the Tigris River valley and uncountable damage to roads and bridges, railways, power stations, industrial plants, farms, and archeological sites. The GOI and Ministry of Water Resources representatives contested USACE’s reports.

FIGURE 5
SOLIDS INJECTED AT MOSUL DAM, PER YEAR, 1986–2007



Source: Data provided by Mosul Dam management.

The U.S. government awarded a task order and associated contracts to conduct studies specifically related to Mosul Dam’s problems, identify the most critical of those problems, develop solutions, and implement those solutions. The United States funded short-term solutions to the Mosul Dam problem, while the Iraqi Ministry of Water Resources was responsible for implementing a long-term solution. The short-term solutions included the most critically needed replacement and spare parts, assistance with the massive grouting program, and enhanced grouting to augment the ministry’s grouting efforts. Starting in 2005, the U.S. government funded 21 contracts, worth approximately \$27 million, to help with the short-term solutions for the Mosul Dam.

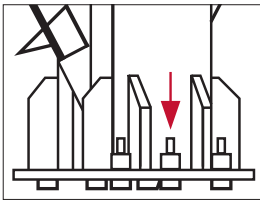
SIGIR visited the Mosul Dam twice in September 2007. Prior to visiting the dam, SIGIR reviewed the design drawings and specifications for all non-procurement contracts associated with the project. SIGIR determined that no comprehensive and relational diagram or schematic drawings existed for the Intelligrout system or the enhanced grouting equipment used inside and outside the Mosul Dam gallery.

Review of the available design drawings revealed several deficiencies, and SIGIR voiced a number of safety concerns. For example, the design drawings for the stationary silos lacked critical details, such as bracing support for the entire height of the silos and instructions directing how the Ministry of Water Resources personnel would deposit cement into

FIGURE 6
REQUIREMENTS OF THE DESIGN DRAWINGS VERSUS ACTUAL
INSTALLATION TECHNIQUES AT MOSUL DAM



Poor installation technique (use of seven washers).



Contractor's design drawings required bolt threads extend beyond the nut and washer.



Example where one foundation bolt extends beyond the nut and another bolt does not.

the silos. Additionally, the design drawings clearly indicated that the contractor was offering concrete-mixing plants instead of the required grout-mixing plants.

SIGIR identified instances of inadequate construction. For example, SIGIR observed that 43 (30%) of the 144 foundation bolts cast within concrete columns had insufficient thread to properly fasten the nuts (Figure 6). In addition, the installation of the foundation bolts contradicted the contractor's own design construction techniques, which required bolt threads to extend higher than the nut. Each stationary silo would hold approximately 1,500 tons of cement, and SIGIR believed that the inadequate installation of the foundation bolts left these structures in a potentially dangerous condition. The U.S. government subsequently terminated the contractor for default and reissued a new contract to construct new stationary silos at a different location on the Mosul Dam property; however, the terminated contractor had already been paid \$635,138 for the potentially unsafe silo framework.

The U.S. government awarded multiple contracts to provide for materials and equipment at the dam, and, in several instances, what was delivered did not meet contract specifications. In addition, because no U.S. representative was on site to verify the delivery of the materials and equipment, SIGIR could not assure that all of the required equipment was delivered to the work site.



Grouting equipment in the tunnel under the Mosul Dam during SIGIR inspection.

The Advanced Grouting System—a significant portion of the enhanced grouting program—was non-operational. The system comprised the Intelligrout system and enhanced grouting equipment, valued at approximately \$16.4 million. The three Integrated Analytical System units continued to experience a variety of significant problems that delayed their use, and the enhanced grouting equipment remained unused because of a lack of comprehensive and relational diagrams or schematic drawings to identify how the components were to be completely assembled and operated. As a result, at the time of SIGIR's site visits, approximately \$19.4 million worth of equipment and materials delivered to the Mosul Dam for the implementation of the massive and enhanced grouting operations did not provide benefit to the Ministry of Water Resources.

After SIGIR's site visits, the U.S. government finalized a detailed plan to provide the required equipment and materials to improve current grouting operations and fully implement the enhanced grouting operation. For example, this plan called for making the Integrated Analytical System units fully operational and procuring additional grout-mixing plants. SIGIR concurred with the plan and recommended its expedited implementation.

Nassiriya Water Treatment Plant

Nassiriya Water Treatment Plant, Nassiriya, Iraq (PA-07-116), 4/28/2008
Iraq's Tigris and Euphrates Rivers and their tributaries supply approximately two-thirds of the raw water that is treated and used for potable

services in Iraq. The rivers generally carry significant levels of silt and erosion, blown sands, and agricultural runoff, which necessitates the use of water treatment processes that typically include treatment with alum; mixing, flocculation, and sedimentation to remove some of the solids; and sand filtration to remove the remaining solids prior to chlorination and transportation through the distribution system to the end user.

The water network for Thi-Qar province, including its existing water treatment plants and compact units, was approximately 50 years old. According to a survey of the province, the existing water treatment plants were inefficient and overloaded, while the distribution pipes were subject to substantial leakage. By 2003, a critical situation developed in central and southern Iraq in terms of the number of cases of water-borne illnesses, such as typhoid, cholera, and malaria. These diseases were linked to the absence of clean water supply and adequate sanitation systems.

In March 2004, the U.S. government awarded a contract to FluorAMEC to increase the quantity and quality of potable water available to the citizens living in Nassiriya through the construction of a new water supply system. The \$277 million Nassiriya Water Supply project, which included the Nassiriya Water Treatment Plant, 110 kilometers of transmission piping, three booster pump stations, and five elevated storage tanks, was one of the largest U.S.-funded reconstruction projects in Iraq.

This project was originally conceived as a cost-sharing project with the GOI. The U.S. government would fund the water supply project, and the GOI would fund the permanent power required to operate it, repair the leaks in the distribution system to allow potable water to flow from the conveyance lines to the end user, and provide a qualified and motivated staff to be trained by the contractor to operate and maintain the facility after the project was turned over to the GOI.

The Nassiriya Water Treatment Plant was designed to operate 24 hours per day, with a total capacity output of 10,000 cubic meters (m³) of potable water per hour, and serve five cities. Construction began in August 2004, commissioning was completed in June 2007, and the project was officially turned over to the GOI on September 12, 2007. However, at the time of turnover, the GOI had failed to provide reliable power from the national grid, repair the leaks in the distribution system, and provide qualified and motivated staff to be trained to operate and maintain the system.

SIGIR visited the Nassiriya Water Treatment Plant twice—in December 2007 and February 2008. During both site visits, the plant was operating only one shift of eight hours per day and producing



Illegal taps in the transmission and distribution lines, which reduce the water pressure and amount of water available to residents. (USAID photo)



The disabled flow meter for the high-service pump station meter vault.



WTP laboratory equipment inventory did not include items necessary for performing jar tests.

2,000–2,300 m³/hour of potable water (20% of its design output). In addition, the amount of finished water was provided to only three of the five cities. This situation resulted from a number of factors, such as:

- lack of reliable power from the national grid
- an old distribution system that was afflicted with leakages and unable to withstand the higher pressures and flows
- illegal taps in the water transmission line to Diwayah
- unqualified and unmotivated Ministry of Municipalities and Public Works staff unwilling to consistently attend the contractor-provided training

SIGIR's site visits revealed deterioration of the water treatment plant, which was just more than one year old. For example, plant personnel claimed that they did not know how to operate the flow meters and therefore removed them. In addition, the on-site laboratory equipment necessary to perform the required testing was missing, although the plant's daily report for the day of SIGIR's site visit stated testing was performed and the results were within World Health Organization tolerances. Because of the lack of appropriate laboratory equipment, SIGIR questioned the validity of the reported results.

SIGIR determined that, for almost four years, the GOI had not addressed these issues. As a result of GOI delays, potable water was reaching only a fraction of the Iraqi people whom it was intended to serve.

SIGIR recommended that the U.S. government continue its efforts to influence the GOI to increase operational output and avert further deterioration of plant equipment—actions key to saving the significant investment made for the benefit of the Iraqi people. As a result of the efforts of the U.S. government—specifically the U.S. Ambassador, the Iraq Transition Assistance Office, and USACE—to influence the GOI,

Daily Process Acceptance Report				Date: 2/21/2008		
Sampling Record of Raw Water						
Parameter	Period	Comments	1	2	3	
Turbidity (NTU)	1 time per shift		1.8	2.8	2.5	
Total Chlorine (mg/L)	1 time per shift		1.5	1.5	1.5	
Free Chlorine (mg/L)	1 time per shift		1.5	1.5	1.5	
Total Chlorine Demand (mg/L)	1 time per shift		0.0	0.0	0.0	
Sampling Record of Clarified Water						
Parameter	Period	Comments	1	2	3	
Turbidity (NTU)	1 time per shift at 9:00 AM		0.5	0.5	0.5	
Turbidity (NTU)	1 time per shift at 7:00 PM		0.5	0.5	0.5	
Sampling Record of Filtered water Effluent Tank						
Parameter	Period	Comments	1	2	3	
Turbidity (NTU)	1 time per shift		0.5	0.5	0.5	
Total Chlorine (PPM)	1 time per shift		1.5	1.5	1.5	
Sampling Records of Treated Water from Ground Storage Tank						
Parameter	Period	Units	Requirement	1	2	3
Total & Free Chlorine	1 time per day	Maximum	5.0 PPM	1.5	1.5	1.5
Turbidity (NTU)	1 time per day	Maximum	0.5 NTU	0.5	0.5	0.5
Temperature (C)	1 time per day	Minimum	10.0 C	10.0	10.0	10.0
Process Reports						
Parameter	Period	Requirement	1	2	3	
Raw Water Flow (M3/hr)	Continuous	2000 M3/hr Per Pump	2000	2000	2000	
Clear Bottom Flow Rate (L/hr)	Continuous	20-50 PPM Dosing Rate	20	20	20	
Program Dosing Flow Rate (L/hr)	Continuous	0.5 PPM Dosing Rate	0.5	0.5	0.5	
Chemical # 1 Dosing Rate (L/hr)	Continuous	0.5 PPM	0.5	0.5	0.5	
Chemical # 2 Dosing Rate (L/hr)	Continuous	0.5 PPM	0.5	0.5	0.5	
Chemical # 3 Dosing Rate (L/hr)	Continuous	0.5 PPM	0.5	0.5	0.5	
Water Produce Flow (M3/hr)	Continuous	2000 M3/hr Per Pump	2000	2000	2000	
Sampling Records of Elevated Storage Tanks						
Parameter	Period	Requirement	1	2	3	
Turbidity (NTU)	1 time per day	0.5 NTU	0.5	0.5	0.5	
Free Residual Chlorine (PPM)	1 time per day	0.5 PPM	0.5	0.5	0.5	

Turbidity NTU measurements of 1.8, 2, 2.8, and 2.5

Water produce flow of 2,300, 2,300, 2,300, and 2,300m³/hour

Daily process acceptance report for February 21, 2008, the day of SIGIR's site visit. (Courtesy of USACE)

some improvements have occurred since SIGIR's site visits. For example, the Ministry of Municipalities and Public Works reported that the Nas-siriya Water Treatment Plant had increased finished water production from 2,300 m³/hour to 6,000 m³/hour. While SIGIR viewed this as an encouraging sign, it also noted that the GOI still needed to find long-term solutions to the issues of reliable power from the national grid, leaking distribution lines, and qualified and motivated staff to operate and maintain the plant 24 hours per day, seven days per week.

Pipeline Exclusion Zone

Kirkuk to Baiji Pipeline Exclusion Zone—Phase 3, Kirkuk, Iraq (PA-08-137), 7/24/2008

Iraq's proved reserves of crude oil are among the largest in the world. Oil exports provide more than 90% of the country's revenue and are critical to the successful funding of the Iraqi government. With production capacity of approximately 900,000 barrels per day, the Kirkuk oil fields dominate production in northern Iraq. These fields provide all the crude oil processed at the Baiji Refinery, 40% to 45% of the crude oil at the Doura Refinery, and most of the crude oil piped to Turkey's port of Ceyhan for export.

After the 2003 Coalition invasion, Iraq's 4,300-mile network of pipelines became a continuous target for interdictions and sabotage.



Chain-link fence and barbed wire along Phase 3 of the pipeline exclusion zone for the Kirkuk-to-Baiji pipeline.

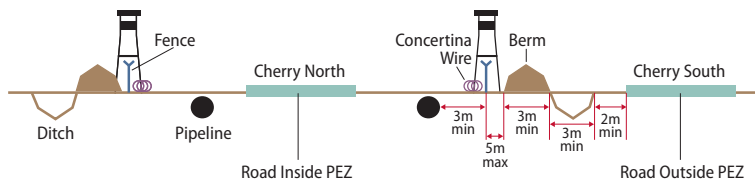
By 2008, there had been more than 400 reports of either sabotage or violence against Iraq's oil infrastructure, resulting in the potential loss of millions of dollars for the GOI.

The Infrastructure Security Program, a collaborative effort between various U.S. government entities in Iraq, was initiated to reduce the incidence of insurgent damage to the oil pipeline system, electrical distribution system, and other important infrastructure throughout Iraq. To protect critical oil pipeline corridors, this program developed the concept of the pipeline exclusion zone (PEZ). The PEZ is a significant example of the GOI's increasing desire to take responsibility for the security of its oil pipelines and of an effective cost-sharing partnership between the U.S. government and the GOI.

SIGIR inspected the Kirkuk-to-Baiji PEZ, which is approximately 95 kilometers long and provides physical barriers to prevent the interdiction or destruction of the oil pipeline or the tapping of the pipeline to illegally extract the oil. To complement the approximately \$34.4 million U.S. investment, the GOI committed its own resources to the project, both monetary and military, to enhance the overall effectiveness of the PEZ. Specifically, the GOI awarded a contract worth approximately \$12.3 million to provide extra security in the form of 185 guard towers, 16 company headquarters, and 4 battalion headquarters buildings along the entire length of the Kirkuk-to-Baiji PEZ, while also supplying 762 Iraqi Army troops to staff guard towers and patrol the entire length of the PEZ.

The PEZ provides physical and visible protection through the use of ditches, chain-link fences, berms and channels, concertina wire, and

FIGURE 7
SIDE VIEW OF THE PIPELINE EXCLUSION ZONE



Source: Based on USACE illustration.

guard houses (Figure 7). The Infrastructure Security Program developed and provided the original design to the contractor, who was encouraged to improve upon the furnished design. SIGIR reviewed the contractor's final design submittal package and determined that it was adequate to construct the various barriers and guard houses for the PEZ.

In an attempt to complete the entire length of the Kirkuk-to-Baiji PEZ expeditiously, the project was divided into seven phases, with each segment awarded to a different contractor. In June 2008, SIGIR visited the Phase 3 segment, which is at the northern end of the PEZ and surrounded by farmland and small, scattered villages on both sides. SIGIR found the fences, berms, ditches, concertina wire, and guardhouses to be in compliance with contract designs and specifications.

At the time of the inspection, U.S. government and military representatives reported that there had been no pipeline interdictions in the area since installation of the Kirkuk-to-Baiji PEZ. The decrease in interdictions along the PEZ directly resulted in a substantial increase in northern crude oil exports. In the 11-month period from July 2007 to May 2008, average northern monthly exports were more than 8 million barrels higher than they were during the preceding 18 months, representing a revenue increase of approximately \$8.215 billion.

Considering that the U.S. investment for the entire length of the Kirkuk-to-Baiji PEZ, when completed, was expected to be approximately \$34.4 million, the additional \$8.215 billion in crude oil revenues provided a 239:1 return on investment in only 11 months.

Kahn Bani Sa'ad Correctional Facility

Kahn Bani Sa'ad Correctional Facility, Kahn Bani Sa'ad, Iraq (PA-08-138), 7/25/2008

Before 2003, years of neglect led to a deteriorated prison infrastructure in Iraq. Prisons previously used for maximum security were suitable for no more than medium security by international standards. The



Kahn Bani Sa'ad Correctional Facility. (USACE photo)

prison facilities in Diyala province were damaged during the Coalition invasion and looted and vandalized afterward. To address the unacceptable conditions of Diyala's correctional facilities, the CPA decided to increase the overall bed count of the Iraq Corrections Service for the Ministry of Justice through the construction of a new secure prison that would house a total of 3,600 inmates in three types of facilities: segregation, maximum-security, and medium-security units. The Kahn Bani Sa'ad Correctional Facility project was designed for a two-phase construction.

In May 2004, the CPA awarded the first phase, which would accommodate 1,800 inmates, to Parsons Delaware, Inc., with a required completion date of November 12, 2005. However, by June 2006, the facility had been only partially completed, and the U.S. government notified Parsons that it would be terminated for default. Subsequently, the U.S. government awarded three successor contracts to complete the work; but in June 2007, citing security issues, it terminated all remaining work on the project and authorized leaving more than \$1.2 million worth of materials at the site. By that time, the U.S. government had expended approximately \$40 million on the project.

U.S. officials met with Ministry of Justice representatives to discuss plans to use the partially completed facility. The deputy minister stated that the ministry had no plans to "complete, occupy, or provide security for this facility." U.S. officials concluded that "subsequent to 1 August 2007, Kahn Bani Sa'ad will be under the ownership of the Government of Iraq and will no longer be secured."

During an on-site assessment of the facility in June 2008, approximately one year after the termination, SIGIR found the project site neither secured nor occupied by the GOI. SIGIR confirmed that the



Measurement of a concrete core sample that did not meet contract specifications. (USACE photo)

facility remained in the same condition it was in when the U.S. government unilaterally transferred it to the GOI in August 2007. Significant construction deficiencies remained:

- areas of severe exposure of the reinforcement bar on the surface of the load-bearing concrete ceiling beams
- concrete segregation and honeycombing
- potentially dangerous building columns
- generally poor workmanship

The U.S. government commissioned an engineering assessment company to inspect the partially completed facility. The resulting assessment report stated the facility had “numerous deficiencies in construction to include, but not limited to, poorly mixed concrete, insufficient cover over reinforcement, cracking, and poor concrete placement.” In some instances, the thickness of selected concrete cores was less than 100 millimeters, which is far less than the design thickness of 150 millimeters. The assessment recommended demolishing one medium-security building and significant portions of the other two medium-security buildings, as well as demolishing all non-reinforced walls.

SIGIR also searched the entire site for the \$1.2 million in materials that the contractor reported as “abandoned” when the contract was terminated. SIGIR observed several stacks of cement blocks and several dozen rolls of chain-link fence; however, most of the reported materials were missing from the site.

SIGIR believed the U.S. government and the GOI should make an effort to use the \$40 million investment that the U.S. government had made in the Kahn Bani Sa'ad Correctional Facility. SIGIR believed that costly portions of the facility were functional, and, with additional investment, other portions could be used. SIGIR discussed this recommendation with U.S. government and military representatives who agreed to work with the appropriate GOI and Diyala provincial government representatives to make use of the facility.

Falluja Waste Water Treatment System

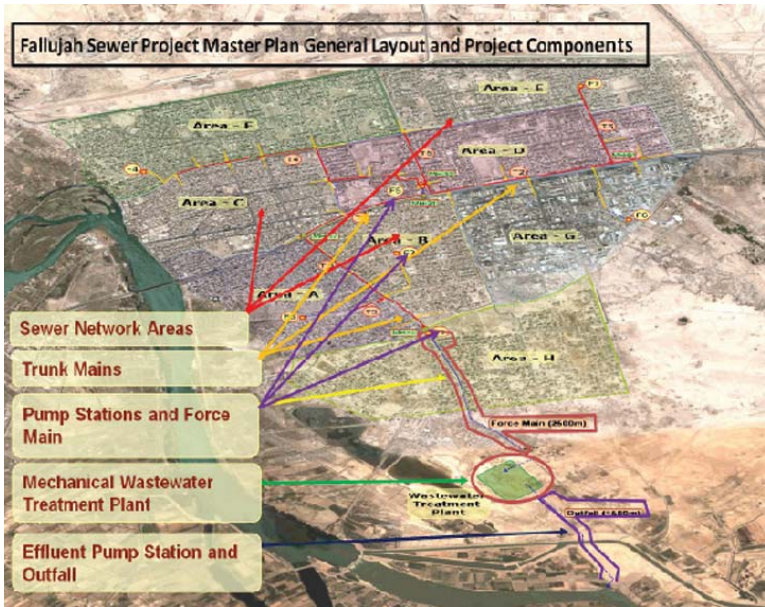
Falluja Waste Water Treatment System, Falluja, Iraq (PA-08-144, PA-08-145, PA-08-146, PA-08-147, and PA-08-148), 10/27/2008

In June 2004, the CPA issued a task order to FluorAMEC to design and construct a new wastewater treatment system to serve the then-estimated 24,400 homes in the entire city of Falluja. At the time, the city did not have a comprehensive wastewater system, and the U.S. government and GOI identified this project as a priority because it would provide sewage treatment for a predominantly Sunni area.

The system was to include eight sewer collection networks, trunk and force-main pipelines, seven pump stations, a wastewater treatment plant, and an effluent pump station with outfall to the Euphrates River. The project was to start on July 1, 2004, and was scheduled to be completed in 18 months. In September 2005, after the project experienced schedule delays and cost growth of approximately \$25.8 million, the U.S. government terminated the original contract. At the time, only a portion of one collection network was complete. Over the next three years, 45 separate contracts were awarded to Iraqi contractors to complete portions of the wastewater treatment system and provide needed equipment and supplies.

In July 2008, the U.S. Ambassador to Iraq became “extremely concerned” that the Falluja Waste Water Treatment System had “gone so far off track and for so long”—specifically, that the project was now expected to cost \$98 million, be only partially completed by April 2009 (56 months after the original start date), and serve only 9,300 homes (approximately 38% of the city of Falluja).

SIGIR performed this assessment to address the Ambassador’s concerns about costs, timeliness, and extent of completion. After reviewing project file documentation, SIGIR determined that several factors contributed to the schedule slippage and escalating costs:



Original design for the entire Falluja Waste Water Treatment System. (Courtesy of USACE)

- unrealistic expectations by the U.S. government with regard to schedule and cost estimates, given the unpredictable security situation in the area
- the decision to redesign the treatment plant from a lagoon system to an activated-sludge system
- funding and contracting issues
- indecision by the U.S. government with regard to identifying a path forward for this project
- quality issues arising from a limited contractor and subcontractor pool
- workplace safety issues at the project sites

SIGIR chose five contracts to review in its assessment report. The selected contracts provided coverage of all three funding sources and multiple facets of the project, including sewer collection Area A, the force main, and the wastewater treatment plant.

Because the work site was located in a dangerous area, SIGIR's inspectors only had time to inspect the wastewater treatment plant and Pump Station 1. At the treatment plant, they found no significant deficiencies; however, at Pump Station 1, they observed an area of inadequately



Pump station under construction at the Falluja Waste Water Treatment Plant.

poured concrete. USACE had previously identified the unacceptable concrete work on a deficiency list, which it required the contractor to replace before issuing final payment.

SIGIR determined that sustainability was not adequately addressed for this project. At the inception of the project, the U.S. government wanted the treatment plant to use a lagoon system because it required little power, no skilled personnel, and little maintenance to operate. However, the Ministry of Municipalities and Public Works rejected the lagoon system because it was “for third-world countries.” Instead, the ministry requested the use of a mechanical (activated-sludge unit) system, and the U.S. government accepted the ministry’s proposal to use such a system. This decision had significant, irreversible, and long-term ramifications on the future operation and maintenance of the treatment plant and associated facilities.

When the original task order was awarded in mid-2004, little permanent power was required at the facility because the wastewater treatment plant was designed with a lagoon system. In November 2005, when the U.S. government agreed to the redesign, the need for permanent, reliable power became critical. In July 2007, the U.S. government realized that the Iraqi national grid would not provide “any significant improvements [for permanent power] in the foreseeable future.” As a result, the plant was further redesigned to operate by continuous-use generators, instead of standby generators. This would require approximately 520 gallons of fuel per hour to operate the generators for the full running of the wastewater treatment system, or



Unacceptable cement pour at a Falluja Waste Water Treatment System pump station.

200–250 gallons of fuel per hour to operate the limited service portion of the project. At the time, no contract existed to provide the needed fuel. According to U.S. representatives, the Ministry of Municipalities and Public Works would be responsible for providing the fuel; however, the ministry had not yet committed to providing the fuel that would be required to run the treatment plant and three pump stations.

SIGIR determined that the results of the Falluja Waste Water Treatment System project would not be consistent with either the original or revised project objectives. Originally, the project objective was to provide a comprehensive wastewater treatment system for the entire city of Falluja; however, due to significantly increased costs and project delays, the objective was modified to provide the backbone to the wastewater treatment system (that is, the treatment plant, pump stations, and trunk lines) and make it available to only three of Falluja's eight collection areas. The original intent was to provide house-connection pipes to within one meter of the property line, and the Ministry of Municipalities and Public Works would then be responsible for making the connections from each house to the collection system. In a cost-saving measure, the ministry proposed allowing each homeowner to make the connection to the collection system. USACE representatives were concerned about this proposal; specifically, they believed that homeowners would simply knock a hole through the manhole walls, damaging the collection system. Without house connections to the collection systems, there would be no method of transferring wastewater from individual houses to the wastewater treatment system. At

the time of SIGIR's assessment, neither the U.S. government nor the GOI had funding in place to perform the house-connection work; therefore, no Falluja residents would benefit from the wastewater treatment system.

To protect the \$98 million U.S. investment, SIGIR recommended that U.S. representatives coordinate with the GOI to ensure an adequate amount of fuel would be provided until permanent, reliable power was available; to ensure a solution to permanent power for the treatment plant and pump stations; and to guarantee that house connections were made to tie the three collection areas into the sewer network system.

Abu Ghraib Dairy

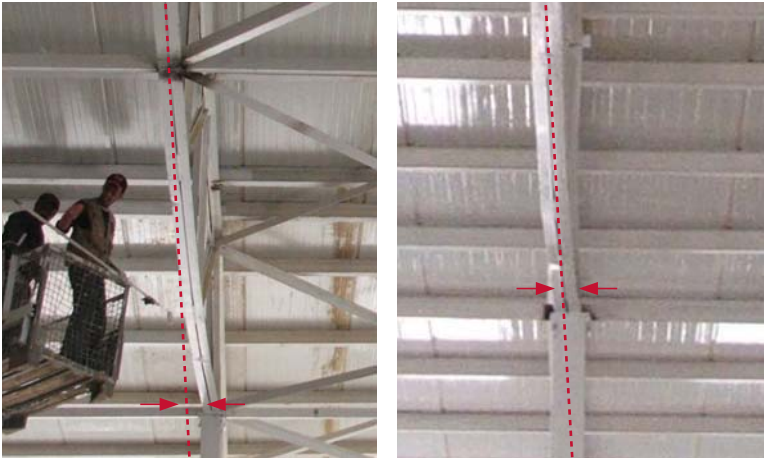
Abu Ghraib Dairy, Abu Ghraib, Iraq (PA-09-172), 1/14/2010

Iraq does not have the resources necessary to provide dairy products to its increasing population. According to the Iraqi Ministry of Agriculture, in 2008 Iraq had 1,064,404 head of cattle, 146,092 head of water buffalo, 13,793,789 sheep, and 645,662 goats, which produced approximately 165,000 tons of fresh milk annually. This liquid "ready to drink" milk accounted for about one-third of the total consumption, while the remaining two-thirds came from reconstituted powdered milk.

Iraq's State Company for Dairy Products produces milk-based products, such as bottled milk, yogurt, cheese, cream, and butter. However, this state-owned company suffered for years from lack of investment in new machinery and in regular maintenance of the existing equipment, which resulted in the "newest machinery" being more than 28 years old. A manual glass-bottle-filling machine was more than 50 years old, and the homogenizer had been out of order for several years.

In August 2002, the Saddam Hussein government entered into a contract with a Lebanese company for the delivery and installation of new line equipment to produce 10 tons of milk per hour in high-density polyethylene bottles. This equipment, earmarked for the Abu Ghraib Dairy Plant, was delivered in crates in 2002 to a warehouse within the Ministry of Industry and Minerals compound because the dairy plant did not have room to store it. Before a new facility could be constructed, the United States and its Coalition partners had begun Operation Iraqi Freedom, postponing the project and leaving the equipment to sit idle in crates.

At the request of the Multi-National Division-Baghdad in 2007, the Task Force for Business and Stability Operations (TFBSO) sought to rebuild the production capability of the Abu Ghraib Dairy Plant by using the previously purchased equipment. The U.S. government entered



Deformation (lateral bow) in lower roof truss chords at the Abu Ghraib Dairy.

into a \$3.4 million cooperative agreement with the State Company for Dairy Products to rebuild the Abu Ghraib Dairy factory's production capability, satisfy the local market, and support the Ministry of Education's school nutrition program of providing Iraqi children with pasteurized milk.

SIGIR reviewed the contractor's designs and specifications and found them insufficient to adequately construct the facility and the various systems within the facility. Specifically, the contractor's design drawings lacked significant details for site utilities, such as a potable water system, water supply and treatment, sewage treatment, and electrical generation and distribution. For example, due to the lack of information available regarding the existing potable water system, SIGIR could not determine if the contractor had verified that the existing potable water supply could provide the required pressure or quantity of water for the facility.

SIGIR reviewed the contractor's design calculations for the steel columns and continuous truss of a typical building section and identified the following significant issues with the integrity of the structure:

- The allowable roof load used in the analysis was 8 pounds per square foot; International Building Code required a minimum live load of 12 pounds per square foot for the design of roofs.
- The calculations did not account for lateral loads on the structure, including high winds and seismic loading.
- Based on the contractor's calculations, five members of the truss were designated as failing the American Institute of Steel Construc-

tion code check. Two of the members failed the code check by more than three times the allowable limit. Failing by a factor of this magnitude indicates that the members could yield and possibly fracture under the design load.

- The analysis did not consider knee braces. The size and placement of knee braces will significantly affect the performance of the structure and may result in the failure of the lower truss chord.

SIGIR immediately brought these concerns to the attention of U.S. officials and TFBSO. The contracting officer issued a partial stop-work order and requested that the contractor submit a proposed plan to remedy the issues. TFBSO retained USACE to provide oversight for the performance of the contractor's corrective actions and QA of ongoing construction.

SIGIR made two visits to the project site. During the first site visit, SIGIR observed construction deficiencies: anchor bolts were not adequately protected, the concrete masonry unit wall was not constructed on the exterior of the steel framing, the floor slab was poorly constructed, and several of the roof trusses were deformed. SIGIR's second site visit, performed after TFBSO had retained USACE, confirmed that the contractor had corrected several of the deficiencies SIGIR had identified during the initial site visit. In addition, SIGIR noticed the contractor's construction quality improved after USACE's involvement in construction oversight.

Even after the completion of the building, the production capability of the Abu Ghraib Dairy would depend on the condition of the existing milk-line equipment. The U.S. government awarded the cooperative agreement before the equipment had been tested to confirm it was fully operational. SIGIR was concerned that, after sitting idle in a leaking warehouse for more than seven years, the equipment would not be operational, which would require the procurement of new equipment and further delay the opening of the Abu Ghraib Dairy.

Missan Surgical Hospital

Missan Surgical Hospital, Al-Amarah, Iraq (PA-08-165 and 167), 7/16/2009
Among the poorest of Iraq's 18 provinces, Missan has suffered from some of the most concerning health problems in Iraq and from inadequate healthcare facilities. The GOI requested the U.S. government fund a state-of-the-art 100-bed surgical hospital and training facility for medical students from Missan University Medical College. At a cost of \$12.7 million,

the Missan Surgical Hospital was the largest U.S.-funded health project for this province. This project would directly benefit more than 100,000 Iraqi citizens, and the Iraqi Minister of Health viewed it as the single most important development in Missan province.

By late 2008, the U.S. Ambassador became increasingly frustrated and concerned about the lack of progress with the construction of the hospital and asked SIGIR to perform an assessment. SIGIR's review of the contractor's design drawings identified that, almost two years after the notice to proceed was issued, neither the contractor nor the U.S. government had determined how water would be provided to the hospital and how wastewater from the hospital would be disposed of.

SIGIR inspected the construction site in January 2009 and found only a partial skeleton of the project completed—concrete formwork and preparation for concrete placement. SIGIR determined that the “26% complete” reported by various U.S. agencies was overly optimistic; the main hospital portion of this project, scheduled to be completed by March 2009, was more realistically about 10%–15% complete. SIGIR observed construction deficiencies, such as a poorly constructed security wall, areas of reinforcing steel with a coating of cement residue, a reinforcing configuration used in the construction of the reinforced concrete columns that varied from the configuration specified in the design drawings, and several examples of concrete honeycombing—ranging from slight to moderate to severe.



Unacceptable cement pour with honeycombing and exposed rebar at the Missan Surgical Hospital.

SIGIR recommended that the USACE Gulf Region Division resolve the design deficiencies, omissions, and areas of concern, specifically ensuring complete design drawings for water and wastewater distribution lines to and from the hospital, with the contractor to guarantee that the project was adequately designed. The Gulf Region Division agreed with SIGIR's recommendation and began working with the contractor and the local municipality for both water and electrical requirements.

The GOI's lack of planning was also cause for concern. When funding this project, the U.S. government promised to construct a surgical hospital and ancillary facilities, and the GOI committed in writing to provide all the medical equipment, furniture, and personnel to open, operate, and maintain the project, as well as start-up and annual operating budgets. Yet, as of May 2009 (21 months after the GOI's pledge to fund this project), the GOI had not procured any equipment, identified any of the specialized doctors and nurses needed to staff the hospital, or allocated any funding for this project.

SIGIR briefed the Deputy Chief of Mission on the results of the assessment and noted that the hospital would serve no beneficial purpose until the issues that SIGIR identified were resolved.

Basrah Children's Hospital

Basrah Children's Hospital, Basrah, Iraq (PA-08-160), 7/28/2009

Over the past 35 years, Iraq's healthcare system deteriorated from the best in the Middle East to that of a third-world developing country, primarily because of a lack of investment in health care for children and in modern training for healthcare providers. In 2003, First Lady Laura Bush expressed concern about the deteriorating Iraqi healthcare system and, particularly, the need to support children suffering from cancer. As of 2003, childhood cancers were 8–10 times more common in Iraq than in the western world; the incident rate in Iraq was 8% compared with 0.5%–1% in developed countries. Children under the age of five accounted for approximately 56% of the registered cancer cases. Because of Iraq's lack of adequate healthcare services, most cancer cases were not detected until the disease reached the advanced stages, when even the best therapies cannot provide a cure. Approximately 8% of Iraqi children with leukemia survived, compared with 80% in the United States.

Project HOPE—an international nonprofit health, education, and humanitarian assistance organization—made a fact-finding mission to Iraq in 2003 and found “deplorable health care conditions plaguing Iraqi society.” Project HOPE identified a very high child-mortality rate



Signage at the entrance of the Basrah Children's Hospital.

in southern Iraq, where 150 out of 1,000 children were dying before reaching the age of five; most died before their first birthday. In addition, cancer is almost five times more prevalent in southern Iraq than the national average.

To combat the alarming rate of child mortality in southern Iraq, USAID and Project HOPE formed a public-private partnership to establish a “state of the art” pediatric specialist hospital in Basrah. Specifically, USAID was responsible for the construction of a two-story, 160,000-square-foot, 94-bed acute- and referral-care center; Project HOPE was responsible for providing medical equipment and training Iraqi doctors and nurses. The focus of this hospital was to be pediatric oncology, and early projections called for annual pediatric admissions of 360 cancer patients, 468 intensive-care patients, 354 neonatal intensive-care patients, and 2,230 acute-care patients. In addition, this hospital was intended to lead the southern province in meeting the Ministry of Health’s goal to reduce child mortality by 50% over the next five years. The U.S. government envisioned a signature project to meet the urgent medical needs of Iraqis, especially the needs of critically ill children. The project eventually became known as the Basrah Children’s Hospital, also referred to as the Laura Bush Children’s Hospital.

Originally scheduled to be completed by December 2005 at an estimated cost of \$50 million, by June 2006 the project had experienced significant cost growth and repeated schedule delays primarily because of poor subcontractor performance and limited oversight by the prime

contractor. At the time of SIGIR's site visit in January 2009, construction of the facility was still ongoing, and the total cost of the project had reached \$165.7 million (including construction, medical equipment, training, and consumables). The project cost more than \$100 million in U.S. funding alone. SIGIR did not observe significant construction deficiencies or any noticeable defects associated with the quality of workmanship, and the facility appeared to meet the standards of the contract. However, several factors contributed to the escalation of the project's costs and the slippage of its schedule, including:

- unrealistic time frames for designing and constructing a new hospital, including determining the scope/size of the facility, while integrating more than 8,000 pieces of equipment, furniture, and computers
- poor soil condition at the project site
- the unpredictable security situation in and around the project site, where 24 workers were murdered during construction
- multiple partners and funding sources
- GOI difficulty in supporting the assigned tasks of construction and operation of the hospital

Throughout the course of this project, the U.S. government and Project HOPE outlined the Ministry of Health's responsibilities for the success of this project. However, as of June 2009, the GOI had difficulty supporting these assigned tasks of construction and operation of the hospital:

- providing qualified candidates for critical training courses, such as radiation therapy
- allocating funding for an annual operating budget
- allocating funding, advertising, or awarding service contracts (housekeeping, laundry, food service, cleaning) or maintenance contracts for high-end medical equipment
- advertising or awarding the wastewater treatment plant contract
- developing, advertising, or awarding the medical fluid waste treatment contract
- providing dedicated electrical power

Each of these GOI items was essential for completion of the project and successful operation of the facility.

Although the Basrah Children's Hospital was originally conceived to provide southern Iraq with a state-of-the-art pediatric-specialist hospital, by February 2009 the U.S. government, Project HOPE, and the GOI had signed a memorandum of understanding that redefined it as

a “modern pediatric hospital in Basrah.” By definition, state-of-the-art refers to the latest and most sophisticated or advanced stage of technology, whereas Project HOPE would be providing medical technology circa 2005.

Chamchamal Correctional Facility

Renovate and Expand Chamchamal Correctional Facility, Chamchamal, Iraq (PA-09-177), 10/22/2009

In 2007, the Iraqi penal system did not have a sufficient number of correctional facilities to adequately house the growing number of captured terrorists and criminals. In addition, the existing Iraqi prisons did not meet the human rights standards prescribed by the United Nations.

At the request of the Kurdistan Regional Government, the U.S. government funded a \$28.7 million project to increase the bed count of the Iraq Corrections Service of the Ministry of Justice by renovating, expanding, and converting the 30-year-old Chamchamal Fort into a safe, secure, and humane correctional facility. Located in Sulaymaniyah province, this poorly maintained fort was partially destroyed in 2003 by Coalition forces, and the remnants were subsequently looted. Once renovated, the Chamchamal Correctional Facility would provide approximately 2,000 medium-security, dormitory-style adult male prison beds, and 1,000 high-security, cell-style adult prison beds to help alleviate overcrowding in the Iraqi prison system. In March 2009, USACE,



Chamchamal Correctional Facility. (USACE photo)

the construction manager, turned over the Chamchamal Correctional Facility to the Iraq Corrections Service.

Prior to visiting the project site, SIGIR reviewed the contractor's design submittals. Although the contractor's design submittals adequately met the requirements of the contract's statement of work, SIGIR noticed that the statement of work did not address the original facility's external expansion joints. Considering that the external walls are exposed to extreme climatic conditions (excessive heat in the summer and snow in the winter), SIGIR's opinion was that external expansion joints should have been part of the statement of work.

In June 2009, SIGIR conducted an on-site assessment of the correctional facility. Due to the size of the site (approximately 20,000 square meters), the complexity of the project, and time limitations (approximately two hours on site), SIGIR performed an expedited assessment of the project. Specifically, SIGIR inspected several medium-security dormitory-style cells (50 or fewer prisoners per cell) and high-security cells (1–4 prisoners per cell).

The U.S. government was responsible for the construction of the correctional facility, and the Kurdistan Regional Government was to be responsible for an operational budget to provide for a staff and electrical power to run the facility. At the time of SIGIR's site visit, the Chamchamal Correctional Facility did not house any prisoners or guards and was not operational, which prevented inspectors from being able to fully assess the buildings' systems, including:

- potable water distribution
- wastewater conveyance/disposal
- electrical power production and distribution
- voice and data communication
- external security lighting system

SIGIR's site visit identified only minor construction deficiencies, such as an incomplete expansion joint system and a tripping hazard outside the kitchen building. Aside from these minor construction issues, SIGIR concluded that the construction of the Chamchamal Correctional Facility was adequate.

At the time of the assessment, U.S. representatives were concerned about the Kurdistan Regional Government's inability to provide power, staffing, and an operational budget for this project. Approximately half of the contractor's one-year warranty for any construction defects had expired without a single prisoner or guard using the facilities—sinks,

toilets, showers, electrical lights and outlets—to identify latent defects. SIGIR met with various U.S. officials in an effort to resolve the problems with the Kurdistan Regional Government’s inability to operate the facility. Representatives of the Department of State’s Bureau of International Narcotics and Law Enforcement Affairs took prompt action to encourage the GOI to use this facility.

In September 2009, a prisoner riot at the Baghdad Central Prison resulted in the death of one prisoner, various injuries to as many as 40 prisoners, and fire damage that left the prison facility “uninhabitable.” The Ministry of Justice relocated 360 inmates and 10 Iraqi correctional officers from the Baghdad Central Prison to the Chamchamal Correctional Facility. Over the next week, the ministry continued to transfer additional inmates to the Chamchamal Correctional Facility to alleviate overcrowding in Baghdad prisons. According to the Chamchamal Correctional Facility’s provisional warden, as of October 12, 2009, there were 2,637 inmates and 240 Iraqi correctional officers at the facility. In addition, the Iraqi Ministry of Finance had allocated 13 billion Iraqi dinars (\$11.1 million) per month to the Iraq Corrections Service for the facility’s operation and sustainment.

Erbil Orphanage and Senior Citizen Assisted Living Center

*Orphanage and Senior Citizen Assisted Living Center, Erbil, Iraq
(PA-09-178), 10/21/2009*

In August 2007, the U.S. government awarded a \$3.7 million contract for a first-of-its-kind facility in Iraq—a combined orphanage and senior center. The project involved the demolition of the original orphanage, which the facility manager had likened to a prison. In February 2009, the U.S. government officially turned over the Orphanage and Senior Citizen Assisted Living Center project to the Director of the Ministry of Social Affairs in Erbil province. The facility was able to provide a safe home for 345 children (165 boys and 180 girls) and 60 senior citizens.

SIGIR reviewed the contractor’s design package, which included the architectural layout and building designs. The contractor’s drawings contained specific information regarding the structural details, building mechanical systems, site utilities, site drainage, sewage collection system, and other project features. Based on the detailed statement of work and the inclusion by reference of other applicable codes and standards, adequate information was provided in the specifications for the contractor to complete the final design and con-



Exterior of dorm buildings at the Erbil Orphanage and Senior Citizen Assisted Living Center.



Interior view of a dorm room.

struct the facility. In addition, although not required by the contract, the contractor supplied a geotechnical report, which was prepared by a local construction laboratory. The report contained information on the borings, physical and chemical properties of the soil, and allowable soil-bearing capacity.

In July 2009, SIGIR conducted an on-site assessment of the Orphanage and Senior Citizen Assisted Living Center, which was occupied and functioning. Aside from a few minor safety concerns, SIGIR concluded that the quality of work by the contractor was the best SIGIR had observed in more than five years of performing project assessments.

Specifically, the administration building included an exquisite rotunda, spiral staircase, and decorative interior floor tile. A balcony surrounded the rotunda on the second level, complete with decorative brass and stainless steel handrails. In addition, the contractor had maximized the efficient use of space in the design. For example, the kitchen area provided significant open space for food preparation and contained commercial-grade appliances, and the walls and floor were finished with ceramic tiles, which allowed for easy cleaning.

SIGIR also found the facility to be in immaculate condition even after five months of continuous operation. The individual bedrooms, living rooms, kitchen, and dining areas were spotless. The facility staff encouraged the children to keep their rooms neat and tidy, with toys tucked away under their beds. SIGIR concluded that the operation and maintenance of this facility by the staff was the best SIGIR had seen.

Basrah Modern Slaughterhouse

Basrah Modern Slaughterhouse, Basrah, Iraq (PA-09-189), 4/27/2010

Because Basrah province did not have an adequate number of slaughterhouses to kill and process meat in a safe and sanitary environment, the U.S. government in August 2008 awarded a \$5.6 million contract to design and construct a modern slaughterhouse in the province's al-Zubair district.

SIGIR found the contract and its statement of work to be poorly written and confusing, which prevented four USACE representatives, including the project's construction representative, from understanding the requirements. One USACE representative stated that "there is confusion regarding what is actually required for the project." In addition, the contractor designed the slaughterhouse facility significantly smaller than the statement of work required. The contract and statement of work called for a 6,000-square-meter slaughtering facility for sheep and cattle. However, within USACE, there was confusion as to the definition of "facility." For example, four USACE representatives, including the construction representative responsible for the project, reviewed the contract and statement of work and determined that the project required the contractor to construct a slaughterhouse with an operational area of 1,728 square meters and a perimeter fence of 500 meters. But when the contractor submitted designs providing an operational area of 840 square meters and a perimeter fence of 320 meters, USACE approved the designs. In addition, USACE did not attempt to negotiate an equitable price adjustment for the significant amount of work



Basrah Modern Slaughterhouse under construction, showing upper-level concrete intermediate (cross) beams improperly supported by brick façade.

de-scoped from the project. Consequently, it appears that the contractor was overpaid.

SIGIR reviewed the contractor's 100% design drawings and related construction documentation and found them to be inadequate for initiating construction. Specifically, the 100% drawings were incomplete and contained many inaccuracies, omissions, and unapproved changes. SIGIR also determined that the project file did not include any assumptions, such as the anticipated number of sheep and cattle to be housed in the summer/winter halls prior to slaughtering, the daily number of sheep and cattle to be slaughtered, or the daily requirements for electrical power, potable water, and wastewater. Without these assumptions, SIGIR could not determine if the contractor had adequately designed the facility for the anticipated operational requirements.

SIGIR visited the project site in September 2009, which was approximately five weeks after the August 2009 deadline to complete the project. SIGIR found the facility to be approximately 45% complete. None of the building systems, such as potable water storage and distribution, wastewater conveyance/disposal, or electrical power production and distribution, were in place. During the site visit, SIGIR identified instances of construction not in accordance with the contractor's design, such as the placement of lintels, tie beams, and intermediate beams.

While the contract addressed sustainability for construction warranties and spare parts, the remainder of the project suffered from a lack of adequate planning. This facility, when completed, would require a significant amount of electricity, potable water, and sewage and blood disposal. Reliable, permanent power is essential for operating the various pieces of slaughtering equipment, as well as the cold storage rooms, waste processing equipment, laboratory, and miscellaneous ancillary facilities. An adequate supply of potable water is critical to operating the slaughterhouse in a hygienic manner. The treatment and disposal of waste products, such as wastewater and animal blood, is vital to keeping the slaughterhouse operating sanitarily. The lack of any one of these utilities would render the slaughterhouse inoperable.

As of the time that SIGIR issued its report in April 2010, which was more than 19 months after award of the contract, neither USACE nor the contractor knew of a potential source of permanent power, potable water, or sewage and blood disposal for the slaughterhouse. A USACE representative stated that “the Iraqi government has not made any further commitments to provide utilities to the site.”

Appendix A: Breakdown of Inspections by Sector, Location, Contracting Agency, Funding Source, and Type of Assessment

The vast number of reconstruction projects carried out by the U.S. government in Iraq made it impossible for the Special Inspector General for Iraq Reconstruction (SIGIR) to assess all of them. That they were being carried out in a war zone made it unfeasible to randomly select projects for assessment. Instead, SIGIR sought to focus on a representative cross section. SIGIR selected projects from each sector, from large and small contractors, in different geographic areas of Iraq, involving each of the major U.S. agencies and different funding sources, as well as from projects at varying stages of execution—ongoing to complete. Also considered in the selection of projects for inspections were the requests of military commanders and Department of State officials; the significance of the project; the likelihood of fraud or waste; and allegations about specific projects, sites, and contractors.

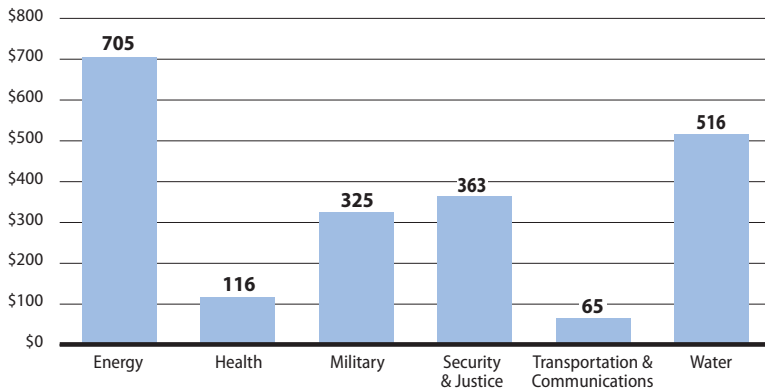
From June 2005 through April 2010, SIGIR issued reports on 170 projects, providing snapshots of reconstruction activities valued at nearly \$2.1 billion.

Sectors

SIGIR conducted assessments in six reconstruction sectors:

- Security and Justice—36 reports (\$363 million)
- Energy—33 reports, including one special assessment (\$705 million)
- Transportation and Communications—33 reports (\$65 million)

FIGURE 8
CONTRACT VALUE OF PROJECTS INSPECTED, BY RECONSTRUCTION SECTOR
\$ Millions



Note: Data not audited. Numbers affected by rounding.

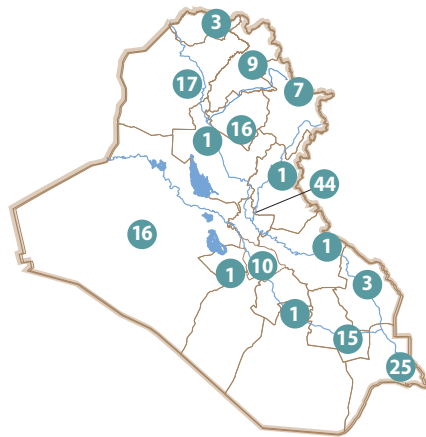
- Health—24 reports (\$116 million)
- Water—25 reports (\$516 million)
- Military—19 reports (\$325 million)

Figure 8 shows the sector breakdown by contract value.

Locations

Figure 9 shows the locations, by province, where SIGIR conducted inspections.

**FIGURE 9
LOCATIONS OF ON-SITE PROJECT
ASSESSMENTS COMPLETED BY SIGIR**



Contracting Agencies

U.S. agencies involved in Iraq relief and reconstruction efforts included the Coalition Provisional Authority (CPA) and its Program Management Office; the U.S. Army Corps of Engineers (USACE) and its Gulf Region Division¹ and Project and Contracting Office; the Department of State and its Iraq Reconstruction Management Office, Iraq Transition Assistance Office, and Iraq Strategic Partnership Office; and the U.S. Agency for International Development. The CPA's Program Management Office awarded most of the relief and reconstruction contracts in 2003 and 2004. After the Program Management Office was disestablished in 2004, relief and reconstruction contracts were awarded either by USACE's Gulf Region Division or the Joint Contracting Command-Iraq/Afghanistan of the

¹ The USACE organization in Iraq initially comprised three districts under the Gulf Region Division: Gulf Region North, Gulf Region Central, and Gulf Region South. Each of the districts had local area, resident, and project offices. The designation of a local office as an area, resident, or project office depended on the number of reconstruction projects that it was responsible for overseeing. Since July 2009, USACE in Iraq has reorganized to downsize as the number of reconstruction projects has diminished. The Gulf Region Division was disestablished, and the three districts were combined to form the Gulf Region District. The reduced number of reconstruction projects has also resulted in the closing or reduction in size of many of the local area, resident, and project offices. In the body of this report, the names of USACE organizations at the time of the actions cited are used.

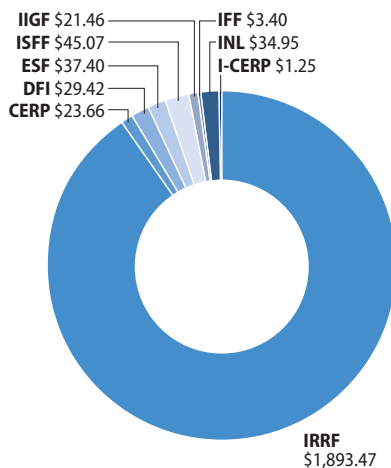
Multi-National Force-Iraq, which was subsumed into the U.S. Forces-Iraq in January 2010.²

Most contracts were administered by the Gulf Region Division through its Gulf Region North, Gulf Region Central, or Gulf Region South Districts. Other agencies that administered relief and reconstruction contracts included the Air Force Center for Engineering and the Environment and Multi-National Force-Iraq (which included the Multi-National Security Transition Command-Iraq, Multi-National Corps-Iraq, and Multi-National Division-Iraq).

Funding Sources

Different types of funds have been used to reconstruct Iraq. The majority of the projects assessed by SIGIR's Inspections Directorate were funded by the Iraq Relief and Reconstruction Fund (IRRF). The other projects reviewed were funded by the Commander's Emergency Response Program (CERP), Iraq Security Forces Fund (ISFF), Economic Support Fund (ESF), Iraq Freedom Fund (IFF), Iraqi Interim Government Fund (IIGF), the Department of State's Bureau of International Narcotics and Law Enforcement Affairs (INL), the Development Fund for Iraq (DFI), and the Iraq-Commander's Emergency Response Program (I-CERP). Figure 10 summarizes the dollar value of projects SIGIR assessed, by fund.

FIGURE 10
COST OF PROJECTS SIGIR ASSESSED, BY FUND
\$ Millions



Note: Data not audited. Numbers affected by rounding.

In-progress Projects versus Completed Projects

SIGIR issued reports on 116 projects still under construction at the time of SIGIR's site visit and 54 sustainment assessments of projects that were completed by the time of the site visit.

² The U.S. Forces-Iraq replaced and absorbed the former Multi-National Corps-Iraq, Multi-National Force-Iraq, and the Multi-National Security Transition Command-Iraq. In the body of this report, the names of U.S. Forces-Iraq organizations at the time of the actions cited are used.

Appendix B: Completed SIGIR Inspections

This appendix contains a list of completed inspections on Iraq reconstruction activities by the Special Inspector General for Iraq Reconstruction (SIGIR).

ASSESSMENT NUMBER	PROJECT NAME	PROVINCE	TOTAL COST	EXECUTING AGENCY	CONTRACTOR
PA-05-001	Al Wahda Water Treatment Plant	Baghdad	\$7,464,685	PCO	Fluor/AMEC
PA-05-002	Al Wathba Water Treatment Plant	Baghdad	\$7,464,685	PCO	Fluor/AMEC
PA-05-003	Al Nahrwan Water Supply Project	Baghdad	\$289,980	GRD	Foreign
PA-05-004	Al Sumelat Water Network	Baghdad	\$743,650	PCO	SIMA International
PA-05-005	Al Hakamia Substation	Basrah	\$5,933,973	PCO	Perini Corporation
PA-05-006	Hamdan Substation	Basrah	\$5,000,933	PCO	Perini Corporation
PA-05-007	Al Kaffat Substation	Basrah	\$5,933,973	PCO	Perini Corporation
PA-05-008	Al Seraji Substation	Basrah	\$5,709,225	PCO	Perini Corporation
PA-05-009	Shatt al Arab Substation	Basrah	\$5,298,324	PCO	Perini Corporation
PA-05-010	Al Fatah Pipe River Crossing	Tameem	\$29,715,425	PCO	PIJV
PA-05-011	Kirkuk Canal Crossing	Tameem	\$2,087,890	PCO	PIJV
PA-05-012	Al Fatah River Crossing Tie-ins	Tameem	\$8,156,284	PCO	PIJV
PA-05-013	Kirkuk to Baiji Pipeline Project	Tameem	\$635,500	GRD-PCO	PIJV
PA-05-014	Kirkuk to Baiji Pipeline Project	Tameem	\$658,100	GRD-PCO	PIJV
PA-05-015	Al Balda Police Station	Babylon	\$134,655	GRD	Foreign
PA-05-016	Hilla Maternity and Children's Hospital	Babylon	\$7,414,096	PCO	Parsons Global Services
PA-05-017	Hai Al Imam Clinic	Babylon	\$441,625	PCO	Parsons Delaware, Inc.
PA-05-018	Special Weapons and Tactics (SWAT) Police Station	Babylon	\$2,219,092	GRD	Foreign
PA-05-019	Babil Railway Station Rehabilitation	Babylon	\$273,931	PCO	Foreign
PA-05-020	Seif Sa'ad Police Station	Babylon	\$153,000	GRD	Foreign

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ASSESSMENT NUMBER	PROJECT NAME	PROVINCE	TOTAL COST	EXECUTING AGENCY	CONTRACTOR
PA-05-021	Border Forts Numbered 602, 604, 628, and 634	Sulaymaniyah	\$271,912	GRD	Parsons Delaware, Inc.
PA-05-022	Border Forts Numbered 602, 604, 628, and 634	Sulaymaniyah	\$274,632	GRD	Parsons Delaware, Inc.
PA-05-023	Border Forts Numbered 602, 604, 628, and 634	Sulaymaniyah	\$271,912	GRD	Parsons Delaware, Inc.
PA-05-024	Border Forts Numbered 602, 604, 628, and 634	Sulaymaniyah	\$271,912	GRD	Parsons Delaware, Inc.
PA-05-025	Ammo Supply Point	Basrah	\$252,650	GRD	Foreign
PA-05-026	Operation Center & Security Facilities Construction	Basrah	\$408,433	GRD	Foreign
PA-05-027	Security Upgrades for the Port of Umm Qasr	Basrah	\$3,698,515	GRD	Foreign
PA-05-028	Umm Qasr Water Scheme	Basrah	\$15,600,000	GRD-PCO	Washington International
PA-05-029	Project Phoenix Restore Qudas Gas Turbine Units to Operation	Baghdad	\$12,685,332	PCO	Fluor/AMEC
PA-05-032	Police Academy Hilla	Babylon	\$23,554,376	JCC-I/A	SBIG Logistics & Technical Services
PA-05-033	Kerbala Library	Kerbala	\$1,293,810	CPA (South Central)	Global Business Group
PA-06-034	Air Traffic Control Tower and Navigational Aids	Ninewa	\$10,329,474	GRD	Foreign
PA-06-035	Ninewa Village Roads Segment 3	Ninewa	\$1,119,476	GRD	Foreign
PA-06-036	Fire Station Construction Ainkawa	Erbil	\$1,355,857	GRD	Parsons Global Services
PA-06-037	Erbil City Transformers	Erbil	\$3,372,288	GRD	Washington International, Inc.
PA-06-038	Sheile Primary School	Dahuk	\$460,438	GRD	Foreign
PA-06-039	Zakho Military Academy	Dahuk	\$5,814,033	GRD	Foreign
PA-06-040	Aviation Base Building	Tameem	\$13,199,923	AFCEE	Environmental Chemical Corporation

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ASSESSMENT NUMBER	PROJECT NAME	PROVINCE	TOTAL COST	EXECUTING AGENCY	CONTRACTOR
PA-06-041	New Second Brigade Base	Tameem	\$44,657,392	AFCEE	Environmental Chemical Corporation
PA-06-042	Primary Health Care Centers Numbered KE-1 through KE-05	Tameem	\$612,885	GRD	Parsons Delaware, Inc.
PA-06-043	Primary Health Care Centers Numbered KE-1 through KE-05	Tameem	\$533,447	GRD	Parsons Delaware, Inc.
PA-06-044	Primary Health Care Centers Numbered KE-1 through KE-05	Tameem	\$533,447	GRD	Parsons Delaware, Inc.
PA-06-045	Primary Health Care Centers Numbered KE-1 through KE-05	Tameem	\$533,447	GRD	Parsons Delaware, Inc.
PA-06-046	Primary Health Care Centers Numbered KE-1 through KE-05	Tameem	\$533,447	GRD	Parsons Delaware, Inc.
PA-06-049	Basrah International Airport-Terminal and Tower Renovation	Basrah	\$5,044,988	GRD-PCO	NANA Pacific
PA-06-050	Basrah International Airport-Air Side Power Supply to NAVAIDS and VISAIDS	Basrah	\$383,043	GRD-PCO	Reyam Ltd.
PA-06-051	Police Station-Safwan IHP 404	Basrah	\$2,550,841	GRD-PCO	Foreign
PA-06-053	Nasiriyah Fire Station	Thi-Qar	\$508,800	GRD-PCO	Foreign
PA-06-054	Nasiriyah Prison Facility	Thi-Qar	\$49,087,462	GRD-PCO	Parsons Global Services
PA-06-055	Muthanna Village Roads Segment 4	Muthanna	\$2,939,268	GRD-PCO	Foreign
PA-06-056	609th Iraqi National Guard Battalion Garrison	Thi-Qar	\$10,665,485	GRD	Foreign
PA-06-057	Baghdad Railway Station Rehabilitation	Baghdad	\$5,910,741	GRD-PCO	Foreign
PA-06-058	Baghdad Al Karkh Courthouse	Baghdad	\$10,315,012	GRD	Foreign
PA-06-059	Thi-Qar Village Roads Segment 3	Thi-Qar	\$1,441,858	GRD	Foreign
PA-06-063	Kirkuk to Baiji Pipeline Project	Tameem	\$86,900,000	Multiple	Multiple
PA-06-064	Al Alwaiya Maternity Hospital	Baghdad	\$1,986,462	GRD	Parsons/Local
PA-06-065	Al Alwaiya Children's Hospital	Baghdad	\$1,288,000	GRD	Parsons/Local

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ASSESSMENT NUMBER	PROJECT NAME	PROVINCE	TOTAL COST	EXECUTING AGENCY	CONTRACTOR
PA-06-066	Critical Care Unit Ibn Al Bitar Hospital	Baghdad	\$579,285	GRD	Foreign
PA-06-067	Baghdad Municipal Solid Waste Landfill	Baghdad	\$28,849,930	GRD	FluorAMEC
PA-06-069	Al Kut Training Academy	Wassit	\$22,958,920	GRD	ECCI
PA-06-070	Dahuk Rehabilitation Center	Dahuk	\$5,633,803	GRD	Biltek
PA-06-071	Al Kasik Water Storage Tanks Al Kasik Military Training Base	Ninewa	\$4,900,000	AFCEE	AMEC
PA-06-072	Ninewa Provincial Police Headquarters	Ninewa	\$988,178	GRD	Foreign
PA-06-073	Bab Eshtar Substation 11 kV Feeder Cable	Ninewa	\$1,221,000	GRD	Foreign
PA-06-074	Waste Water Treatment Plant Al Kasik Military Training Base	Ninewa	\$2,700,000	AFCEE	Shaw
PA-06-075	51st Brigade Iraqi Army Barracks	Babylon	\$999,298	GRD	Local
PA-06-076	Al Hillah Police Firing Range	Babylon	\$434,057	GRD	Local
PA-06-077	402nd Battalion Iraqi Army Headquarters Barracks	Babylon	\$736,939	GRD	Local
PA-06-078.1 & 079.1	Quick Reaction Report on the Baghdad Police College	Baghdad	\$42,909,000 & \$29,345,000	GRD	Parsons
PA-06-078.2 & 079.2	Baghdad Police College	Baghdad	\$72,250,000	GRD	Parsons
PA-06-080	Al Basrah Oil Terminal	Basrah	\$48,239,066	GRC	Parsons
PA-06-082	Electrical Substation Sustainment	Basrah	\$5,677,575	GRD	Perini Corporation
PA-06-083	Electrical Substation Sustainment	Basrah	\$5,718,727	GRD	Perini Corporation
PA-06-084	Electrical Substation Sustainment	Basrah	\$5,438,408	GRD	Perini Corporation
PA-06-085	Electrical Substation Sustainment	Basrah	\$5,717,727	GRD	Perini Corporation
PA-06-086	Electrical Substation Sustainment	Basrah	\$5,724,335	GRD	Perini Corporation
PA-06-087	Tallil Military Base Camp Ur	Thi-Qar	\$59,750,000	AFCEE	Weston

Continued on next page

ASSESSMENT NUMBER	PROJECT NAME	PROVINCE	TOTAL COST	EXECUTING AGENCY	CONTRACTOR
PA-06-088	Tallil Military Base Camp Ur	Thi-Qar	\$59,750,000	AFCEE	Weston
PA-06-089	Recruiting (Babil Volunteer) Center	Babylon	\$1,823,731	AFCEE	Weston
PA-06-090	Iraqi Civil Defense Headquarters	Baghdad	\$3,000,064	GRC	Parsons
PA-06-091	Bab Shams Police Station	Ninewa	\$353,400	GRN	Local
PA-06-092	Gaugli Ashur Police Station	Ninewa	\$881,188	GRN	Local
PA-06-094	Erbil Maternity and Pediatric Hospital	Erbil	\$6,832,360	GRN	Local
PA-07-096	Sadr City Al Qana'at Raw Water Pump Station	Baghdad	\$4,230,000	GRC	Comet Company
PA-07-097	Baghdad International Airport Power System Enhancement	Baghdad	\$11,792,479	USAID	Bechtel
PA-07-098	Al Rasheed Brigade Set	Baghdad	\$64,008,857	AFCEE	Tetra Tech, Inc.
PA-07-099	Iraqi C-130 Base	Baghdad	\$30,801,495	AFCEE	Toltest, Inc.
PA-07-100	West Baghdad International Airport Special Forces Barracks	Baghdad	\$5,205,003	GRC	Local
PA-07-101	Qudas Power Plant Turbine Restoration Project and Qudas Power Plant Expansion Project	Baghdad	\$90,600,000	GRD	Flour Amec
PA-07-102	Ministry of Defense Headquarters Building	Babylon	\$31,465,205	MNSTC-I	Laguna Construction Company, Inc.
PA-07-103	Doura Power Station Units 5 and 6	Baghdad	\$90,800,000	GRD	Bechtel National, Inc.
PA-07-104	Qudas Power Plant Turbine Restoration Project and Qudas Power Plant Expansion Project	Baghdad	\$147,400,000	GRD	URUK Engineering Services and the Baghdad Company for Gas Turbines LTD Joint Venture/ FluorAMEC, LLC
PA-07-105	Relief and Reconstruction Funded Work at the Mosul Dam	Ninewa	\$27,114,874	GRD	Washington International/ Black and Veatch

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ASSESSMENT NUMBER	PROJECT NAME	PROVINCE	TOTAL COST	EXECUTING AGENCY	CONTRACTOR
PA-07-106	Right Bank Drinking Water Treatment Plant Rehabilitation	Ninewa	\$1,714,233	GRN	Local
PA-07-107	Showairrej to Tak Harb Road Paving	Ninewa	\$1,439,175	GRN	Local
PA-07-108	Bartilla New Road Paving	Ninewa	\$147,560	GRN	Local
PA-07-109	Bartilla Booster Pump Station Repair	Ninewa	\$237,500	GRN	Local
PA-07-110	Al Escandrona School	Baghdad	\$86,615	GRD	Local
PA-07-111	Rehabilitation of the Mansour Pump Station	Baghdad	\$122,950	GRD	Local
PA-07-112	Mahalla 824 Sewer Collapse Project	Baghdad	\$724,350	GRD	Local
PA-07-114	Iraqi Army Facilities	Erbil	\$9,300,000	AFCEE	Toltest, Inc.
PA-07-115	Erbil Police Academy	Erbil	\$10,006,379	GRN	Tigris Company
PA-07-116	Nassiriya Water Treatment Plant	Thi-Qar	\$277,000,000	GRD	FluorAMEC
PA-07-118	Repair of the Ghazaliyah G-7 Sewage Lift Station	Baghdad	\$253,246	GRD	Local
PA-07-118.1	Repair of the Al Ghazaliyah G-6 Sewage Lift Station	Baghdad	See above	GRD	Local
PA-08-119	Refurbishment of the Kurdistan Regional Government Ministry of Interior Complex	Erbil	\$5,896,011	GRN	Tigris (Turkey)
PA-08-120	Sarwaran Primary School	Erbil	\$693,631	GRN	Local
PA-08-121	Binaslawa Middle School	Erbil	\$601,611	GRN	Local
PA-08-123	Nassiriya Prison Expansion	Thi-Qar	\$6,263,042	GRS	Local
PA-08-124	Al Shofa Water Facility	Thi-Qar	\$348,850	GRS	Local
PA-08-125	Al Kazim Water Supply	Thi-Qar	\$492,800	GRS	Local
PA-08-127	Nassiriya 33-kV Power line	Thi-Qar	\$1,537,560	GRS	Local
PA-08-129	Al Ager Water Compact Unit	Thi-Qar	\$650,000	GRS	Local
PA-08-131	Follow-up on the Nassiriya Prison Facility	Thi-Qar	\$15,523,772	GRS	Local

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ASSESSMENT NUMBER	PROJECT NAME	PROVINCE	TOTAL COST	EXECUTING AGENCY	CONTRACTOR
PA-08-132	Haditha General Hospital	Anbar	\$5,033,791	GRC	Local
PA-08-133	Heet Primary Healthcare Center	Anbar	\$412,130	GRC	Parsons/Local
PA-08-134	Haditha Primary Healthcare Center	Anbar	\$537,780	GRC	Parsons/Local
PA-08-135	Rehabilitation of the Suroor Elementary School	Baghdad	\$245,535	GRC	Local
PA-08-136	Renovations of the Khandek Intermediate School	Baghdad	\$295,840	GRC	Local
PA-08-137	Kirkuk to Baiji PEZ Phase 3	Kirkuk	\$3,838,308	GRN	Local
PA-08-138	Kahn Bani-Sa'ad Correctional Facility	Diyala	\$40,497,030	GRD	Parsons
PA-08-140	Rebuilding of the Sagrah School	Anbar	\$399,050	MNF-West	Local
PA-08-141	Al Iqitadar School	Anbar	\$251,915	MNC-I	Local
PA-08-142	Al Shurhabil School	Anbar	\$268,000	MNC-I	Local
PA-08-143	Sadr City R3 Water Treatment Plant	Baghdad	\$65,848,442	GRC	Washington International, Inc. /Black and Veatch
PA-08-144	Falluja WWTP	Anbar	\$83,297,392	GRC	FluorAMEC
PA-08-145	Falluja Sewer--Area A Construction and Repair	Anbar	\$2,906,420	GRC	Local
PA-08-146	Falluja Sewer--Pump Station 1&2	Anbar	\$7,223,472	GRC	Local
PA-08-147	Falluja Sewer--Force Main	Anbar	\$1,803,949	GRC	Local
PA-08-148	Falluja Sewer--Earthwork for the WWTP	Anbar	\$2,768,887	GRC	Local
PA-08-149	Al Quds School	Baghdad	\$419,700	MNC-I	Local
PA-08-150	Al Mualameen School	Baghdad	\$389,200	MNC-I	Local
PA-08-151	Al Faoo School	Baghdad	\$441,000	MNC-I	Local
PA-08-152	Anbar Rule of Law/ Judicial Complex	Anbar	\$21,461,905	GRC	ALMCO Limited
PA-08-153	Ramadi 132-kV Substation	Anbar	\$28,789,029	GRC	Symbion-Ozdil-Al Namarq Joint Venture

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ASSESSMENT NUMBER	PROJECT NAME	PROVINCE	TOTAL COST	EXECUTING AGENCY	CONTRACTOR
PA-08-154	Plumbing Repairs at the Baghdad Police College	Baghdad	\$3,182,659	AFCEE & MNSTC-I	Laguna Construction
PA-08-155	Plumbing Repairs at the Baghdad Police College	Baghdad	See above	AFCEE & MNSTC-I	Laguna Construction
PA-08-156	Plumbing Repairs at the Baghdad Police College	Baghdad	See above	AFCEE & MNSTC-I	Laguna Construction
PA-08-157	Shiqaq Hai Musalla Primary Healthcare Center	Tameem	\$304,540	GRN	Parsons/Local
PA-08-158	Hai Tiseen Primary Healthcare Center	Tameem	\$465,015	GRN	Parsons/Local
PA-08-159	Basrah Courthouse Construction	Basrah	\$8,780,942	GRS	Local
PA-08-160	Basrah Children's Hospital	Basrah	\$37,682,169	GRS	Bechtel & MID Contracting
PA-08-162	Roll-on/Roll-off Berth in the Port of Umm Qasr	Basrah	\$2,734,500	GRS	Local
PA-08-164	4th Brigade, 10th Infantry Division Iraqi Army HQ Barracks	Missan	\$1,253,096	GRS	Local
PA-08-165	Missan Surgical Hospital, Phase 2	Missan	\$6,800,000	GRS	Local
PA-08-166	Secure Document Storage Facility	Baghdad	\$1,535,006	GRC	SIMA International
PA-08-167	Missan Surgical Hospital, Phase 1	Missan	\$5,900,000	GRS	Local
PA-08-168	Renovation of the Tomb of the Unknown Soldier	Baghdad	\$1,740,772	MNC-I	Bennett, Fouch, and Associates
PA-09-169	Basrah Courthouse Witness Protection Facility	Basrah	\$2,195,235	GRS	Local
PA-09-170	Mujarrah Canal Bridge	Anbar	\$1,261,500	GRC	Local
PA-09-171	Ammanna Market Renovation	Baghdad	\$596,360	GRC	Local
PA-09-172	Abu Ghraib Dairy	Baghdad	\$3,400,000	TFBSO	Al Balagh Investments
PA-09-173	Rabaaa Point of Entry Screening Facility	Ninewa	\$3,109,588	GRN	Biltex Construction Company
PA-09-174	Hammam Al Alil Division Training Center	Ninewa	\$3,573,708	GRN	Local

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ASSESSMENT NUMBER	PROJECT NAME	PROVINCE	TOTAL COST	EXECUTING AGENCY	CONTRACTOR
PA-09-177	Renovate and Expand Chamchamal Correctional Facility	Sulaymaniyah	\$28,691,150	GRN	Local
PA-09-178	Orphanage and Senior Citizen Assisted Living Center	Erbil	\$3,725,000	GRN	Local
PA-09-179	Abattoir (Slaughterhouse) in Qaladze	Sulaymaniyah	\$1,100,000	GRN	Local
PA-09-182	Al Kasik Location Command	Ninewa	\$6,311,861	GRN	Local
PA-09-183	Hammam Al Alil Regional Training Center	Ninewa	\$5,028,566	GRN	Local
PA-09-186	Humer Kwer Health Center	Sulaymaniyah	\$547,257	GRN	Local
PA-09-188	Thi Qar Bee Farm	Thi-Qar	\$254,960	GRS	Local
PA-09-189	Basrah Modern Slaughterhouse	Basrah	\$5,635,000	GRS	Local
PA-09-190	Al Hadi Permanent Police Station	Basrah	\$1,274,339	MNSTC-I	Local
PA-09-191	Al Qaim 33/11kV Electrical Mobile Substation	Anbar	\$6,460,630	GRC	Local
PA-09-192	Haditha Dam Perimeter Security	Anbar	\$997,500	GRC	Local
SA-05-001	Pipeline River Crossing	Salah Al-Din	\$75,700,000	USACE	KBR and PJIV (Parsons)

Appendix C: Acronyms

ACRONYM	DEFINITION
AFCEE	Air Force Center for Engineering and the Environment
CERP	Commander's Emergency Response Program
CPA	Coalition Provisional Authority
DFAC	Dining Facility
DFI	Development Fund for Iraq
ESF	Economic Support Fund
GE	General Electric
GOI	Government of Iraq
GRC	Gulf Region Central
GRD	Gulf Region Division
GRN	Gulf Region North
GRS	Gulf Region South
HDD	horizontal directional drilling
HOPE	Health Opportunities for People Everywhere
I-CERP	Iraq-Commander's Emergency Response Program
IFF	Iraq Freedom Fund
IG	inspector general
IIGF	Iraqi Interim Government Fund
INCLE	International Narcotics Control and Law Enforcement account
IRMS	Iraq Reconstruction Management System
IRRF	Iraq Relief and Reconstruction Fund
ISFF	Iraq Security Forces Fund
JCC-I/A	Joint Contracting Command-Iraq/Afghanistan
KBR	Kellogg Brown & Root Services, Inc.
m ³	cubic meters
MNC-I	Multi-National Corps-Iraq
MNF-West	Multi-National Force-West
MNSTC-I	Multi-National Security Transition Command-Iraq
MW	megawatt
PCO	Project Contracting Office
PEZ	pipeline exclusion zone
PIJV	Parsons Iraq Joint Venture
QA	quality assurance
QC	quality control
SIGIR	Special Inspector General for Iraq Reconstruction
TFBSO	Task Force for Business and Stability Operations
USACE	U.S. Army Corps of Engineers
USAID	U.S. Agency for International Development

