AL NAHRWAN WATER SUPPLY PROJECT AL NAHRWAN, IRAQ

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Special Inspector General for Iraq Reconstruction

SIGIR PA-05-003 **March 15, 2006**

Al Nahrwan Water Supply Project

Synopsis

Introduction. This report was previously provided on a limited distribution basis only in Iraq to representatives of the Gulf Region Division of the U.S. Army Corps of Engineers and the Project and Contracting Office. In accordance with the revised policy of the Office of the Special Inspector General for Iraq Reconstruction, all project assessment reports are being issued publicly.

This project assessment was initiated as part of our continuing assessments of selected sector reconstruction activities for electricity, oil, and public works and water. The overall objectives were to determine whether selected sector reconstruction contractors complied with the terms of their contracts or task orders and to evaluate the effectiveness of the monitoring and controls exercised by administrative quality assurance and contract officers. 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 included a professional engineer and an auditor.

Project Assessment Objectives. The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties in order to enable appropriate action, when warranted. Specifically, we determined whether:

1. Project results will be consistent with original objectives;
2. Project components were adequately designed prior to construction or installation;
3. Construction or rehabilitation met the standards of the design; and
4. The contractor's quality control plan and the U.S. Government's Quality Assurance program were adequate.

Conclusions. This Project Assessment determined that:

1. The work performed under this contract for the design and construction of a water pipeline, connection of fifty houses to the new water pipeline, and removal of illegal water connections in the City of Al Nahrwan met the stated objectives.

2. The design package was complete and sufficiently specific to install the required water pipe lines and make connections to fifty homes.

3. The scheduled on-site inspection could not be conducted due to security concerns. The project assessment for the Al Nahrwan Water Supply Project was based solely on U.S. Army Corps of Engineers quality assurance reports and photographs, contractor quality control reports, and interviews with the U.S. Army Corps of Engineers quality assurance representative. It appears that the project was completed to the standards of the design, but this could not be conclusively determined without a site inspection.

4. The contractor's quality control plan and the U.S. Government's quality assurance program were adequate for this project. Proper documentation by the contractor

through daily quality control reports and U.S. Army Corps of Engineers Quality Assurance Representative through quality assurance reports ensured the project was completed on time and within budget. The U.S. Army Corps of Engineers Quality Assurance Representative was on-site during the critical stages of material inspection and pressure testing.

Recommendations and Management Comments. We discussed the results of this project assessment with U.S. Army Corps of Engineers' officials who concurred with our conclusions. This report does not contain any negative findings; therefore management comments were not required.

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Introduction

Objective of the Project Assessment

The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties in order to enable appropriate action, when warranted. Specifically, we determined whether:

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

Background

Contract, Task Order, and Costs

The Al Nahrwan Water Supply Project was funded through the U.S. Government's appropriated Iraq Relief and Reconstruction Fund (IRRF) and administered by the Public Works and Water Sector of the Project and Contracting Office (PCO). The contract file maintained by the U.S. Army Corps of Engineers (USACE), Gulf Region Division - Central District (GRC) showed that this project is being completed under Contract Number W917QW-05-P-0017. Contract Number W917QW-05-P-0017, awarded on December 1, 2004, is a competitively bid, design-build, firm-fixed price contract for $163,035. This contract was for the design and construction of water pipelines, connection of fifty houses to the new water pipeline, and removal of illegal water connections in the City of Al Nahrwan.

GRC gave the contractor notice to proceed on February 13, 2005. The contract was administratively modified, with no change in costs, on December 15, 2005, to correct invoicing procedures and point of contact information. The contract was additionally modified on March 18, 2005, to change the specifications of the water pipeline from Polyvinyl Chloride to Unplasticised Polyvinyl Chloride (UPVC) and to change the length and diameter of the required water pipelines. This modification increased the total contract value from $163,035 to $289,980.

The GRC contracting office had made three interim payments to the contractor at the time of our project assessment. The initial progress payment was approved by GRC on March 28, 2005, for $28,998. The second progress payment was approved on April 18, 2005, for $73,432, at which time the project was 35 percent complete. The third progress payment was approved on June 9, 2005, for $148,957, at which time the project was 72 percent complete. In total, $251,387 had been paid to the contractor by the GRC contracting office at the time of our project assessment.

Project Objective

According to the Statement of Work (SOW) and USACE project engineer, the objective of this project was to supply potable water directly to fifty homes in the City of Al Nahrwan, which did not have water supplied previously. An additional objective was to remove illegal water connections from the water main to increase the flow of water to the City of Al Nahrwan and beyond.

Description of the Project Location and Existing System

The City of Al Nahrwan is located approximately 17 miles east of downtown Baghdad, and is surrounded by predominantly rural areas. According to information located within the revised SOW, dated March 18, 2005, and discussions with the USACE project manager, there was no potable water service to specific blocks of houses in the City of Al Nahrwan. The City of Al Nahrwan was supplied with potable water through a 600-millimeter water main, which had numerous illegal connections to it.

Scope of Work of the Task Order

As indicated in the GRC contract file, the modified SOW for the Al Nahrwan Water Supply project included the following major components of work:

- Supply and install approximately 1500 meters (m) of 200 millimeter (mm) UPVC pipe and fittings.
- Supply and install approximately 100 meters of 160 millimeter UPVC pipes and fittings.
- Supply and install approximately 100 meters of 110 millimeter UPVC pipes and fittings.
- Excavate along the line of an existing 600 millimeter ductile steel pipeline and disconnect illegal connections, repair pipeline, and backfill.
- Supply, install, and commission fifty new house connections.
- Pressure test and sterilize new pipelines and house connections.

Project Work Reported to be Completed

Discussions with the USACE quality assurance representative and USACE project engineer and a review of the contract indicated that all project work included in the SOW had been completed.

Site Assessment

The project assessment team from the Office of the Special Inspector General for Iraq Reconstruction did not visit the Al Nahrwan Water Supply Project due to security concerns. Our project assessment for the Al Nahrwan Water Supply Project relied solely on USACE quality assurance reports and photographs, contractor quality control reports, and interviews with the USACE quality assurance representative (QAR).

Work Completed

Supply and install approximately 1500 meters of 200 millimeter UPVC pipe
The contract and design specifications required the supply and installation of approximately 1500 meters of 200 millimeter (8 inch) UPVC to connect an existing 450 millimeter (18 inch) water main to an existing housing area. This work required the excavation of a trench, placement of a sand base, installing the pipe, connecting the 200 millimeter new pipe to the 450 millimeter existing water main, and then backfilling and grading.

According to the USACE quality assurance reports and contractor quality control reports, piping and fittings arrived on site on March 26, 2005 and were inspected by the USACE QAR on March 28, 2005. Excavation of the pipeline began March 26, 2005. Installation of the connecting flange to the 450 millimeter water main was accomplished on April 3, 2005 (Site Photo 1[1]). The pipeline was then installed with a sand base in the excavated trench (Site Photo 2) and the trench was backfilled. The contractor quality control reports, USACE QAR reports, material list, and photographs appear consistent with the contract and design requirements.

Photo 1: Installation of connecting flange to the 450 mm water main

[1] All photographs were furnished by the U.S. Army Corps of Engineers, Quality Assurance Representative

Photo 2: Installation of 200 mm UPVC pipeline

Supply and install approximately 100 meters of 160 millimeter UPVC pipe and fittings

The contract and design required approximately 100 meters of 160 millimeter (6 inch) UPVC pipe and fittings to be supplied and installed to connect two existing water systems in order to complete a closed loop system.

According to the USACE quality assurance reports and contractor quality control reports, the materials arrived on site on March 28, 2005, and were inspected by the USACE QAR that day. Excavation required for the installation of the valve connection and pipe commenced on March 28, 2005. An additional 50 meters of line was required based on site conditions and installation of 150 meters of 160 millimeter UPVC pipe was completed on April 5, 2005. The contractor quality control reports, USACE QAR reports, and material list appear consistent with the contract and design requirements. Site photographs were not available for this task.

Supply and install approximately 100 meters of 110 millimeter UPVC pipes and fittings

The contract and design required approximately 100 meters of 110 millimeter (4 inch) UPVC pipe and fittings be supplied and installed. The requirement was to connect a 300 millimeter (12 inch) existing water main to the new 200 millimeter water pipe in order to equalize the high pressure city water system with the low pressure system and to complete a closed loop system.

According to the USACE quality assurance reports and contractor quality control reports, the materials arrived on site on March 26 and 28, 2005, and were inspected by the USACE QAR on March 28, 2005. Excavation required for the installation of the pipe was initiated May 19, 2005, and the placement of the pipeline and connections and backfilling was completed on May 22, 2005 (Site Photo 3). The

contractor quality control reports, USACE QAR reports, material list, and photographs appear consistent with the contract and design requirements.

Photo 3: 110 mm connection to 300 mm existing pipe

Excavate along the line of existing 600 millimeter ductile and disconnect illegal connections, repair pipeline, and backfill

The contract and design required the excavation of a 600 millimeter (24 inch) water main, disconnection of the illegal connections, repairing the pipeline and backfilling. The water main extended from a water pump station to the City of Al Nahrwan and ran through four villages. The illegal connections were of poor quality, producing numerous leaks from the water main.

According to the USACE quality assurance reports and contractor quality control reports, the identification of the illegal connections began May 26, 2005. Excavation, illegal connection removal, repair of pipeline, and backfilling was accomplished between June 13 and 16, 2005 (Site Photos 4 through 7). In excess of 159 illegal connections, ranging in size from ½ inch to 4 inch, were identified and removed along a 963-meter length of the water main. The contractor quality control reports, USACE QAR reports, and photographs appear consistent with the contract and design requirements.

Photo 4: Excavation to locate illegal connections

Photo 5: Illegal connections

Photo 6: Illegal connection (saddle used to tap into water main)

Photo 7: Repair of water main after disconnecting illegal connection

Supply, install, and commission 50 new house connections

The contract and design required connecting 50 homes to the new 200 millimeter water pipe using 15 millimeter (½ inch) High Density Polyethylene (HDPE) water lines.

According to the USACE quality assurance reports and contractor quality control reports, the house connections were completed May 12 through May 18, 2005 (Site Photos 8 and 9). The contractor quality control reports, USACE QAR reports, material list, and photographs appear consistent with the contract and design requirements.

Photo 8: Arrival of 15 millimeter water line used for house connections

Photo 9: Placement of 15 millimeter water lines in excavation

Pressure test and sterilize new pipelines and house connections

The contract and design required pressure testing and sterilizing the new pipelines and house connections.

According to the USACE quality assurance reports and contractor quality control reports, the following tests were completed: 160 millimeter pipeline on April 5, 2005; 200 millimeter pipeline on May 3 and 9, 2005; and 110 millimeter pipeline on May 22, 2005. The test results were signed by the Nahrwan Water Engineer, Nahrwan Water Director, and the contractor quality control representative. Testing was also witnessed by the USACE QAR. The house connections were completed on May 18, 2005, but there was no verification of the testing being completed in the contractor quality control reports or the USACE QAR reports. Except for inadequate documentation of the testing of the house connections lines, the contractor quality control reports, USACE QAR reports, and photographs appear consistent with the contract and design requirements.

Conclusions

Reviews of contract documentation, the design package, and quality assurance documentation, as well as interviews of key project personnel, led to the following conclusions for each of the stated Project Assessment objectives.

1. Determine whether project results will be consistent with original objectives.

   The work performed under this contract for the design and construction of a water pipeline, connection of fifty houses to the new water pipeline, and removal of illegal water connections in the City of Al Nahrwan met the stated objectives.

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

   The design package was complete and sufficiently specific to install the required water pipe lines and make connections to fifty homes.

3. Determined whether construction or rehabilitation met the standards of the design.

   The scheduled on-site inspection could not be conducted due to security concerns. The project assessment for the Al Nahrwan Water Supply Project was based solely on USACE quality assurance reports and photographs, contractor quality control reports, and interviews with the USACE quality assurance representative. It appeared that the project was completed to the standards of the design, but this could not be conclusively determined without a site inspection.

4. Determine whether the contractor's quality control plan and the Government quality assurance program are adequate.

   The contractor's quality control plan and the U.S. Government's quality assurance program were adequate for this project. Proper documentation by the contractor through quality control reports and USACE Quality Assurance Representative (QAR) through quality assurance reports ensured the project was completed on time and within budget. The USACE QAR was on site during the critical stages of material inspection and pressure testing.

Recommendations and Management Comments. We discussed the results of this project assessment with USACE representatives who concurred with our conclusions. This report does not contain any negative findings; therefore management comments were not required or received.

Appendix A. Scope and Methodology

We performed this project assessment from June through July 2005, in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency.

In performing this Project Assessment we:

- Reviewed contract documentation, to include the Independent Government Estimate, Scope of Work, Contract, and contract modifications;
- Reviewed the design package (drawings and specifications), Quality Assurance Plan, Quality Control Plan, and quality control and assurance reports;
- Interviewed the Contracting Officer, Project Manager, Project Engineer, and quality assurance representative; and
- Planned for an on-site assessment, but due to the security situation at the time of the planned assessment, one could not be conducted.

Appendix B. Acronyms

GRC	Gulf Region Division – Central District of the U.S. Army Corps of Engineers
HDPE	High Density Polyethylene
m	Meter
mm	Millimeter
PVC	Polyvinyl Chloride
QAR	Quality Assurance Representative
SIGIR	Special Inspector General for Iraq Reconstruction
SOW	Statement of Work
UPVC	Unplasticised Polyvinyl Chloride
USACE	U.S. Army Corps of Engineers

Appendix C. 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 include:

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