

**SADR CITY R3 WATER TREATMENT
PLANT
BAGHDAD, IRAQ**

**SIGIR PA-08-143
OCTOBER 29, 2008**

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SIGIR

Special Inspector General for IRAQ Reconstruction

October 29, 2008

Sadr City R3 Water Treatment Plant

Summary of Report: PA-08-143

Why SIGIR Did This Study

This project assessment was initiated as part of our continuing assessments of selected reconstruction activities in the water sector.

What SIGIR Recommends

SIGIR recommends that Gulf Region Division continue to provide information and documentation to assist the U.S. Agency for International Development in evaluation of faulty design and construction work and that the U.S. Agency for International Development and the Iraq Transition Assistance Office evaluate the issue and take appropriate action.

The initial comments were in response to an understanding of our original recommendations that required legal action on the potential claim for faulty design and construction work. The Iraq Transition Assistance Office and U.S. Agency for International Development stated that they had not been given sufficient time to consider legal action and that the report contained errors, though no instances or examples were provided.

Based on the comments received, recommendations were revised and sections of the report were edited. Further input will be allowed through November 23, 2008 at which time those comments will be evaluated and the need for a follow-on report covering issues raised and beyond the scope and objectives of this assessment will be determined.

What SIGIR Found

The Sadr City R3 Water Treatment Plant was originally to be built under a U.S. Agency for International Development contract with Bechtel National, Inc. Bechtel sub-contracted with Parsons Global Services, Inc. for the design and construction of the project. When the project was reported to be 85% complete Bechtel and Parsons departed Iraq and the project was turned over to the U.S. Army Corps of Engineers to be finished. The U.S. Army Corps of Engineers contracted with Washington International, Inc./Black & Veatch to complete the design and construction of the project.

On September 17, 2008, SIGIR performed an on-site assessment of the Sadr City R3 Water Treatment Plant. The observed construction work associated with the project appeared to effectively meet the standards of the design. The USACE and Washington International, Inc./Black and Veatch maintained an active role in managing the project to ensure quality and compliance with the contract requirements.

The contractor's quality control was effective in guiding the contractor's quality control program. The contractor's daily quality control reports contained required project and work activity information to document construction progress and identify problems with the required corrective action. The contractor's adequate quality control will help supply 4,000 cubic meters per hour of potable water to Sadr City.

Sustainability was addressed in the contract requirements. The contract requires the contractor to train the appropriate individuals; provide operation and maintenance support during the construction, startup, and commissioning phases of the project; complete commissioning and startup activities; provide consumables; and provide options for potential plant expansion.

The Baghdad Water Authority is required to provide the consumables for operation of the water treatment plant—such as alum, chlorine, polymer, and diesel fuel—to support continued operation. The original design of the facility was for 4,000 cubic meters per hour of potable water; however, the design provides for a future capacity expansion to accommodate 6,000 cubic meters per hour in multiple cell expansions.

The Sadr City R3 Water Treatment Plant project should result in a functional project. At the time of the assessment, the Sadr City R3 Water Treatment Plant was reported to be 92% complete. If the current quality of construction and effective project management continues, the Sadr City R3 Water Treatment Plant will be completed and the project results will be consistent with the original objectives.



For more information, contact SIGIR Public Affairs at (703) 428-1100 or PublicAffairs@sigir.mil



SPECIAL INSPECTOR GENERAL FOR IRAQ RECONSTRUCTION

October 29, 2008

MEMORANDUM FOR COMMANDING GENERAL, MULTI-NATIONAL FORCES-
IRAQ
COMMANDER, JOINT CONTRACTING COMMAND-
IRAQ/AFGHANISTAN
COMMANDER, GULF REGION DIVISION, U.S. ARMY
CORPS OF ENGINEERS
MISSION DIRECTOR-IRAQ, U.S. AGENCY FOR
INTERNATIONAL DEVELOPMENT
DIRECTOR, IRAQ TRANSITION ASSISTANCE OFFICE

SUBJECT: Report on Project Assessment of the Sadr City R3 Water Treatment Plant
(Report Number SIGIR PA-08-143)

We are providing this report for your information and use. It addresses the current status of the Sadr City R3 Water Treatment Plant. The assessment was made to determine whether the project was operating at the capacity stated in the original contract.

SIGIR received several iterations of comments on a draft of this report from the Gulf Region Division, Iraq Transition Assistance Office, and U.S. Agency for International Development. Numerous changes have since been made and all comments are appended to this report. Additional comments received from the U.S. Agency for International Development requested that we address issues beyond the announced scope and objectives of this assessment. An additional 30 days has been provided for further comments. Based on the extent of the comments, SIGIR will consider a follow-on report to address the earlier phases of the Sadr City R3 Water Treatment Plant project which were not a part of the objectives of this assessment.

We thank the 3rd Brigade Combat Team 4th Infantry Division for assistance in coordinating the visit to the Sadr City R3 Water Treatment Plant.

If you have any questions please contact Mr. Brian Flynn at DSN 318-343-9244 or via e-mail at brian.flynn@iraq.centcom.mil. For public affairs queries concerning this report, please contact SIGIR Public Affairs at publicaffairs@sigir.mil or at 703-428-1100.

Stuart W. Bowen, Jr.
Inspector General

Special Inspector General for Iraq Reconstruction

SIGIR PA-08-143

October 29, 2008

Sadr City R3 Water Treatment Plant Baghdad, Iraq

Synopsis

Introduction. This project assessment was initiated as part of our continuing assessments of selected reconstruction activities in the water sector. This project assessment was conducted in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team comprised a professional engineer/inspector and an auditor/inspector.

Project Objectives. The objective of the Sadr City R3 Water Treatment Plant is to provide 4,000 cubic meters (4 million liters) per hour of potable water to serve approximately 192,000 residents in Sadr City. It was designed to receive untreated water from the existing raw water supply system and supply treated potable water to the existing distribution system. The plant is to employ approximately 150 operations, maintenance, and management personnel and will cost \$65,848,442.

The Sadr City R3 Water Treatment Plant was originally to be built under a U.S. Agency for International Development contract with Bechtel National, Inc. Bechtel sub-contracted with Parsons Global Services, Inc. for the design and construction of the project. When the project was reported to be 85% complete Bechtel and Parsons departed Iraq and the project was turned over to the U.S. Army Corps of Engineers to be finished. The U.S. Army Corps of Engineers contracted with Washington International, Inc./Black & Veatch to complete the design and construction of the project.

This assessment covers only the portion of the work at the Sadr City R3 Water Treatment Plant performed under the task orders issued to Washington International, Inc./Black & Veatch. Issues surrounding the prior work on this project performed under contract with Bechtel National, Inc may be the subject of a follow-on report.

Project Assessment Objectives. The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties to enable appropriate action, when warranted. Specifically, the Special Inspector General for Iraq Reconstruction determined whether:

1. Project components were adequately designed prior to construction or installation;
2. Construction or rehabilitation met the standards of the design;
3. The contractor's quality control program and the U.S. government's quality assurance program were adequate;
4. Project sustainability was addressed; and
5. Project results were consistent with original objectives.

Conclusions. The assessment determined that:

1. The final plans and designs for the Sadr City R3 Water Treatment Plant were effective for the construction of the facility. Buildings and facilities for the Sadr City R3 Water Treatment Plant were initially designed by Bechtel National, Inc. and Parsons Global Services, Inc. under a U.S. Agency for International Development contract. Upon transfer of the project to the U.S. Army Corps of Engineers for completion, the U.S. Army Corps of Engineers contracted with Washington International, Inc./Black & Veatch, which supplemented the original design.

Bechtel and Parsons were required to design and construct a residual solids pipeline, which would dump the residual solids solution into the existing Police Canal. Because of environmental concerns, the contractor determined that a three-cell lagoon would be constructed to settle out the solids in the residual solids solution. The U.S. government issued a grant agreement with the Iraq Ministry of Water Resources to construct three residual sludge lagoons for the Sadr City R3 Water Treatment Plant for \$4,161,176. As of August 2008, the lagoon construction had been delayed due to indecision on the location, identification of the property owners, and the relocation of the residents living on the property. Until the lagoons are completed, the residual solids from the Sadr City Water Treatment Plant sedimentation and filtration processes will be pumped into the Police Canal.

2. The observed construction work associated with the project appeared to effectively meet the standards of the design. The U.S. Army Corps of Engineers and Washington International, Inc./Black & Veatch maintained an active role in managing the project to ensure quality and compliance with the contract requirements. For example, the northeast wall of the filter structure showed signs of significant concrete repair work. The repair work was to correct a deficiency identified on the contractor's punch list. At the time of the inspection, the concrete repair work was not leaking. However, the re-work has delayed the project completion date and has cost the U.S. government additional funds to repair the deficiency.
3. The contractor's quality control was effective in guiding the contractor's quality control program. The contractor's daily quality control reports contained required project and work activity information to document construction progress and identify problems with the required corrective action. The contractor's adequate quality control will help supply 4,000 cubic meters per hour of potable water to Sadr City.

The government quality assurance program was effective in monitoring the contractor's quality control program. The quality assurance representative maintained a presence at the construction site and provided daily quality assurance reports that contained project-specific information to document construction progress and highlight deficiencies. The quality assurance representative also supplemented the daily reports with detailed photographs that reinforced the narrative information provided in the reports.

4. Sustainability was addressed in the contract requirements. The contract required the contractor to train the appropriate individuals; provide operation and maintenance support during the construction, startup, and commissioning phases

of the project; complete commissioning and startup activities; and provide options for potential plant expansion.

Washington International, Inc./Black & Veatch has been providing training on use of the lab equipment, management of a drinking water system, operation of the chemical building, operation and maintenance of chemical systems, ductile iron pipe repair, and pumping of the water treatment plant. The operation and maintenance manuals provide an overview of the equipment by identifying the major process units, listing the equipment components and their capacities, and explaining the main operating practices and maintenance requirements of the plant as a whole unit.

The Baghdad Water Authority is required to provide the consumables for operation of the water treatment plant—such as alum, chlorine, polymer, and diesel fuel—to support continued operation. The original design of the facility was for 4,000 cubic meters per hour of potable water; however, the design provides for a future capacity expansion to accommodate 6,000 cubic meters per hour in multiple cell expansions.

5. The Sadr City R3 Water Treatment Plant project should result in a functional project. At the time of the assessment, the Sadr City R3 Water Treatment Plant project was reported to be 92% complete. If the current quality of construction and effective project management continues, the Sadr City R3 Water Treatment Plant will be completed, and the project results will be consistent with the original objectives.

Recommendations. SIGIR recommends that:

1. The Commanding General, Gulf Region Division continue to provide information and documentation to assist the U.S. Agency for International Development in evaluation of faulty design and construction work.
2. The Mission Director of the Baghdad Office of the U.S. Agency for International Development and the Director, Iraq Transition Assistance Office evaluate the issues raised in this report and take appropriate action.

Management Comments. SIGIR received several iterations of comments on a draft of this report from the Gulf Region Division, Iraq Transition Assistance Office, and U.S. Agency for International Development. Numerous changes have since been made and all comments are appended to this report.

The initial comments were in response to an understanding of our original recommendations that required legal action on the potential claim for faulty design and construction work. The Iraq Transition Assistance Office and U.S. Agency for International Development stated that they had not been given sufficient time to consider legal action and that the report contained errors, though no instances or examples were provided.

Additional comments received from the U.S. Agency for International Development requested that we address issues beyond the announced scope and objectives of this assessment. An additional 30 days have been provided for further comments. Based on the extent of the comments, SIGIR will consider a follow-on report to address the earlier phases of the Sadr City R3 Water Treatment Plant project which were not a part of the objectives of this assessment.

The Gulf Region Division, of the United States Army Corps of Engineers provided formal comments concurring with the recommendations in the report. Specific comments were also provided to clarify or correct technical aspects of the report.

Evaluation of Management Comments. Based on the comments received, recommendations were revised and sections of the report were edited. Further input will be allowed through November 23, 2008 at which time those comments will be evaluated and the need for a follow-on report covering issues raised beyond the scope and objectives of this assessment will be determined.

SIGIR appreciates the concurrence by the Gulf Region Division. SIGIR reviewed the information and clarifying comments provided by the Gulf Region Division and revised the final report as appropriate.

Table of Contents

Synopsis	i
Introduction	
Background	1
Objective of the Project Assessment	2
Pre-Site Assessment Background	3
Contract, Task Order and Costs	3
Project Objective	3
Description of Facility (preconstruction)	4
Scope of Work of the Task Order	4
Current Project Design and Specifications	6
Site Assessment	
Work Completed	10
Work in Progress	23
Work Pending	23
Project Quality Management	
Contractor Quality Control Program	24
Government Quality Assurance Program	25
Project Sustainability	26
Conclusions	27
Recommendations	29
Management Comments	29
Evaluation of Management Comments	29
Appendices	
A. Scope and Methodology	30
B. Contract Modifications	31
C. Construction Codes and Standards	33
D. Acronyms	34
E. Report Distribution	35
F. United States Embassy-Iraq Comments	37
G. Gulf Region Division Comments	38
H. United States Agency for International Development	41
I. Assessment Team Members	47

Introduction

Background

A water treatment plant (WTP) is a vital community asset. Its goals are to produce an adequate supply of quality drinking water for its community, which if properly treated, can lower the risk of water-borne diseases such as cholera, typhoid fever and dysentery, and in general improves people's health. However, in order to achieve these goals, the responsibility lies not only with the WTP, but also with the community. Community actions include: keeping the water source free of debris and contamination by properly disposing of refuse and contaminated waste, promptly reporting any suspected water leaks or unauthorized connections in the distribution system, and most importantly, using this valuable produced resource responsibly.

Prior to construction of the Sadr City WTP, the majority of potable water available in Sadr City was received from the Shark Dijlah WTP. The total production of the Shark Dijlah WTP was approximately 500 million liters per day and provided for about a quarter of the population of Baghdad. The Baghdad Water Authority (BWA) estimated that Sadr City received only 45 million liters per day (lpd) from the Shark Dijlah WTP in addition to 6 million lpd from the Ofalaa facility, a portable WTP. These two sources combined provided an estimated 46 liters per capita per day (l/c/d) of drinking water to the residents of Sadr City.

The production capacity of the Shark Dijlah WTP was expanded in 2005 to 750 million lpd. This expansion was expected to improve water quantity, quality, and pressure for the western half of the municipality, but was not expected to benefit the eastern half, including Sadr City.

The BWA published an updated drinking water master plan in January 2003. This plan called for a combination of mobile WTPs (called compact units), upgrades to existing treatment plants, and the construction of a new water treatment plant to service Sadr City exclusively. The new plant was referred to as the R3 WTP as it would deliver water to the R3 pressure zone of the drinking water distribution system. The R3 zone primarily serves Sadr City.

The BWA January 2003 master plan proposed a capacity for the Sadr City R3 WTP of 4,000 cubic meters per hour (m^3/hr), which would directly increase the available water supply to the residents of Sadr City from 46 l/c/d to approximately 200 l/c/d. Water to operate the plant would come from the existing raw water network. Treated water was planned to be stored in the proposed R3 reservoir next to the plant and then distributed to Sadr City via the existing drinking water distribution system. Construction of the R3 reservoir and pump station had been previously started and was stopped after initial pile foundation work was underway.

The Sadr City R3 WTP is an entirely new treatment plant, which, when fully operational, will provide approximately $4,000\text{-m}^3/\text{hr}$ of additional treated water to the residents of Sadr City. The operating philosophy of the plant is to operate in a continuous manner 24 hours a day, 365 days a year to produce a consistent quantity and quality of potable water in a safe and reliable manner. This results in continuous production of potable water that can be stored during periods of low demand and distributed during periods of high demand. The plant is designed to provide for a future expansion to an ultimate production capacity of $6,000\text{-m}^3/\text{hr}$ of treated water.

USAID - Contract SPU-C-00-04-00001, Job Order Number 04-510

The Sadr City R3 Water Treatment Plant was originally to be built under a U.S. Agency for International Development (USAID) contract with Bechtel National, Incorporated (Bechtel) for approximately \$35 million in Iraq Relief and Reconstruction Fund (IRRF). Bechtel was the USAID's primary design/ build contractor. Bechtel sub-contracted with Parsons Global Services Inc. (Parsons) for the design and construction of the project. Ultimately, Parsons contracted with Al Iraq Al Mo'asir (ALMCO) to perform the actual construction under Parsons' direction and supervision. When the project was reported to be 85% complete (Aerial Image 1), Bechtel and Parsons departed Iraq and the project was turned over to the U.S. Army Corps of Engineers (USACE) to be finished. According to USACE and Iraq Transition Assistance Office (ITAO) representatives, USAID turned over little historical documentation regarding this project. The U.S. Army Corps of Engineers contracted with Washington International, Inc./Black & Veatch (WII/BV) to complete the design and construction of the project.

This report does not address the Sadr City R3 WTP prior to USACE assumption of management.



Aerial Image 1. Sadr City Water Treatment Plant in November 2006

Objective of the Project Assessment

The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties to enable appropriate action, when warranted. We conducted this limited scope assessment in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team comprised an engineer/inspector and an auditor/inspector. Specifically, we determined whether:

1. Project components were adequately designed prior to construction or installation;
2. Construction or rehabilitation met the standards of the design;
3. The contractor's quality control (QC) program and the U.S. government's quality assurance (QA) program were adequate;
4. Sustainability was addressed; and
5. Project results were consistent with original objectives.

Pre-Site Assessment Background

Contract, Task Order and Costs

On 11 March 2004, the Coalition Provisional Authority (CPA) issued WII/BV Contract W914NS-04-D-0007, a design/build, indefinite delivery/indefinite quantity contract to restore, rebuild, and develop national water resources projects in Iraq.

After Bechtel and Parsons departed Iraq and USAID turned the project over to the USACE, WII/BV was tasked to assess and complete the Sadr City R3 WTP project in two phases. The first phase required performing an assessment of the project's state of construction. Specifically, investigate, study, and assess the current construction status and recommend any solution(s) necessary to complete the current construction in accordance with the plans and specifications. The second phase required implementing the recommended solution(s) upon the approval of the contracting officer and the availability of funding.

Under its design/ build contract, Task Order (TO) 0014 was issued to WII/BV on 6 August 2006, to perform an assessment of the project's current status. Specifically, investigate, study, and assess the current construction status and to recommend the solution(s) necessary to complete the current construction in accordance with the plans and specifications. The second phase, issued as TO 16 on 27 August 2006, in the amount of \$6,100,000, required implementing the recommended solution(s) upon the approval of the contracting officer and the availability of funding; specifically, identify and implement key work elements necessary to facilitate project completion activities for the Sadr City WTP.

There were 15 modifications associated with TO 16 (see Appendix B for a description of each modification).

The total cost of this project, including the amount spent under the USAID contract, the two TOs to WII/BV, and grant to the GOI was \$65,848,442¹.

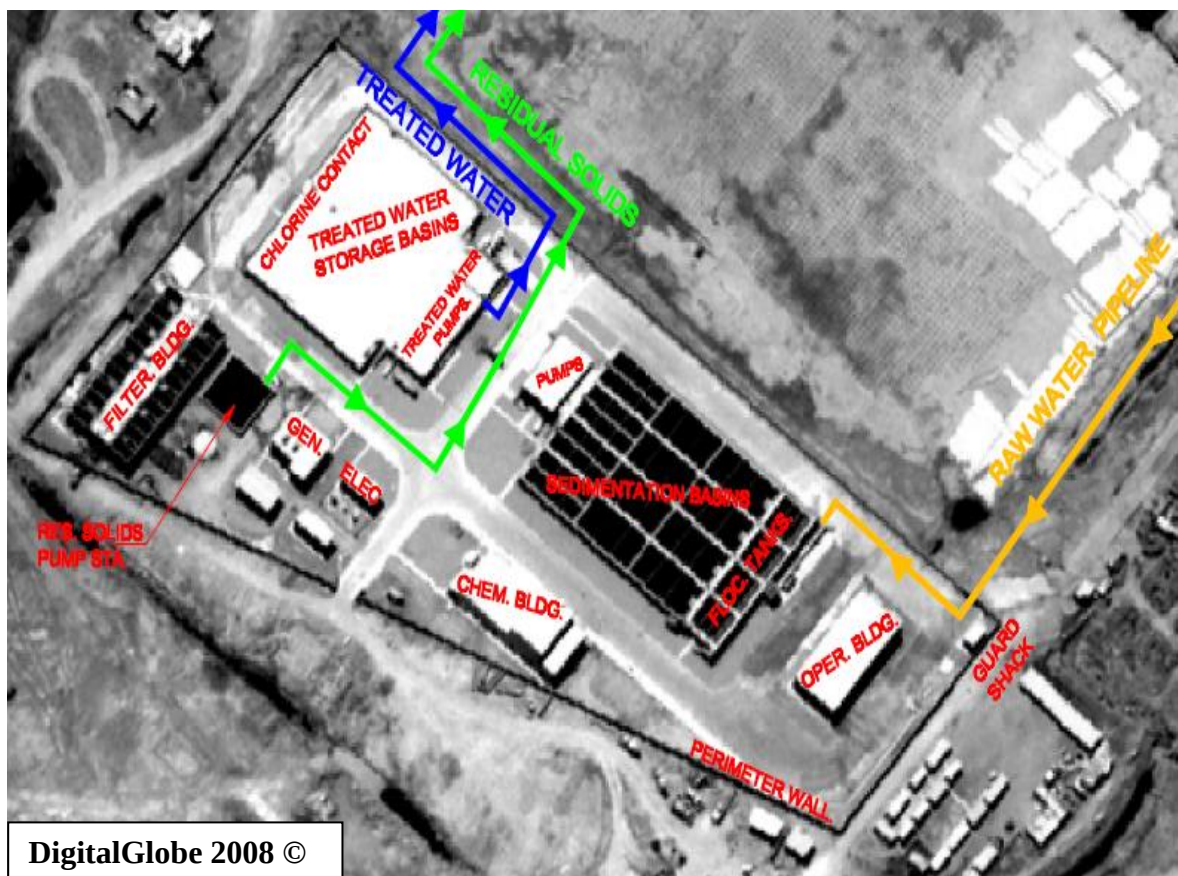
Project Objective

The objective of the Sadr City R3 WTP is to provide 4,000 m³/hr of potable water to approximately 192,000 residents in Sadr City. The new potable WTP will connect the existing raw water supply system and existing treated water distribution system. The plant will employ approximately 150 operators, maintenance, and management personnel.

¹ The breakdown of the \$65,848,422 is the following: USAID's Contract SPU-C-00-04-00001, Job Order Number 04-510 for \$34,959,514; Contract W914NS-04-D-0007, TO 14 for \$289,244; Contract W914NS-04-D-0007, TO 16 for \$26,438,508; and the Lagoon Grant for \$4,161,176.

Description of the Facility (preconstruction)

The description of the facility (preconstruction) was based on information obtained from the USACE project file. The Sadr City WTP is located in Ad Hamiyah, immediately north of the Sadr City district in the Governorate of Baghdad on a site approximately 7.4 acres. The plant site is located adjacent to the site of the planned R3 drinking water storage reservoir and pump station. The WTP site is located just northwest of Sadr City and is located approximately 1.5 kilometers (km) south of the Police Canal, in a sparsely populated area. The site lies more than 5-km from the Tigris River, which supplies the raw water to the WTP through an existing 1500 millimeter (mm) raw water pipeline and the new extension of a 1000-mm raw water pipeline (Aerial Image 2).



Aerial Image 2. Current view of the Sadr City Water Treatment Plant

Scope of Work of the Contract

USAID - Contract SPU-C-00-04-00001, Job Order Number 04-510

The Sadr City R3 WTP's original intent was to increase the quantity and quality of potable water to Sadr City and the surrounding area of Baghdad. The new WTP included tie-ins to the existing raw water supply (inlet to the water treatment plant) and treated water discharge line to an existing distribution system. The Sadr City WTP project included a potable water treatment system with a capacity of 1,000-m³/hr, a potable (treated) water storage facility, a pumping station to pump treated water from storage to the existing distribution system, and ancillary facilities such as

an administration building and emergency power system for critical facilities. The main components of the new WTP are:

- raw water supply pipeline connecting to the existing raw water system piping
- potable water treatment system with treated pumping to ground storage tank(s)
- potable water treatment system including:
 - treatment train of 4,000-m³/hr capacity with redundancy for out-of-service considerations
 - aluminum sulphate (alum) storage and feed system
 - flash or rapid mixer
 - flocculation and sedimentation tanks
 - gravity filters
 - chlorination system for disinfection with sodium hypochlorite storage and feed facilities
 - provisions to accommodate future treatment processes and chemical additions for expansion to 4,000-m³/hr and ultimately 6,000-m³/hr
- treated water storage tank of 8,000-m³
- treated water pump station and pipeline to existing distribution system
- necessary buildings/enclosures for equipment, chemical feed and electrical service
- administration building with laboratory
- standby diesel generator(s) in a manufactured enclosure(s) capable of operating critical portions of the plant and treated water pumping
- transformers for electric power provided to the site
- sludge and filter backwash treatment (or reclamation) pond or sedimentation tank
- perimeter guard house and facilities

Although the original design capacity of the facility was 4,000-m³/hr, design considerations and provisions allow for future expansion capacity to 6,000 m³/hr. The potential expansion provisions are:

- interconnections from the raw water supply system and the water distribution system
- treated water pumping station expansion for future pumps
- on-site utilities (water and electrical) for expansion to accommodate future capacity

Additionally, the plant was designed to be operated on a continuous basis with sufficient redundancy built in to allow for critical components to be temporarily out of service without completely interrupting the potable water supply to the served community.

Contract W914NS-04-D-0007, TO 14

TO 14's Statement of Work (SOW) required the contractor to perform a study of the status of the construction. In performing the construction assessment (under TO 14), WII/BV reviewed documentation received during the Parsons and WII/BV contract transition, and interviewed on-site personnel and the subcontractor. WII/BV addressed several critical areas where the assessment of work and quality remain to be determined. Four areas of concern mentioned in the WII/BV construction assessment are: (1) hydrostatic testing of water containing structures, (2) hydrostatic testing of piping, (3) electrical testing of installed cables, and (4) resolution of

outstanding action items involving the design of an incoming electrical utility power system and the emergency backup fuel storage and delivery system.

WII/BV construction assessment stated that the hydrostatic testing of water containing structures and the hydrostatic testing of piping had not occurred. WII/BV stated that the subcontractor failed on an initial testing of the electrical cables, and Parsons issued a change-order that lowered the electrical testing specification. WII/BV requested direction from the contracting officer regarding the enforcement of project specifications where specification deviations have resulted in an inadequacy in the construction of the WTP.

Also highlighted in the WII/BV construction assessment was the major concerns with the subcontractor, ALMCO. Specifically, WII/BV found ALMCO has been:

- only marginally responsive to WII/BV since the contract was executed
- engaged in a pattern of delay
- made a concerted effort to produce a work product that does not meet the intent of the specification requirements
- demonstrated a lack of technical understanding of the essential elements of plant work construction

Contract W914NS-04-D-0007, TO 16

TO 16's SOW required the contractor to implement the recommended solutions of Phase I of the study of the status of the construction. Specifically, the SOW required the contractor to do the following:

- determine the adequacy of existing construction plans and specifications and prepare appropriate revisions
- investigate resource needs and develop appropriate requirements and make recommendations for any revisions and improvements
- facilitate project implementation and make recommendations for any necessary revisions and improvements to project implementation
- facilitate communication between the various stakeholders
- provide construction management services
- provide construction services
- provide training

WII/BV identified 93 deficiencies in either the original design or construction. These deficiencies resulted in schedule delays and increased costs.

Current Project Design and Specifications

Contract SPU-C-00-04-00001, Job Order Number 04-510 required all design packages and subcontractor submittals to be submitted to USAID for review, distribution, and record purposes.

The contract required conformance to the numerous American codes and standards for the design and construction. Appendix C lists all of the contract's required codes and standards.

The contract required that the design and installation of equipment and materials meet the site specific design conditions and conform to the design and water quality standards represented by internationally recognized codes and standards. As part of

TOs 14 and 16, WII/BV supplemented the design drawings and specifications provided by Bechtel/Parsons.

The USACE provided SIGIR with the Sadr City R3 WTP design drawings submitted by Bechtel/Parsons. The 100% designs included over 230 drawings used for construction of the plant, consisting of civil and site utilities, architectural, electrical, mechanical, HVAC, instrumentation, and structural drawings.

Bechtel's design submittals included a set of civil site plans and yard piping drawings, which identified the location of all significant new construction for the WTP. The main improvements shown included the raw water metering control station, the operations building, the rapid mix flocculation sedimentation basins, the intermittent transfer pump station, the chemical building, the filter structure, the residual solids pump station, the filter waste recycle pump station, the chlorine contact treated water storage tanks, the outlet pump station, the generators, the electrical facility, the perimeter wall, and the guard house.

The design package also included general design drawings featuring a process flow diagram, a flow/mass balance diagram, and a hydraulic profile.

The contractor provided a process flow design for the Sadr City R3 WTP. The source of raw water supply for the WTP is the Tigris River via the existing raw water distribution system. Raw water from the Tigris River is conveyed from the Shark Dijlah water pump station to the vicinity of the plant site by an existing raw water transmission pipeline. The raw water enters the raw water metering control stations where it is pumped to the rapid mix tanks. The water is then chlorinated as it is conveyed to the rapid mix tanks, where alum and polymer are added to facilitate the flocculation and coagulation of solids. The alum forms small gel-like precipitate that traps suspended solids and forms sediments that settle easier than normal solids. The well mixed water flows slowly through the flocculation/sedimentation basins where it outlets through the effluent channel. The settled solids are collected from the bottom of the tank and ultimately are pumped to a drainage canal as sludge. The effluent water from the sedimentation basins is further chlorinated as it flows to the filters. The filters are made of granular media material. The filters remove additional solids— those that did not settle out in the clarifier. The filtered water is once again chlorinated and then stored in the treated water storage tanks. Since the potable water must be conveyed to the end users, there is a system of four pumps that pump the water from the storage tanks into the distribution lines for conveyance to the residents (Figure 1).

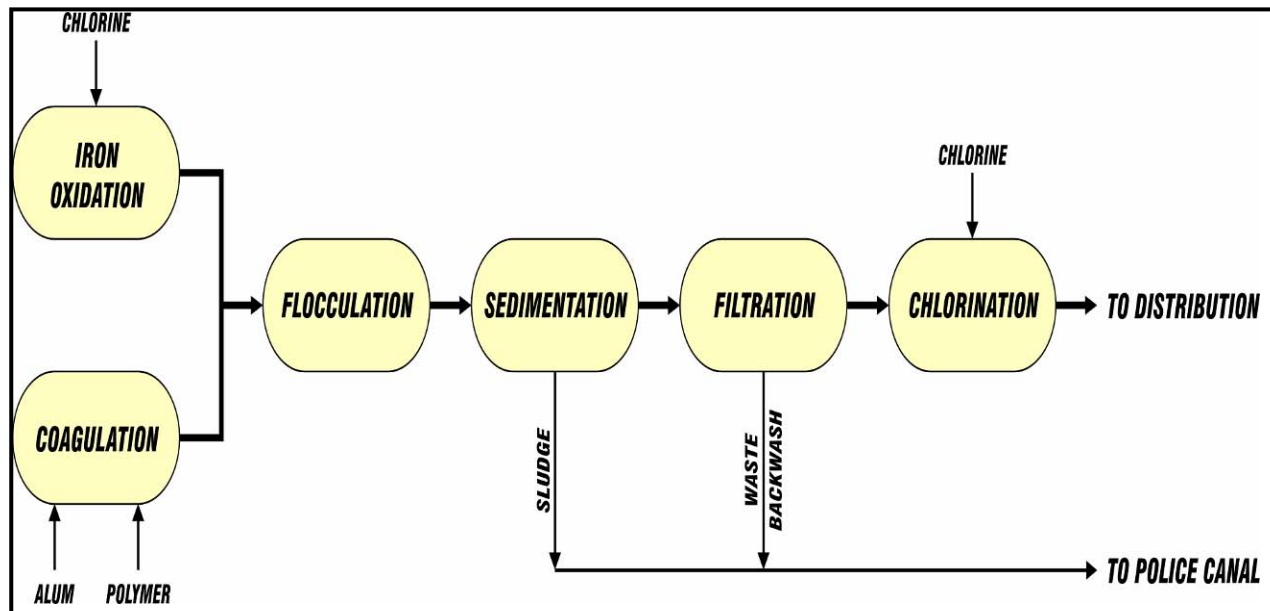


Figure 1. Treatment process overview

The treatment processes, shown in Figure 2, already constructed include: the raw water metering and control; the coagulation rapid mix tanks; the operations building, the flocculation sedimentation basins, the intermittent transfer pump station, the chemical building, the filter structure, the residual solids pump station, the filter waste recycle pump station, the chlorine contact treated water storage tanks, the outlet pump station, the generators, the electrical facility, the perimeter wall, and the guard house. Three structures primarily comprise these facilities: (1) rapid mix/flocculation/sedimentation/intermediate transfer pump station is one common structure; (2) the filter structure is the second; and (3) the chlorine mix/chlorine contact tank/treated water storage/treated water pumping is the third.

A raw water flow control system comprised of a flow control valve and a flow meter is provided at the plant ahead of the treatment processes. The flow meter and flow control valve are used to regulate raw water flow rate to the plant and thereby control treated water production rates.

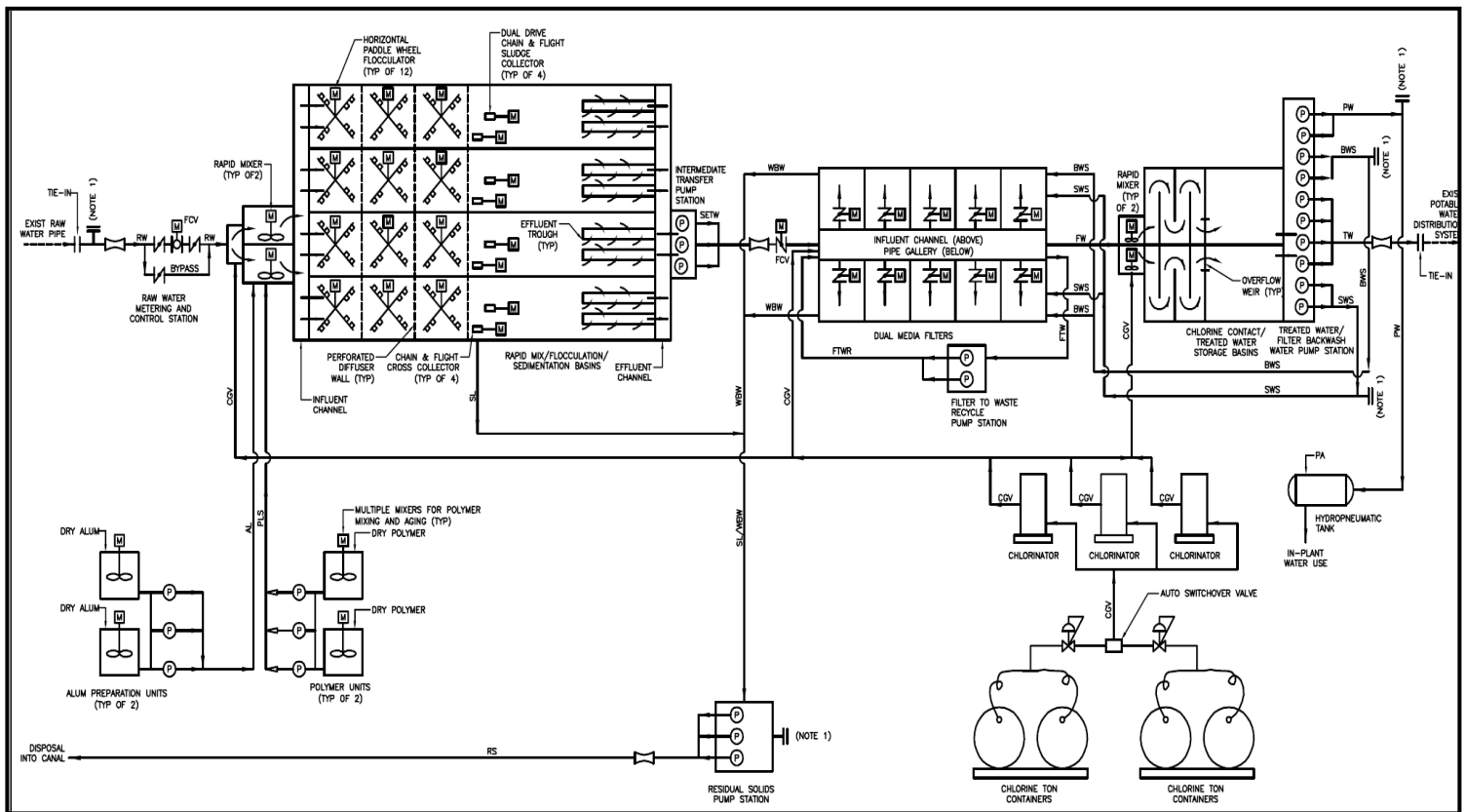


Figure 2. Process flow diagram

The treatment process hydraulic structures and associated equipment rooms are constructed of cast-in-place reinforced concrete and are partially buried, but primarily above grade. Treatment process facilities include a residual solids pump station to pump removed solids in solution to the canal and a filter water waste return pump station to recycle filter-to-wastewater from the filtration process. These facilities are constructed of cast-in-place reinforced concrete and are generally below grade.

Other plant structures include a chemical building for storage and handling of chemicals used in the treatment processes, an electrical building to house the plant electrical distribution equipment, and an operations building to provide administrative and maintenance support functions for the plant.

In addition, the project includes a standby power system consisting of two diesel engine generators with enclosure and a diesel fuel storage and supply system.

Finished Water Quality Requirements

According to project requirements, the finished water quality was to achieve a maximum turbidity of 1 nephelometric turbidity unit² (NTU), which is significantly lower than the World Health Organization (WHO) standard of 5 NTU, to ensure

²In sewage treatment plants, nephelometric turbidity unit (NTU) is a unit measuring the lack of clarity of the water. A nephelometer, an electronic instrument, measures the NTU. A standard container houses the water to be measured. One light beam passes through the water striking a sensor on the other side of the container. A second sensor measures the light scattered by particles in the water. The ratio between the light intensities calculates the turbidity in NTU.

maximum opportunity for microbial removal. The removal/inactivation requirements were 3-log Giardia inactivation and 4-log Virus inactivation, which is equivalent to 99.99% removal.

Design and Construction Deficiencies

According to the ITAO Water Sector and Gulf Region Division (GRD) representatives, WII/BV reported design and construction deficiencies regarding the original design by Bechtel/Parsons. Details of the design deficiencies are currently the subject of legal and administrative review and are not discussed in this report.

SIGIR reviewed the contract requirements, design drawings and specifications, and had discussions with ITAO and USACE representatives. Documentation for the 30/60/90% design submittals was not provided, and there was limited documentation providing review comments on the design submittals. The WII/BV has identified six design deficiencies that should have been clarified or changed in the contract drawings or specifications. Based on our review of the drawings and specifications, they appear to be complete and consistent with the job order's requirements, and demonstrated the understanding of the entire SOW.

Site Assessment

On 17 September 2008, SIGIR performed an on-site assessment of the Sadr City R3 WTP. During the site visit, SIGIR was accompanied by the USACE Gulf Region Central (GRC), Loyalty Resident Office Officer in Charge (OIC). According to the USACE OIC, the project was currently 92% complete. Due to security concerns, SIGIR performed an expedited assessment; the time allotted for the site visit was approximately 45 minutes. Therefore, a complete review of all work completed was not possible.

During the site visit, SIGIR inspectors observed contractor, BWA, and GRC local national QA personnel working at the WTP facility.

The GRC representative confirmed with BWA and contractor representatives that the Sadr City R3 WTP was operating entirely on Baghdad City provided electrical power, with on-site generators serving as standby power.

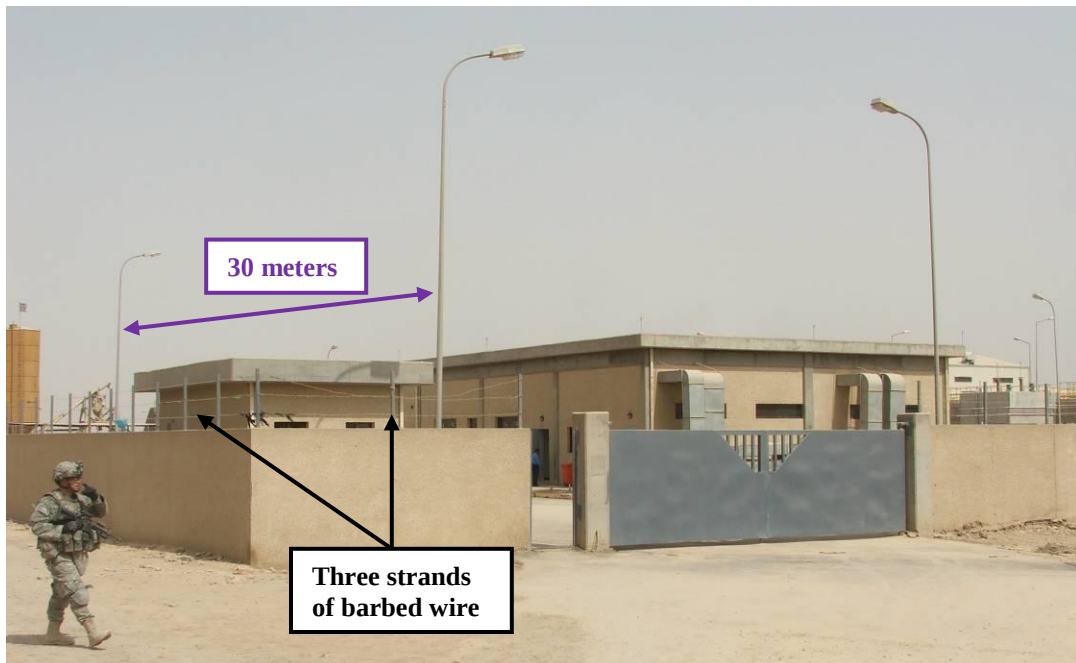
Work Completed

Guard Building and Perimeter

The design required a guard shack at the entrance gate (Site Photo 1) and a perimeter wall (Site Photo 2). The design of the perimeter wall required it to be 2300-mm high, 400-mm thick reinforced concrete block supported by a 1.3-m wide and 0.3-m deep, continuous reinforced concrete footer, with three strands of barbed-wire running along the length of wall. For security purposes, the typical spacing for light poles was 30-m (Site Photos 2 and 3) and an entrance gate made of steel construction, including a separate steel pedestrian door (Site Photo 4).



Site Photo 1. Guard building



Site Photo 2. Perimeter wall



Site Photo 3. Perimeter lighting



Site Photo 4. Perimeter gate (with pedestrian entrance)

Operator Building

The Operator building provides the administrative and maintenance support functions for the plant (Site Photo 5). The design required an electrical room, kitchen, two supervisor's rooms, a file room, a repair shop, and a laboratory (Figure 3).



Site Photo 5. Operator building

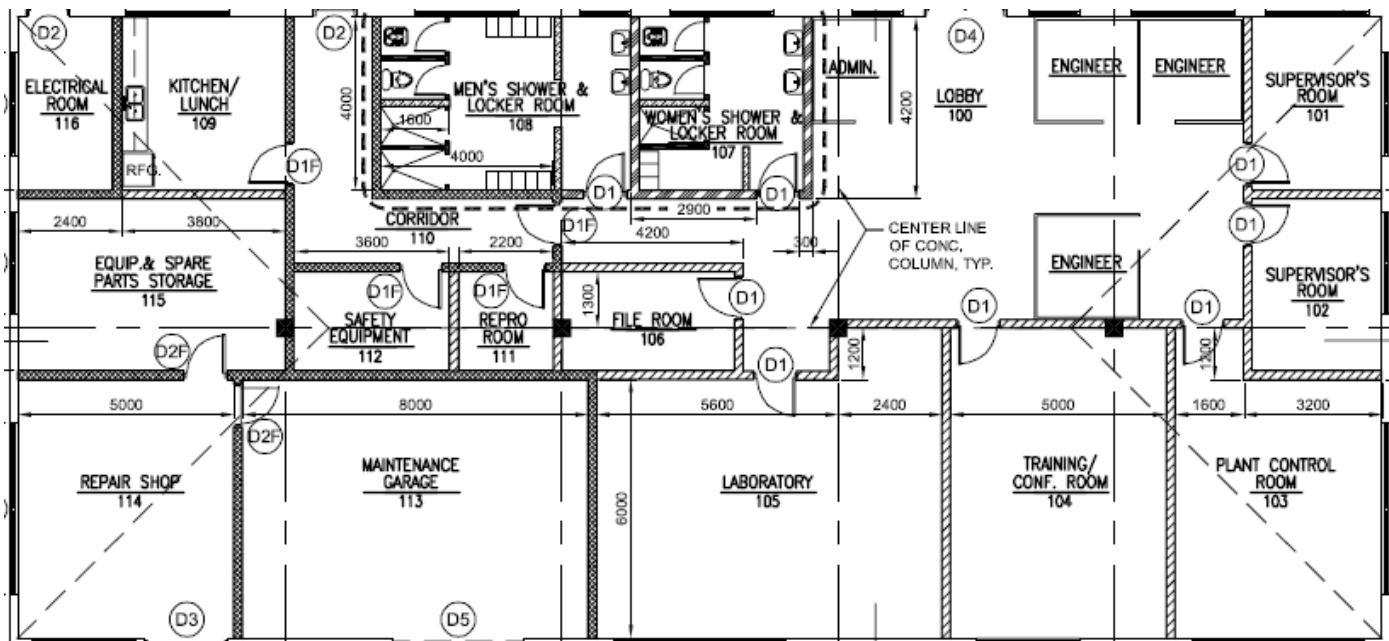


Figure 3. Operator building

On-Site Laboratory

The Sadr City R3 WTP has an on-site water quality laboratory. The objective of the on-site laboratory is to monitor the quality of the raw water, finished water, and treated water at various stages of the treatment process for process/operational control purposes. The WTP is designed to achieve a treated water turbidity of 1 NTU, which is significantly lower than the WHO standard of 5 NTU.

During the site visit, SIGIR toured the WTP laboratory and found the following equipment:

- assorted chemicals for performing tests (Site Photo 6)
- scale
- drying oven
- water sampling basin (Site Photo 7) and water test results (Site Photo 8)
- turbidity meter
- PH meter
- spectrometer
- photo meter
- controller
- glassware

While in the laboratory, SIGIR requested the current day's test results. The daily report for the day of our site visit, 17 September 2008, stated testing was performed at several points throughout the day. The results appeared to be consistent with the project's requirements for finished water quality standards. Specifically, the filtered water NTU readings were within the guidelines established. While the finished water NTU readings were slightly higher, it appears to be a result of an effort to increase the amount of water available to the distribution system (i.e. filtered water was combined with non-treated water). All filtered and finished water readings were well under the WHO standard of 5 NTU.



Site Photo 6. Laboratory chemicals

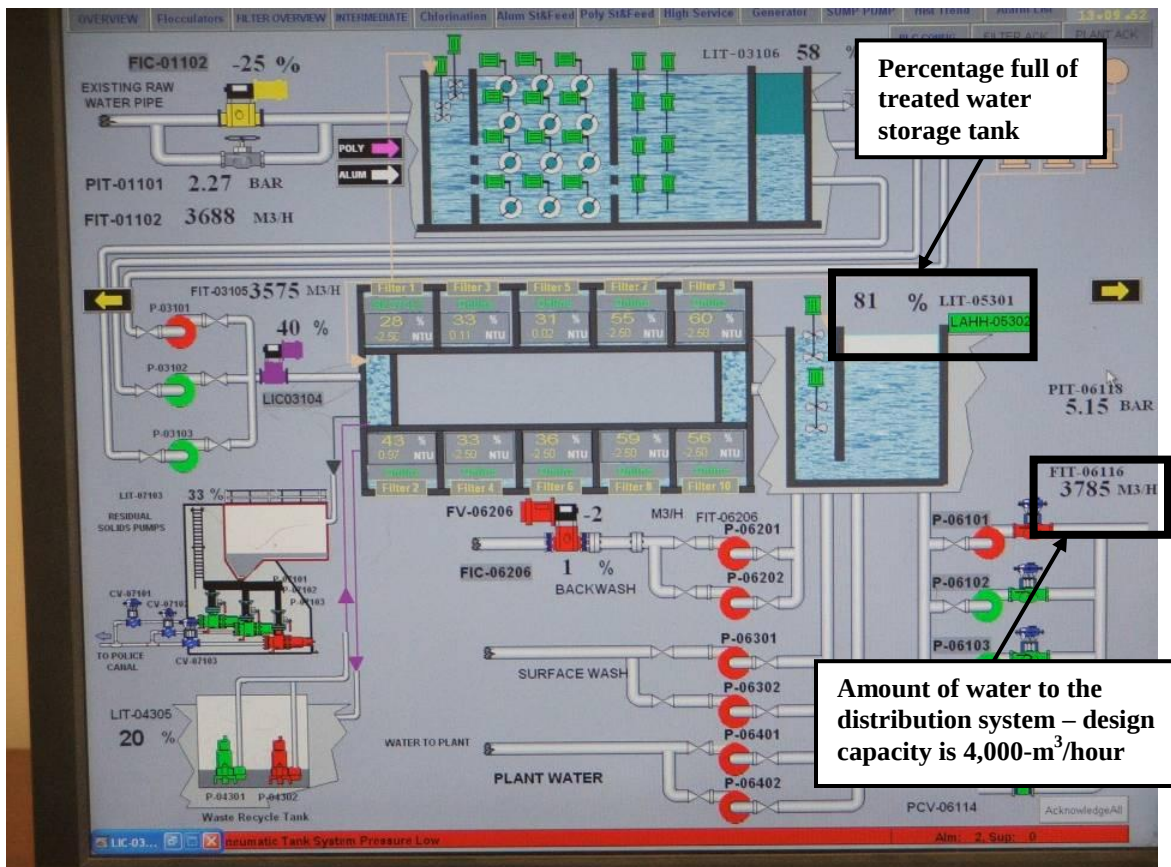


Site Photo 7. Water sampling basin

Item	Parameter	Sample Area	08.00	11.00	13.00	15.00	17.00	20.00
Total Chlorine (mg/l)	Dosed Water							
	Settled Water							
	Filtered Water							
	Treated Water							
Manganese (mg/l)	Raw Water		0.05					
	Dosed Water							
	Settled Water		0.05					
	Filtered Water		0.05					
Total Aluminium (mg/l)	Treated Water		0.05					
	Raw Water							
	Dosed Water							
	Settled Water							
Turbidity (NTU)	Filtered Water		0.34	0.18	0.32			
	Treated Water		1.25	0.48	0.62			

Site Photo 8. Water test results for day of site visit, 17 September 2008

A Programmable Logic Control (PLC) system allows the WTP operators to monitor the status of the facility with real-time information supplied by sensors and controllers installed throughout the WTP processes (Site Photo 9). The operators can open and close valves, turn on and off pumps, and start and stop mixers as necessary to control the treatment process. Alarm conditions are set initially in the system to let the operator know when a reading is out of normal operating range. SIGIR observed that the PLC system monitors were reporting that the flow from the WTP to the distribution system was 3,785-m³/hr, which means the WTP was operating at 95% capacity (3,785/4,000-m³/hr). All ten filters appeared to be in use and the treated water storage tank was 81% full. An alarm condition due to low pressure in the hydro pneumatic tank was reported during the inspection.



Site Photo 9. PLC control monitor

Rapid Mix/Flocculation/Sedimentation/Intermediate Transfer Pump Station

The 1,000-mm raw water pipeline (Site Photo 10) enters the reinforced concrete metering and flow control station where the pipeline is reduced down to a 750-mm pipe (Site Photo 11). The water is then passed through a venture-type meter and a motorized flow control butterfly valve. Also, located in this station is an air release valve, a sampling tap, pressure gauges, and two shut off butterfly valves (Figure 4).

The raw water pipeline enters the rapid mix tanks (Site Photo 12) through an inlet box. The rapid mix tanks are reinforced concrete and include two sluice gates, a chlorine solution injector, three chemical solution diffusers, and two rapid mixers.



Site Photo 10. 1000-mm raw water inlet piping



Site Photo 11. Raw water metering and flow control station

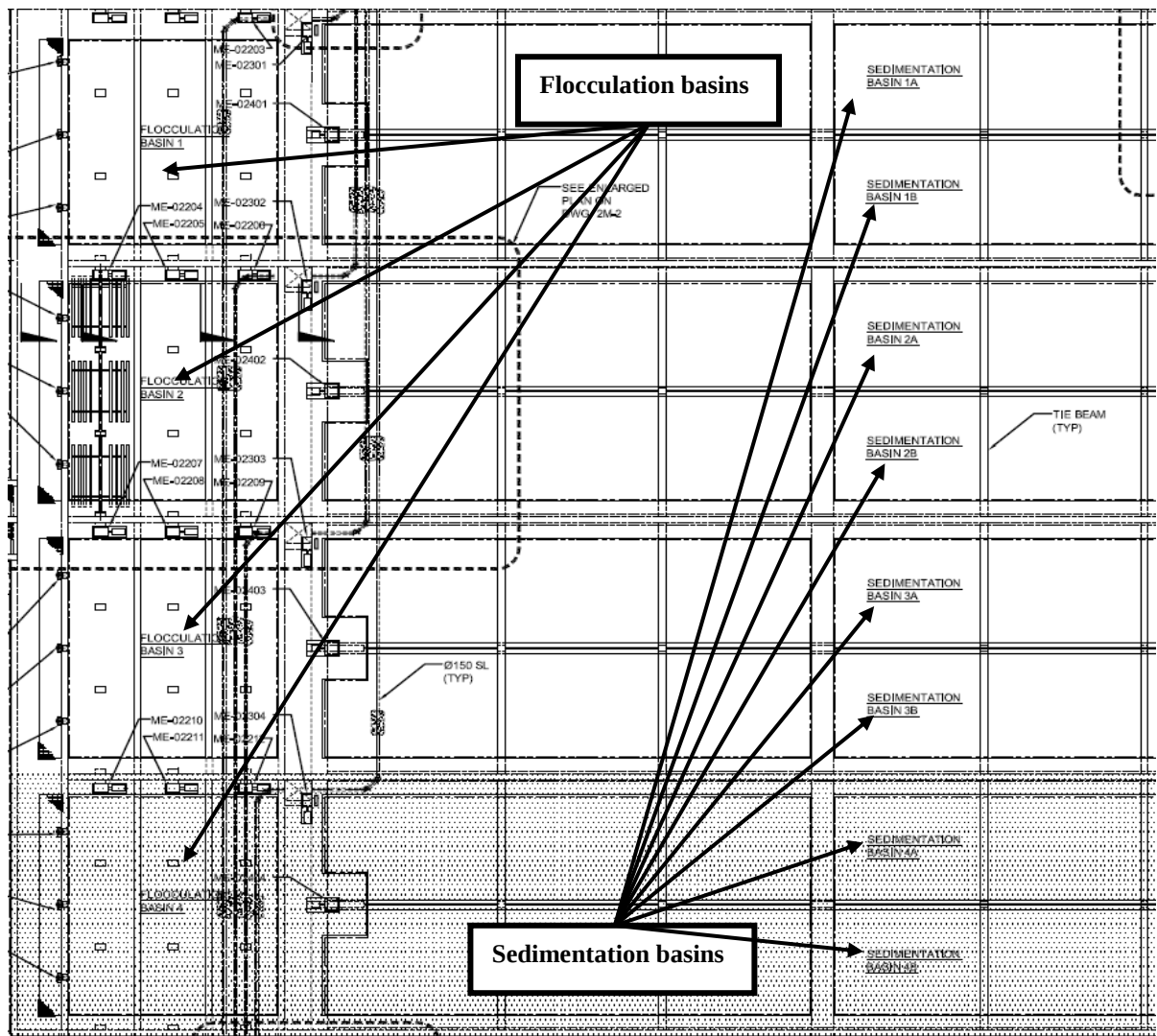


Figure 4. Flocculation/sedimentation basins



Site Photo 12. Rapid mix tank

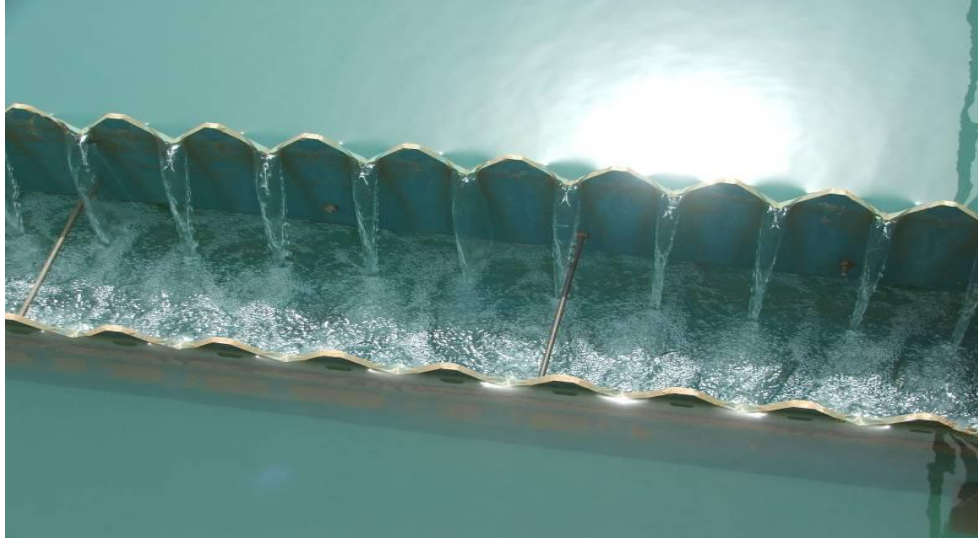
The water/chemical solution is channeled to the four reinforced concrete flocculation basins (Figure 4 and Site Photo 13) in which each basin includes three sluice gates, three paddle wheel type flocculators separated by three perforated diffuser walls, and a dual drive chain and flight sludge collector system.



Site Photo 13. Flocculation tanks

The eight sedimentation basins receive the water from the flocculators and each basin contains a sludge collector system, eight interior baffle walls and two effluent launders with V-notch weirs (Figure 4). The sedimentation basins are also reinforced concrete structures.

The water leaving the effluent launder is sent to an effluent channel (Site Photo 14) connected to the intermediate transfer pump station wet well. The three effluent pumps are located in a separate dry pump room. This pump room is reinforced concrete and includes three pumps, three check valves, sampling points, and a floor drain with a duplex sump pump.



Site Photo 14. Launder and weir

The water is pumped from intermediate transfer pump station structure to the filter structure through a 900-mm pipe (Site Photo 15).



Site Photo 15. Intermediate pump station

Filter Structure

The filter structure is a reinforced concrete structure with ten separate filter compartments (Site Photo 16). Each compartment has an upper and lower flume compartment, four wash water troughs, an under drain system with anthracite and sand layers, and a surface wash piping and nozzle system. The ten filters are allocated five to a side and are separated by a reinforced concrete room that houses the effluent piping, the effluent control valves and the backwash flow control valves.



Site Photo 16. Filter effluent piping

According to GRD documentation, in January 2008, the project had reached 95 % completion when wet commissioning began. During wet commissioning issues developed with the filter under drain system, installed under the USAID project. Specifically, WII/BV “discovered a critical problem” in the filter gallery. According to WII/BV, there was evidence of the following:

- cracked and damaged under-drain blocks
- improperly assembled laterals
- damaged laser shields
- corroded and missing laser shield plate fasteners
- missing grout
- undulation in the installed under-drain that exceeds the tolerance of 1/4” (3-mm) over the entire span, lack of retaining wall in the flume design, which leaves the ends of the laterals exposed
- lack of pressure relief in the backwash water system design

These major problems with the filter under-drains required the removal and replacement of all filter under-drains and pushed the completion date back to September 2008.

In July 2008, GRD reported that filter repairs had been completed for 30% of the Filter Building, and the WTP was sending approximately 1,600-m³/hr of potable water supply to Sadr City. During the SIGIR site visit, the on-site GRC and WII/BV representatives confirmed the filter repairs had recently been completed, which allowed the WTP to operate at full capacity.

Chlorine Mix/Chlorine Contact Tank/Treated Water Storage/Treated Water Pumping

The filtered water is then sent to the Chlorine Mix/Contact Tank through a 1000-mm pipe. The filtered water is separated into two different rapid mixers and chlorine is injected for the final time. Each mixer has an outlet to a separate chlorine contact chamber. Each chamber consists of four sections 30-m long for a total length of approximate 120-m. Each section is 3-m wide and all walls are made of reinforced concrete. The disinfected water travels over the outlet weir into one of two treated water storage tanks.

Filtered water flows by gravity from the filters to the chlorination system. The chlorination system consists of two separate and parallel trains consisting of a chlorine mixing chamber and chlorine contact tank. Each train is designed for a process flow $2,000\text{-m}^3/\text{hr}$, half the plant design flow. Gates are provided to allow one train to be taken out of service. Flow from the two trains combines at the end of the chlorine contact tanks before flowing into the two treated water storage tank compartments.

The chlorination containers are stored in the chlorination building (Site Photo 18).



Site Photo 18. Chlorination containers

The chemical building (Figure 5) contains the dry alum (Site Photo 19) storage room. The dry alum storage room leads to the alum feed room, which contains the alum storage hoppers (Site Photo 20). In addition, the alum feed room has a chemical wash and eye flusher (Site Photo 21) for safety.

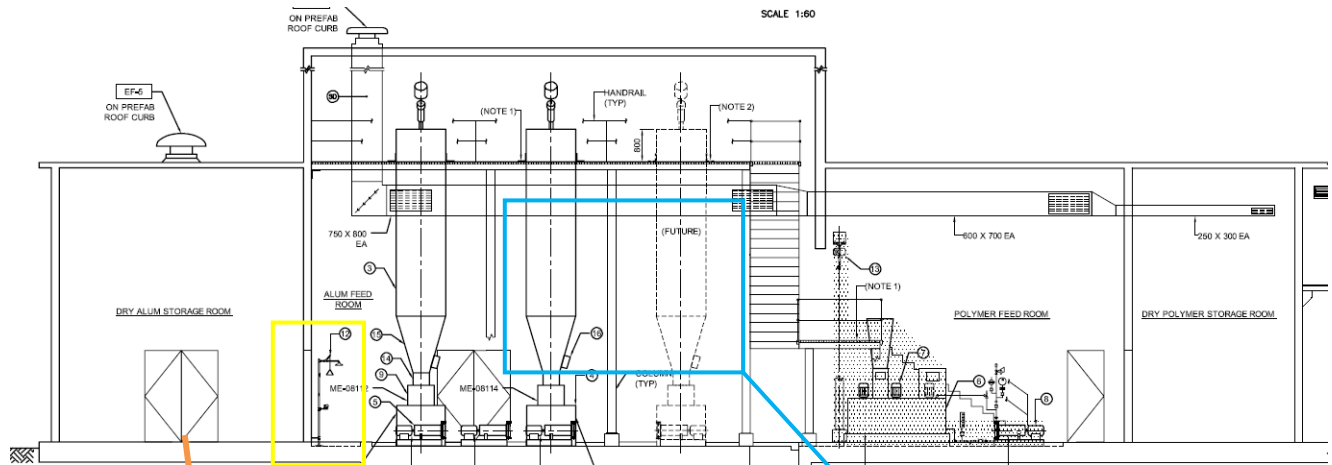


Figure 5. Chemical building



Site Photo 19. Dry alum



Site Photo 20. Alum storage hoppers



Site Photo 21. Chemical wash and eye flusher

The treated water is stored in the 3,000-m³ capacity tank until it is pumped to the distribution system by the treated water pump station. The pump station is constructed of reinforced concrete and has a dry pump room containing a total of ten different pumps. It includes four treated water pumps, two backwash supply water pumps, two filter surface water pumps, and two plant water pumps. The pump room also includes shut-off valves, controls, a sump pump, and air compressor. The air compressor is installed to supply air to the hydro-pneumatic tank located adjacent to

the pump room. This storage tank supplies the potable water for the other treatment plant facilities. The treated water is transported to the Sadr City R3 distribution system by a 900-mm pipe.

Work in Progress

The contract required the contractor complete commissioning and startup activities. Since the overall project was reported as 92% complete at the time of the assessment, the majority of the remaining work consisted of punch list items and commissioning work. The civil punch list item that remains to be addressed is the treated water pump building floor. The slope needs to be repaired due to the accumulation of water (Site Photo 22). Also, WII/BV was working on completing the mechanical and electrical punch list.



Site Photo 22. Accumulation of water due to floor slope

Work Pending

The original SOW required Bechtel to design and construct a residual solids pipeline, which would dispose of the residual solids solution into the existing Police Canal. For environmental concerns, Bechtel and Parsons determined that a three-cell lagoon would be constructed to settle out the solids in the residual solids solution. TO 16 Modification #5 was issued for the design and construction of the lagoons; however, Modification #7 de-scoped the construction of the lagoons. The U.S. government issued a grant agreement with the Iraq Ministry of Water Resources to construct three residual sludge lagoons for the Sadr City R3 WTP in the amount of \$4,161,176.

As of August 2008, the lagoon construction has been delayed due to indecision on the location, identification of the property owners, and the relocation of the residents living on the property. The site selected for the lagoon is in a flood zone that cannot be eliminated, which had resulted in a lagoon re-design. In addition, ownership of the property intended for use for the construction of the WTP was being disputed. The Baghdad Amanat (Baghdad City government) stated in a letter that it owns the land; however, when the contractor was at the site, a local farmer stated he had a lease with BWA to use the land. This remains a critical issue for the WTP.

Until the lagoons are completed, the residual solids from the Sadr City WTP sedimentation and filtration processes are pumped to the Police Canal. The solids solution pumped to the canal will be in a dilute solution having no greater than one percent solids, or 10,000 milligrams per liter (mg/L). The impacts of discharging the quantity of residuals solids estimated to be generated by the Sadr City WTP to the canal without excessive solids deposition in the canal depend on the flow rate and velocity in the canal and the dimensions and gradient of the canal. The USACE stated in a letter to the Amanat that the Sadr City R3 WTP wash water would discharge to the Shourta Canal (also known as the Police Canal) until the completion of the lagoons by the executing company.

Project Quality Management

Contractor Quality Control Program

Department of the Army Engineering Regulation (ER) 1180-1-6, dated 30 September 1995, provides general policy and guidance for establishing quality management procedures in the execution of construction contracts. According to ER 1180-1-6, "...obtaining quality construction is a combined responsibility of the construction contractor and the government."

The contract required the contractor to perform all quality control (QC) throughout the duration of design, construction, fabrication, delivery, installation, and testing and commissioning in accordance with the pre-approved QC plan. The Resident/Project Engineer was responsible for reviewing the QC plan and monitoring all QC activities.

Throughout the project, the WII/BV maintained weekly meetings to review applicable specifications, drawings, submittals, and testing before the start of definable activity on the project. The contractor maintained comprehensive logs, which included descriptions of the day's activities and work performed, workers present, major equipment present, weather conditions, and significant events or concerns for the areas of the Sadr City WTP project. In addition, the daily logs were separated for individual activities such as commissioning, electrical, filters, lab tests, residual solids, and start-up daily reports.

SIGIR reviewed the QC reports for the Sadr City WTP project. The QC reports generally documented the contractor's daily activities as well as the activities of its subcontractor and any critical issues. The QC reports had records of tests, inspections, re-work or deficiencies identified throughout the day. There was detailed documentation of site activities to facilitate further review of progress and quality by senior management for compliance with requirements of the quality control plan. Any deficiencies noted by the contractor were documented in the QC reports. An example was the filter problems encountered by the contractor. The contractor discovered that an under drain was damaged and sand was entering the filtered water zone (Site Photo 23). In addition, Filter 5 was missing four under drain covers and Filter 3 had a gap between the under drain and the end cover. Also, the QC reports contained photographs documenting various stages of construction, installation, and testing.



Site Photo 23. Damaged filter under drain

WII/BV was tasked with assessing and completing the Sadr City WTP, and during the process identified 93 deficiencies in the design and construction performed under the original Bechtel contract. WII/BV agreed in planning sessions with USACE to rehire Bechtel/Parsons' subcontractor, ALMCO, to finish the project. Unfortunately, in WII/BV's opinion, work progress and schedule were impacted by ALMCO's unwillingness to perform work in accordance with the project specifications. For example, WII/BV received and reviewed approximately 20 subcontractor material and work plan submittals from 30 October 2006 through 20 November 2006, and two submittals were adequate enough to be approved by WII/BV engineers.

After reviewing the QC reports, meetings, and submittals, SIGIR determined WII/BV's QC program was adequate.

Government Quality Assurance Program

The USACE ER 1110-1-12 and PCO Standard Operating Procedure (SOP) CN-100 specified requirements for a government quality assurance (QA) program. Similar to the QC program, a crucial oversight technique is presence at the construction site. The USACE GRC Loyalty Resident Office, which was responsible for administration of the Sadr City R3 WTP project, had dedicated personnel on site during significant construction activities.

The USACE local national QA representatives monitored field activities and completed daily QA reports, which were reviewed. The reports showed the percentage of work completed for the buildings, number of workers on the site, and the activity description for the day. Also, the QA reports showed the equipment on site, safety concerns, weather and photographs of the activities taking place throughout the day. The report noted any material that was delivered to the site, QC issues discussed by the contractor and the project management teams in the weekly

job meeting, and photographs of the site. The GRC Loyalty Resident Office tracked deficiencies and noted any concerns in the QA reports.

The government QA program was effective in monitoring the contractor's QC program for the Sadr City WTP project.

Project Sustainability

Commissioning

The contract required WII/BV complete commissioning and startup activities. In addition, WII/BV must complete the current operations and maintenance (O&M) manual in English and submit it to the contracting officer for review and approval approximately four weeks prior to the startup of any portion of the facilities. In August 2008, WII/BV provided a punch list to the USACE that showed the following items on the commissioning punch list: the raw water actuator battery needed replacing, oil change for the rapid mixer gear box, and the Operator Building has an air conditioning unit compressor that needs to be replaced.

Training

The contract required WII/BV to continue and complete training activities already commenced, and conduct O&M training appropriate to the facilities and equipment installed, constructed, or rehabilitated in the scope of the project. Also, the training plan must be submitted to the contracting officer for review and approval four weeks prior to conducting training. The USACE's letter to the Sadr City R3 WTP Plant Manager stated that training should commence immediately on the Cummins emergency generators because the process is necessary due to the safety requirements to have full time standby generator service to power the chlorine scrubber system. WII/BV has been providing training on how to use the lab equipment, managing a water drinking system, operation of the chemical building, symbol abbreviations, chemical systems O&M, pipe and pipe repair, ductile iron pipe repair, and pumping of the WTP.

Operations and Maintenance

The contract required WII/BV to provide O&M support activities. Specifically, WII/BV shall provide O&M support for all facilities and equipment installed, constructed, or rehabilitated in the scope of the project. The support shall be provided during the construction, startup, and commissioning phases of the project. WII/BV shall submit an O&M support plan to the contracting officer for review and approval prior to the startup of any O&M support or within eight weeks of the Notice to Proceed. The contractor's O&M manuals provide an overview of the equipment by identifying the major process units, listing the equipment components and their capacities, and by explaining the operating practices and maintenance requirements of the plant as a whole unit. In addition, the O&M will prove helpful with preventive maintenance and equipment lubrication schedules.

Supplying Consumables & Expansion Potential

The BWA is required to provide the following consumables to support the continued operation of the Sadr City R3 WTP: alum, chlorine, polymer, and diesel fuel.

The future 2,000-m³/hr plant expansion will be a separate, parallel treatment process train. The current plant design includes the following accommodations for the future expansion:

- The raw water pipeline, treated water pipeline, and residual solids pipeline have all been sized for the total future capacity of 6,000-m³/hr.
- The residual solids and the filter waste recycle pump stations have been designed to accommodate the future expansion.
- The chemical building includes space and other provisions for chemical storage and equipment for the expansion.
- The plant water and plant air system have adequate capacity for the expansion.

Conclusions

Based upon the results of our site visit, we reached the following conclusions for assessment objectives 1, 2, 3, 4, and 5. Appendix A provides details pertaining to Scope and Methodology.

1. Determine whether project components were adequately designed prior to construction or installation.

The final plans and designs for the Sadr City R3 Water Treatment Plant were effective for the construction of the facility. Buildings and facilities for the Sadr City R3 Water Treatment Plant were initially designed by Bechtel National, Inc. and Parsons Global Services, Inc. under a U.S. Agency for International Development contract. Upon transfer of the project to the U.S. Army Corps of Engineers for completion, the U.S. Army Corps of Engineers contracted with Washington International, Inc./Black & Veatch, which supplemented the original design.

Bechtel and Parsons were required to design and construct a residual solids pipeline, which would dump the residual solids solution into the existing Police Canal. Because of environmental concerns, the contractor determined that a three cell lagoon would be constructed to settle out the solids in the residual solids solution. The U.S. government issued a grant agreement with the Iraq Ministry of Water Resources to construct three residual sludge lagoons for the Sadr City R3 Water Treatment Plant for \$4,161,176. As of August 2008, the lagoon construction had been delayed due to indecision on the location, identification of the property owners, and the relocation of the residents living on the property. Until the lagoons are completed, the residual solids from the Sadr City Water Treatment Plant sedimentation and filtration processes will be pumped into the Police Canal.

2. Determine whether construction met the standards of the design.

The observed construction work associated with the project appeared to effectively meet the standards of the design. The U.S. Army Corps of Engineers and Washington International, Inc./Black & Veatch maintained an active role in managing the project to ensure quality and compliance with the contract requirements. For example, the northeast wall of the filter structure showed signs of significant concrete repair work. The repair work was to correct a deficiency identified on the contractor's punch list. At the time of the inspection, the concrete repair work was not leaking. However, the re-work has delayed the project completion date and has cost the U.S. government additional funds to repair the deficiency.

3. Determine whether the contractor's quality control program and the government quality assurance program were adequate.

The contractor's quality control was effective in guiding the contractor's quality control program. The contractor's daily quality control reports contained required project and work activity information to document construction progress and identify problems with the required corrective action. The contractor's adequate quality control will help supply 4,000 cubic meters per hour of potable water to Sadr City.

The government quality assurance program was effective in monitoring the contractor's quality control program. The quality assurance representative maintained a presence at the construction site and provided daily quality assurance reports that contained project-specific information to document construction progress and highlight deficiencies. The quality assurance representative also supplemented the daily reports with detailed photographs that reinforced the narrative information provided in the reports.

4. Determine if project sustainability was addressed.

Sustainability was addressed in the contract requirements. The contract required the contractor to train the appropriate individuals; provide operation and maintenance support during the construction, startup, and commissioning phases of the project; complete commissioning and startup activities; and provide options for potential plant expansion.

Washington International, Inc./Black & Veatch has been providing training on use of the lab equipment, management of a drinking water system, operation of the chemical building, operation and maintenance of chemical systems, ductile iron pipe repair, and pumping of the water treatment plant. The operation and maintenance manuals provide an overview of the equipment by identifying the major process units, listing the equipment components and their capacities, and explaining the main operating practices and maintenance requirements of the plant as a whole unit.

The Baghdad Water Authority is required to provide the consumables for operation of the water treatment plant— such as alum, chlorine, polymer, and diesel fuel— to support continued operation. The original design of the facility was for 4,000 cubic meters per hour of potable water; however, the design provides for a future capacity expansion to accommodate 6,000 cubic meters per hour in multiple cell expansions.

5. Determine whether project results were consistent with original objectives.

The Sadr City R3 Water Treatment Plant project should result in a functional project. At the time of the assessment, the Sadr City R3 Water Treatment Plant project was reported to be 92% complete. If the current quality of construction and effective project management continues, the Sadr City R3 Water Treatment Plant will be completed, and the project results will be consistent with the original objectives.

Recommendations

SIGIR recommends that:

1. The Commanding General, Gulf Region Division continue to provide information and documentation to assist the U.S. Agency for International Development in evaluation of faulty design and construction work.
2. The Mission Director of the Baghdad Office of the U.S. Agency for International Development and the Director, Iraq Transition Assistance Office evaluate the issues raised in this report and take appropriate action.

Management Comments

SIGIR received several iterations of comments on a draft of this report from the Gulf Region Division, Iraq Transition Assistance Office, and U.S. Agency for International Development. Numerous changes have since been made and all comments are appended to this report.

The initial comments were in response to an understanding of our original recommendations that required legal action on the potential claim for faulty design and construction work. The Iraq Transition Assistance Office and U.S. Agency for International Development stated that they had not been given sufficient time to consider legal action and that the report contained errors, though no instances or examples were provided.

Additional comments received from the U.S. Agency for International Development requested that we address issues beyond the announced scope and objectives of this assessment. An additional 30 days have been provided for further comments. Based on the extent of the comments, SIGIR will consider a follow-on report to address the earlier phases of the Sadr City R3 Water Treatment Plant project which were not a part of the objectives of this assessment.

The Gulf Region Division, of the United States Army Corps of Engineers provided formal comments concurring with the recommendations in the report. Specific comments were also provided to clarify or correct technical aspects of the report.

Evaluation of Management Comments

Based on the comments received, recommendations were revised and sections of the report were edited. Further input will be allowed through November 23, 2008 at which time those comments will be evaluated and the need for a follow-on report covering issues raised beyond the scope and objectives of this assessment will be determined.

SIGIR appreciates the concurrence by the Gulf Region Division. SIGIR reviewed the information and clarifying comments provided by the Gulf Region Division and revised the final report as appropriate.

Appendix A. Scope and Methodology

SIGIR performed this project assessment of the Sadr City Water Treatment Plant, Unique Record Identifier 29623, from July through October 2008 in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team comprised a professional engineer/inspector and an auditor/inspector.

In performing this Project Assessment, SIGIR:

- Reviewed contract documentation to include the following: USAID - Contract SPU-C-00-04-00001, Job Order Number 04-510; Job Order Number 04-510 amendments; Contract W914NS-04-D-0007, Task Order 14; Contract W914NS-04-D-0007, Task Order 14 modifications; Contract W914NS-04-D-0007, Task Order 16; Contract W914NS-04-D-0007, Task Order 16 modifications; scope of work; and grant agreement;
- Reviewed the design package (drawings and specifications), Quality Control Plan, Contractor's Quality Control Reports, U.S. Army Corps of Engineers Quality Assurance Reports, and Construction Progress Photos;
- Interviewed the U.S. Army Corps of Engineers, Gulf Region Division, Water Sector Program Manager; U.S. Army Corps of Engineers, Gulf Region Central, Program Manager; U.S. Army Corps of Engineers, Project Engineer; and Iraq Transition Affairs Office, Water Resources Senior Consultant; and
- Conducted an on-site assessment of the Sadr City R3 Water Treatment Plant on 17 September 2008 and documented the results at the Sadr City R3 Water Treatment Plant in Baghdad, Iraq.

Appendix B. Contract Modifications

There were 15 modifications to the Contract W914NS-04-D-0007, Task Order 16.

Modification #P00001, issued 25 September 2006, provided the Notice to Proceed and increased the total sum available for payment of cost by \$850,000 to \$6,950,000. The modification directed the contractor to coordinate all efforts with the respective government agencies (Amanat, Ministry of Water Resources, and Ministry of Environment) and prepare a sludge disposal plan.

Modification #P00002, issued 29 September 2006, modified the Statement of Work (SOW) construction management. The modification directed the contractor to redo some of the work. The contractor would design and execute construction necessary to complete a fully operational and functional water treatment plant. This would include construction and operational defects that may be identified related to the previous work done under USAID and work to be completed.

Modification #P00003, issued 22 January 2007, modified the contract Not to Exceed (NTE) amount to \$5,200,000.

Modification #P00004, issued 29 March 2007, increased the contract NTE amount to \$9,487,500.

Modification #P00005, issued 5 June 2007, modified the contract to include the SOW for the Water Treatment Residuals Disposal System – conceptual design. The modification directed the contractor to provide conceptual design documents for the construction of a Lagoon Dewatering water treatment residuals management system based upon the design concepts developed and approved in the Water Residuals Disposal Study. In addition, the conceptual design documents shall illustrate the adaptation of the water residuals disposal study to the proposed site(s). The initial design criteria will use the following assumptions: it is acceptable to discharge the decant from the lagoons to the Police Canal; existing pumps at the WTP are of sufficient capacity to convey sludge to the lagoons; construction of the lagoons will include ramps to allow removal of the dewatered sludge using heavy equipment. The heavy equipment to remove dewatered sludge is not being furnished by the contractor or under this Scope of Work. The lagoon capacity requirements are based upon achieving 20 to 40 % solids in the dewatered cake without mechanical mixing.

Modification #P00006, issued 9 August 2007, modified the contract and increased the NTE to \$17,432,085. The modification increased the NTE amount as a result of the following identified requirements to complete the Sadr City WTP: (1) excavation and leak repair in the 1.5 kilometer (km) Raw Water conveyance line; (2) excavation and leak repair in the 1.65 km Treated Water conveyance line; (3) installation of backflow preventor; (4) Guard House septic system rework; (5) additional interfaces for Plant Automation System; (6) PLC HMI training for plant operation staff; (7) claims from subcontractor to rework previously approved work items under previous USAID contract; (8) increased costs associated with schedule extension due to re-work items stated in #7, security, in-plant electrical distribution system, and power connection to the main electric power grid; (9) in-plant treated water large diameter piping leak repair; and (10) treated water pump start-up and rehab.

Modification #P00007, issued 28 September 2007, modified the contract by de-scoping the construction of the residual lagoons from the Scope of Work. The contractor shall provide deliverables (conceptual design documents and complete statement of work) for the residual lagoons.

Modification #P00008, issued 17 December 2007, modified the contract to allow the contractor to invoice for the earned award fee of TO 16.

Modification #P00009, issued 27 December 2007, modified the contract and increased the obligated funding to approximately \$18,398,402.

Modification #P00010, issued 8 February 2008, modified the contract and the total definitized amount remains in the amount of \$14,477,355. The task order period of performance remains unchanged as follows: 31 December 2007 the completion of the pre-commissioning, commission, start-up, and performance test and 29 February 2008 the task order closeout and contract completion.

Modification #P00011, issued 8 March 2008, modified the contract and increased the obligated funding to cover additional costs due to recent discovery items.

Modification #P00012, issued 16 April 2008, modified the contract and extended the period of performance from 29 February 2008 to 31 December 2008.

Modification #P00013, issued 24 June 2008, modified the contract to definitize the cost of TO 16, Sadr City WTP, as a result of negotiations between the contracting parties. Definitized TO 16 for the total estimated cost of \$23,440,212, which included security costs that were not included in Modification 7. Future discovery items after 6 May 2008 are not included in the definitized estimated cost, and will need approval from the Contracting Officer. The task order period of performance changed to 30 September 2008 for the completion of the pre-commissioning, commission, start-up, and performance test and 30 November 2008 the task order closeout and contract completion.

Modification #P00014, issued 26 July 2008, modified the contract and increased the obligated amount by \$975,000 to the total obligated amount to \$24,415,212.

Modification #P00015, issued but not signed, modified the contract and increased the definitized amount from \$23,440,212 to \$26,438,508 to cover potential sub-contractor claims and liabilities.

Appendix C. Construction Codes and Standards

The contract required conformance to the following codes and standards for the design and construction:

- Air Conditioning and Refrigeration Institute
- Air Movement and Control Association
- American Architectural Manufacturers Association
- American Concrete Institute
- American Institute of Steel Construction
- American Iron and Steel Institute
- American National Standards Institute
- American Society of Heating, Refrigeration, and Air Conditioning Engineers – Guide and Data Books
- American Society of Mechanical Engineers
- American Society of Plumbing Engineers
- American Society of Sanitary Engineers
- American Society of Testing and Materials
- American Standards Association
- American Water Works Association
- American Welding Society
- Associated Air Balance Council Standards
- Concrete Reinforcing Steel Institute
- Department of the Army, Coe, Handbook for Concrete and Cement
- Door and Hardware Institute
- Federal Specifications
- Federal Standards
- Flat Glass Marketing Association
- Illuminating Engineering Society Lighting Handbook
- Institute of Electrical and Electronics Engineers
- National Association of Plumbing-Heating-Cooling Contractors
- National Electric Code
- National Electrical Manufacturers Association
- National Electrical Safety Code
- National Environmental Balancing Bureau
- National Fire Protection Association Codes and Standards
- National Hardwood Lumber Association
- National Standard Plumbing Code
- Manufacturers Standardization Society of the Valve and Fittings Industry
- Military Specifications
- Sheet Metal and Air Conditioning Contractor's National Association
- Steel Deck Institute
- Steel Door Institute
- Steel Structures Painting Council
- Underwriters Laboratories
- Uni-Bell PVC Pipe Association
- Uniform Building Code, 1994 Edition Including Current Revisions
- U.S. Department of Commerce, National Bureau of Standards Handbook
- U.S. Army, Corps of Engineers Handbook and Guide Specifications.

Appendix D. Acronyms

ALMCO	Al Iraq Al Mo'asir
BWA	Baghdad Water Authority
GRC	Gulf Region Central
GRD	Gulf Region Division
ITAO	Iraq Transition Assistance Office
km	kilometer
l/c/d	liters per capita per day
m	meter
mm	millimeter
m ³	cubic meter
m ³ /hr	cubic meters per hour
NTE	Not to Exceed
NTU	Nephelometric Turbidity Unit
O&M	Operations and Maintenance
OIC	Officer in Charge
PLC	Programmable Logic Control
QA	Quality Assurance
QC	Quality Control
SIGIR	Special Inspector General for Iraq Reconstruction
SOW	Statement of Work
TO	Task Order
USACE	United States Army Corps of Engineers
USAID	United States Agency for International Development
WHO	World Health Organization
WII/BV	Washington International, Inc./Black & Veatch Joint Venture
WTP	Water Treatment Plant

Appendix E. Report Distribution

Department of State

Secretary of State

Senior Advisor to the Secretary and Coordinator for Iraq

Director of U.S. Foreign Assistance/Administrator, U.S. Agency for
International Development

Director, Office of Iraq Reconstruction

Assistant Secretary for Resource Management/Chief Financial Officer,
Bureau of Resource Management

U.S. Ambassador to Iraq

Director, Iraq Transition Assistance Office

Mission Director-Iraq, U.S. Agency for International Development

Inspector General, Department of State

Department of Defense

Secretary of Defense

Deputy Secretary of Defense

Under Secretary of Defense (Comptroller)/Chief Financial Officer

Deputy Chief Financial Officer

Deputy Comptroller (Program/Budget)

Deputy Assistant Secretary of Defense-Middle East, Office of Policy/International
Security Affairs

Inspector General, Department of Defense

Director, Defense Contract Audit Agency

Director, Defense Finance and Accounting Service

Director, Defense Contract Management Agency

Department of the Army

Assistant Secretary of the Army for Acquisition, Logistics, and Technology

Principal Deputy to the Assistant Secretary of the Army for Acquisition,
Logistics, and Technology

Deputy Assistant Secretary of the Army (Policy and Procurement)

Commanding General, Joint Contracting Command-Iraq/Afghanistan

Assistant Secretary of the Army for Financial Management and Comptroller

Chief of Engineers and Commander, U.S. Army Corps of Engineers

Commanding General, Gulf Region Division

Chief Financial Officer, U.S. Army Corps of Engineers

Auditor General of the Army

U.S. Central Command

Commanding General, Multi-National Force-Iraq

Commanding General, Multi-National Corps-Iraq

Commanding General, Multi-National Security Transition Command-Iraq

Commander, Joint Area Support Group-Central

Other Federal Government Organizations

Director, Office of Management and Budget
Comptroller General of the United States
Inspector General, Department of the Treasury
Inspector General, Department of Commerce
Inspector General, Department of Health and Human Services
Inspector General, U.S. Agency for International Development
President, Overseas Private Investment Corporation
President, U.S. Institute for Peace

Congressional Committees and Subcommittees, Chairman and Ranking Minority Member

U.S. Senate

Senate Committee on Appropriations
 Subcommittee on Defense
 Subcommittee on State, Foreign Operations, and Related Programs
Senate Committee on Armed Services
Senate Committee on Foreign Relations
 Subcommittee on International Development and Foreign Assistance, Economic Affairs, and International Environmental Protection
 Subcommittee on International Operations and Organizations, Democracy and Human Rights
 Subcommittee on Near Eastern and South and Central Asian Affairs
Senate Committee on Homeland Security and Governmental Affairs
 Subcommittee on Federal Financial Management, Government Information, Federal Services, and International Security
 Subcommittee on Oversight of Government Management, the Federal Workforce, and the District of Columbia
Permanent Subcommittee on Investigations

U.S. House of Representatives

House Committee on Appropriations
 Subcommittee on Defense
 Subcommittee on State, Foreign Operations, and Related Programs
House Committee on Armed Services
 Subcommittee on Oversight and Investigations
House Committee on Oversight and Government Reform
 Subcommittee on Government Management, Organization, and Procurement
 Subcommittee on National Security and Foreign Affairs
House Committee on Foreign Affairs
 Subcommittee on International Organizations, Human Rights, and Oversight
 Subcommittee on the Middle East and South Asia

Appendix F. United States Embassy-Iraq Comments



Appendix G. Gulf Region Division Comments



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
GULF REGION DIVISION
BAGHDAD, IRAQ
APO AE 09348

CEGRD-CG

22 October 2008

MEMORANDUM FOR Special Inspector General for Iraq Reconstruction, US Embassy Annex,
M-202, Old Presidential Palace, APO AE 09316

SUBJECT: Draft SIGIR Draft Project Assessment Report - Sadr City R3 Water Treatment Plant
Baghdad, Iraq (SIGIR - PA-08-143)

1. This memorandum provides the U.S. Army Corps of Engineers, Gulf Region Division response to the subject draft project assessment report.
2. The Gulf Region Division reviewed the subject draft report. The enclosure includes the GRD concurrence with the recommendation and provides additional comments related to clarity and accuracy.
3. Thank you for the opportunity to review the draft report and provide our written comments for incorporation in the final report.
4. If you have any questions, please contact Mr. Robert Donner at (540) 665-5022 or via email Robert.L.Donner@usace.army.mil.

Encl
as

Michael R. Eyre
MICHAEL R. EYRE
Major General, USA
Commanding

Appendix G. Gulf Region Division Comments

COMMAND REPLY

to

SIGIR Draft Project Assessment Report - Sadr City R3 Water Treatment Plant
Baghdad, Iraq
(SIGIR Report Number PA-08-143)
(Project PA-08-143)

Recommendation 1. SIGIR recommends that the Commanding General, Gulf Region Division and the Director, Iraq Transition Assistance Office continue to provide information and documentation to assist the U.S. Agency for International Development in recouping the cost of faulty design and construction work.

Concur. The Gulf Region Division will continue to provide information and documentation to assist the U.S. Agency for International Development in recouping the cost of faulty design and construction work.

Recommendation 2. The Mission Director of the Baghdad Office of the U.S. Agency for International Development pursue the claims identified by the Gulf Region Division of the U.S. Army Corps of Engineers against Bechtel National, Inc. and the local Iraqi contractor for latent defective work.

GRD Comment. GRD suggests the following rewording of the recommendation.

The Mission Director of the Baghdad Office of the U.S. Agency for International Development pursue the Gulf Region Division identified construction defects against Bechtel National, Inc. and the local Iraqi contractor for latent defective work.

Additional Comments. The Gulf Region Division (GRD) provides the following comments for clarity and accuracy.

1. **Draft Report, Page ii, paragraph four.** The contract required the contractor to train the appropriate individuals; provide operation and maintenance support during the construction, startup, and commissioning phases of the project; complete commissioning and startup activities; provide consumables;....

GRD Comment. The contractor doesn't provide consumables. On page iii, it correctly states, "The Baghdad Water Authority is required to provide the consumables for operation of the water treatment plant such as alum, chlorine, polymer, and diesel fuel to support continued operation." The contractor was to provide some items but they are relatively insignificant compared to the main consumables such as alum, chlorine, and fuel.

Enclosure

Appendix G. Gulf Region Division Comments

2. Draft Report, Pages iii and 57. Use of the words “ductile repair”.

GRD Comment. Replace “ductile repair” with “ductile iron pipe repair”

3. Draft Report, Pages iii, paragraph four, last sentence and pages 27 and 29. “This agreement resulted in paying the local Iraqi subcontractor twice for the same work.”

GRD Comment. This is not an accurate statement. The initial work performed was not complete or not acceptable, and the contractor should not have been paid the first time. The subcontractor was legitimately paid to rip out and replace unacceptable work under the new contract. The claim process is underway to recoup the Government’s expenses for the initial defective work. Perhaps a more accurate way to present this statement is to write, “This agreement resulted in additional cost to the Government for repair or replacement of defective work.”

4. Draft Report, Page 20, last paragraph, first sentence. In July 2008, GRD reported that filter repairs had been completed for 30% of the Filter Building, and the WTP was sending approximately 1,600-m³/hr of potable water supply to Sadr City.

Command Comment. The 1,600 m³/hr figure is 40% of plant output, not 30%. On 29 July, a fifth filter was brought online and raised output to 50% (2,000 m³/hr).

5. Draft Report, Page 24, second paragraph, last two sentences. The USACE stated in a letter to the Amanat that the Sadr City R3 WTP wash water would discharge to the Shourta Canal (also known as the Police Canal) until the completion of the lagoons by the executing company. At the completion of the lagoons, the USACE has pledged to “cleanse the KSD drain, Shourta canal, and to fix any blockages that may occur.”

Command Comment. GRD does not have a letter on file that includes an agreement to “cleanse” the Shourta (Police) Canal or remove blockages. GRD has a letter from the MWR, dated 19 Aug 07, that agrees to discharging solids to the canal on the condition that Baghdad Water Authority remove any blockages.

6. Draft Report, Page 27, third paragraph, second sentence. In August 2006, WII/BV identified approximately 93 total deficiencies in the design and construction performed under the Bechtel contract.

Command Comment. WII/BV discovered additional deficiencies in the design and construction performed under the Bechtel contract after August 2006. For example, WII/BV did not discover the filter under drain problem until the winter of 2007 - 2008. Other construction deficiencies came to light over time after WII/BV took over the project.

Appendix H. U.S. Agency for International Development—Management Comments



October 27, 2008

Brian Flynn
Assistant Inspector General for Inspections
Special Inspector General for Iraq Reconstruction

Re: SIGIR-PA-08-143

Dear Mr. Flynn:

Pursuant to your email of October 24, 2008, you indicated in response to concerns raised by the U.S. Mission-Iraq, ITAO, and USAID, that:

c. The assessment report on the Sadr City R3 Water Treatment Plant will be issued on 28 October 2008 indicating that an additional 30 day comment period has been made available to ITAO and USAID to provide comments on the report and that the report will be revised for any facts provided. Of course, any facts presented before 28 October will be included in the report.

USAID submits the following additional comments and recommendations to be included in the report. USAID reserves the right to make additional comments within the 30 day comment period which we assume begins to run on October 28, 2008.

Comments and Recommendations:

1. Originally, the Sadr City R3 Water Treatment Plant was a USAID project. In the fall of 2006, USAID turned over the Project to the U.S. Army Corps of Engineers (USACE). At the time of turnover, the project was 85% - 88% complete. Two plus years have passed since the transfer. The USAID/Bechtel contract has been closed out. The potential claims arose after the transfer of the Project to USACE. Control of the information relevant to the claims is with USACE-GRD. USAID has offered to initiate a pass through type claim on behalf of USACE-GRD, if such a claim is warranted and feasible. However, in our opinion, USAID should not take the lead in any legal action if an assessment concludes legal action is warranted.

Recommendation: Reassess the agency most capable of successfully pursuing any potential claim/s against the relevant contractors and/or subcontractors.

2. The assessment report makes certain material conclusions and statements concerning the project which may unintentionally, yet adversely, affect potential claims brought by the USG for certain alleged deficiencies. For example, page 10 of the assessment report identifies and discusses various design and construction deficiencies. The parties are still waiting for USACE-GRD to provide information and documentation supporting the purported deficiencies. The assessment report prematurely makes material conclusions concerning the cause and nature of the deficiencies before the parties have had a chance to make a thorough evaluation and analysis and information. Further, the information in the assessment report may very well be protected as attorney work product information provided in anticipation of litigation.

Recommendation: We request SIGIR not to finalize or publish the assessment report until the parties (USAID, USACE- GRD and ITAO) determine the feasibility of bringing claim/s against the relevant contractors and/or subcontractors. If the parties determine that it is feasible to bring a claim/s, SIGIR should not finalize or publish the assessment report until the claim is concluded unless and until the parties conclude the assessment report is factually accurate and does not contain information that may be harmful in prosecuting any claim relevant to this matter.

3. In many parts, the assessment report fails to clearly distinguish the various contracts being assessed. The Sadr City Project was originally funded by USAID through a contract/job order to with Bechtel National, Inc. (BNI), Contract SPU-C-00-04-00001/Job Order 05-510. Bechtel subcontracted with Parsons Global Services, Inc. (Parsons) to design and build the Project. Parsons, in turn, subcontracted with ALMCO to construct the Project. In September of 2006, USAID turned the project over to USACE-GRD to be completed. At the time, the project was 85% - 88% complete. USACE-GRD did not assume the Bechtel contract or any of the subcontracts with Parsons and ALMCO. Instead, USACE-GRD issued a JO with Washington International, Inc./Black and Veatch (WII) to finish the work. WII then entered into a new subcontract with ALMCO. Throughout the assessment, SIGIR uses the word contract or subcontract without distinguishing which specific contract or subcontract to which it is referring. Although sometimes the correct inference can be made in context, that is not always the case.

Recommendation: The assessment report should clarify whether it is referring to the BNI contract or the WGI contract. Further, the draft Assessment's reference to subcontractors, and in particular ALMCO, should clarify whether it is referring to ALMCO as a subcontractor under the WGI contract, the BNI contract, or both.

4. The assessment report, including “The Pre-Site Assessment Background” on page 3, omits any reference as to why the Project was turned over to USACE-GRD. At the time of the transfer, Bechtel was in the process of closing its two \$1 billion plus infrastructure contracts in Iraq. The Sadr City R3 Water Treatment Plant was one of the last remaining projects under the Bechtel contract. It was determined that transfer of that project over to USACE-GRD would be economically advantageous.

Recommendation: The assessment report should include a narrative as to why the Project was turned over to USACE. SIGIR should consult with USAID on this matter.

5. The assessment report fails to recognize that the USAID and USACE-GRC had a Participating Agency Service Agreement (PASA) whereby USACE-GRC provided engineering review and construction oversight, performance monitoring, quality control and quality assurance, schedule control and other matters concerning Bechtel’s work under its contract with USAID. These responsibilities included the individual job order for the Sadr City Project. USACE-GRC had been intimately involved and was familiar with the Sadr City Project as the USAID project engineer long before the project was turned over to USACE-GRC in September 2006. As a result, the draft Assessment creates misleading impressions about USAID. For example, on page 7, under Current Project Design and Specifications, the Assessment states “ [the USAID/Bechtel contract/job order] required all design packages and sub-consultant submittals to be submitted to USAID for review, distribution, and record purposes.” This information was actually submitted to USACE-GRC under the USAID/Bechtel contract.

As another example, page two of the assessment report states, “According to USACE and Iraq Transition Office (ITAO) representatives, USAID turned over very little historical documentation regarding this project.” This quote is inaccurate and connotes that USAID has not cooperated. First, as noted earlier, USAID has had little opportunity to provide any significant input into the draft Assessment. Secondly, the project engineer for USAID under the Bechtel contract, USACE must have provided relevant historical documentation from USAID. As noted in the assessment report on Page 7, USACE provided SIGIR 100% of the original design drawings from Bechtel/Parsons for the Sadr City Project. These drawings originated from USAID’s contractor Bechtel. USACE, as USAID’s project engineer had access to the information needed by virtue of its relationship with USAID under the PASA.

Recommendation: Further clarify the background history, including USACE’s role in the oversight and review of Bechtel’s work, and the relationship of the parties in order to make a fair and completed assessment. Those portions of the assessment report that are incorrect should be redacted.

6. It is unclear whether the referenced 93 deficiencies related to the original design and construction were discovered under TO 14 issued pursuant to the WII contract and, if so, when those deficiencies were discovered. An assessment of when the deficiencies were discovered and who was provided notice is required in order to evaluate the potential claims.

Recommendation: Clarify when the claimed deficiencies were discovered.

7. The assessment report does not analyze the available defenses against any potential claims brought against the relevant contractors and/or subcontractors. The claimed deficiencies have not been fully vetted by either side. However, the assessment report concludes that legal action is warranted.

Recommendation: The responses of the contractors/subcontractors to the preliminary list of deficiencies should be reviewed in order to assess the viability of proceeding forward with legal action. Alternatively, SIGIR should withhold finalizing the assessment report until the parties have had the opportunity to properly evaluate the claims.

8. The project was 85% - 88% completed at turnover in September, 2006. The cost to USAID to design and construct the Project to that point was \$29 million for direct cost plus \$5 million for indirect cost. The turnover was approved by USACE-GRD. Only 4% - 7% has been completed since then at a cost exceeding \$30 million. The assessment report indicates that WII's subcontract with ALMCO required ALMCO to "complete those items identified as the uncompleted portion of the project for the unpaid balance of the prior subcontract." It is not clear whether this was actually done or whether WII may have a claim against ALMCO. Further, there is no breakdown of costs attributable to the deficiencies or a determination as to when the deficiencies occurred. There is no assessment as to how this sub-contractual relationship between WII and ALMCO will potentially affect any claims against ALMCO or whether this relationship vitiates any warranty responsibilities of Bechtel or Parsons. This information will most certainly impact any claims brought against Bechtel or Parsons.

Recommendation: SIGIR should further examine the ALMCO relationship with WII and determine if ALMCO has performed according to the terms of their subcontract with WII and, if not, whether WII should pursue a claim against ALMCO.

9. Page 20 of the assessment report lists several items involving the filter gallery that apparently were not discovered until January 2008. The assessment report does not explain why it took WII until January 2008 to perform wet commissioning when 85%- 88% of the work was completed by September 2006. Moreover, most of the "critical problems" appear associated with construction defects as opposed to design defects. This is inconsistent with earlier discussions in the assessment

report regarding design defects. Further, it is unclear whether these problems are the result of original construction or design under the Bechtel contract or as the result of construction or design under the WII contract.

Recommendation: Clarify and provide the appropriate explanations.

10. "Work Pending" as identified on page 23 of the draft Assessment indicates that there were two modifications to the original designs by Bechtel and Parsons for a three cell lagoon. It is unclear if these modifications were due to potentially defective design of the lagoon or requested changes. The same section on page 23 indicates that there is an ownership issue regarding the "WTP." How long has this issue been known and does it involve the entire Project area or just the lagoon area?

Recommendation: Clarify and explain.

11. SIGIR's revised recommendations are as follows:

1. The Commanding General, Gulf Region Division continue to provide information and documentation to assist the U.S. Agency for International Development in evaluation of faulty design and construction work.

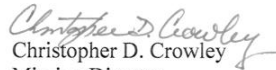
2. The Mission Director of the Baghdad Office of the U.S. Agency for International Development and the Director, Iraq Transition Assistance Office evaluate the issues raised in this report and take appropriate action.

These recommendations are both redundant and somewhat inconsistent. Recommendation No. 1 requires GRD to provide information and documentation to assist USAID in the evaluation of faulty design and construction work. Recommendation No. 2 asks USAID and ITAO to evaluate the issues raised in the report and take appropriate action. The principal issue raised in the report involves the evaluation of the design and construction work.

Recommendation: SIGIR redraft the recommendations in the assessment report into one recommendation in order to reflect the comments contained herein and in order to reduce redundancy and confusion. Suggested revision:

1. The Commanding General, Gulf Region Division continue to provide information and documentation to assist the U.S. Agency for International Development and the Director, Iraq Transition Assistance Office in evaluating the possibility of legal recourse against the various contractors for potential design, construction and/or other deficiencies associated with the project.

Respectfully,


Christopher D. Crowley
Mission Director
USAID/Iraq

Cc: ITAO
USACE-GRD

Appendix I. Project Assessment Team Members

The Office of the Assistant Inspector General for Inspections, Office of the Special Inspector General for Iraq Reconstruction, prepared this report. The principal staff members who contributed to the report were:

Angelina Johnston

Kevin O'Connor

Todd Criswell, P.E.