

AL KUT TRAINING ACADEMY
AL KUT, IRAQ

SIGIR PA-06-069
OCTOBER 18, 2006



SPECIAL INSPECTOR GENERAL FOR IRAQ RECONSTRUCTION

October 18, 2006

MEMORANDUM FOR DIRECTOR, IRAQ RECONSTRUCTION MANAGEMENT OFFICE
COMMANDING GENERAL, MULTI-NATIONAL FORCES-IRAQ
COMMANDING GENERAL, MULTI-NATIONAL SECURITY
TRANSITION COMMAND-IRAQ
COMMANDING GENERAL, JOINT CONTRACTING COMMAND-
IRAQ/AFGHANISTAN
COMMANDING GENERAL, GULF REGION DIVISION-PROJECT
AND CONTRACTING OFFICE, U.S. ARMY CORPS OF
ENGINEERS

SUBJECT: Report on Project Assessment of the Al Kut Training Academy,
Al Kut, Iraq (Report Number SIGIR-PA-06-069)

We are providing this project assessment report for your information and use. We assessed the construction work performed on the Al Kut Training Academy, Al Kut, Iraq, an IRRF funded, Multi-National Security Transition Command project located in the Wassit Governorate to determine its status and whether intended objectives will be achieved. This assessment was made to provide you and other interested parties with real-time information on a relief and reconstruction project in order to enable appropriate action to be taken, if warranted. The assessment team included an engineer and an auditor.

This report does not contain any negative findings. As a result, no recommendations for corrective action are made and further management comments are not required.

We appreciate the courtesies extended to our staff. This letter does not require a formal response. If you have any questions please contact Mr. Brian Flynn at (703) 604-0969 or brian.flynn@sigir.mil or Mr. Jon Novak at (703) 343-9149 or jon.novak@iraq.centcom.mil.

For public or congressional queries concerning this report, please contact SIGIR Congressional Relations and Public Affairs at publicaffairs@sigir.mil or at (703) 428-1100.

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Inspector General

Special Inspector General for Iraq Reconstruction

SIGIR PA-06-069

October 18, 2006

Al Kut Training Academy, Al Kut, Iraq

Synopsis

Introduction. This project assessment was initiated as part of our continuing assessments of selected reconstruction activities. The overall objectives were to determine whether selected reconstruction contractors were complying 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. We conducted this project assessment in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team included an engineer and an auditor. The initial objective of the Al Kut Training Academy project was to plan, construct, and renovate a complete secure training academy including perimeter walls, barracks, office space, classrooms, a dining facility, fencing, firing ranges, a laundry and a physical conditioning field near Al Kut, Iraq for Iraqi security and safety forces. Subsequently, the project's objective expanded to include training facilities, housing, classrooms, offices, dining facilities, a clinic, a gymnasium, a warehouse, a laundry, and other support facilities for the cadets and instructors of the Iraqi Police (IP), Department of Border Enforcement (DBE), and for the Iraqi National Guard (ING).

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 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 and the U.S. Government's Quality Assurance programs were adequate;
4. Project sustainability was addressed; and
5. Project results were consistent with original objectives.

Conclusions. The assessment team found:

1. With one significant exception, all major components reviewed during this limited scope assessment were sufficiently designed to construct a fully operational training academy. The exception was the newly constructed septic/sewer system which could not handle the volume of water directed to it. The excess waste water overflowed from the main septic tank and created a large pool on academy grounds. The septic tank system was not sufficiently large enough given the soil conditions and daily volume input. The contractor's Program Manager and the government's Program Manager advised that

completion of an approved design modification will alleviate the overflow problem.

2. The construction and rehabilitation of the facility appeared to meet the standards of the design except for construction of some waste water piping, concrete work, and other areas of construction workmanship. The newly constructed waste water pipes in the dormitories leaked because they were not joined with water-tight fittings. The assessment team found crumbling concrete in a roadway and sidewalk patchwork that was uneven or thin. In addition, the assessment team observed instances of exposed electrical wiring, bathroom doors which were hung without enough floor clearance, improperly hung light fixtures, and poor quality hardware being used throughout the facility. The workmanship and material quality did not always meet the International Building Code, International Electrical Code, International Plumbing Code, or International Mechanical Code standards referred to in the Statement of Requirements and Specifications. During the assessment, the team verified that the contractor's Program Manager, assigned to the project in March 2006, was addressing construction quality issues. For example, the aforementioned plumbing leaks in dormitories D1 and D4 were corrected by replacing leaking pipes and fittings with heavier pipe material and water-tight fittings.
3. Quality Management (QM) practices were not completely effective during critical periods of construction because the contractor did not implement a deficiency tracking system to ensure that construction deficiencies were identified, tracked, and corrected in a timely manner. At the same time, Quality Assurance personnel did not establish an effective working relationship with contractor personnel in order to ensure a level of QM compliant with contract requirements. As a result, latent construction deficiencies not evident when accepted by the Government subsequently turned into much larger rework issues. In addition, numerous examples of substandard workmanship quality were observed with some having the potential to become significant safety issues.
4. Sustainability was adequately addressed in the contract and task order. Specifically, the U.S. Government's plan is to turn over operations of the facility to the Iraqi Government after project completion. The initial contract required a one-year construction warranty on all materials and workmanship for the buildings and facilities constructed or renovated. The task order required as-built drawings depicting buildings and footprints, operation and maintenance manuals in English and Arabic, manufacturers' warranties, a preventive maintenance plan, and mechanical systems training and manuals. As a result, the Al Kut Training Academy personnel should be able to operate the facility over the long term. However, sustainability could be enhanced by extending the warranty coverage period to cover any latent defects. This was recommended by the assessment team and the Air Force Center for Engineering Excellence (AFCEE) Program Manager initiated action to obtain a warranty extension.
5. The Al Kut Training Academy project has met general objectives. At the time of our assessment, construction was almost complete. Dormitories, an office, a dining facility, a laundry facility, two ranges, a perimeter barricade with secure entrances, and classrooms had been constructed or renovated. An electrical power distribution system, a water treatment and distribution system, and a septic system had been installed. The facility was in use for the intended purpose to train Iraqi military and law enforcement personnel.

Recommendations and Management Comments. While conclusions for objectives 1, 2, and 3 were, in part, negative, the assessment team verified that government or contractor officials took or initiated appropriate corrective actions. For example, the government's Program Manager responded to SIGIR's verbal recommendation provided during field work and initiated action to obtain a warranty extension as a hedge against latent construction defects. In addition, the conclusions for objectives 4 and 5 were favorable. As a result, this report does not include any recommendations for corrective action and management comments were not required. The U. S. Army Corps of Engineers, Gulf Region Division reviewed the draft report and offered no additional information and had no comments.

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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 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) and the U.S. Government's Quality Assurance (QA) programs were adequate;
4. Project sustainability was addressed; and
5. Project results were consistent with original objectives.

Pre-Site Assessment Background

Contract, Task Order, and Costs

Based on contract documentation¹, the Al Kut Training Academy project was funded through the U.S. Government's appropriated Iraqi Relief and Reconstruction Fund and was contracted by the U.S. Air Force Materiel Command (AFMC) for the Multi-National Security Transition Command-Iraq (MNSTC-I). This was one of many projects performed under the Air Force Center for Environmental Excellence (AFCEE) Worldwide Environmental Restoration and Construction (WERC) contract number, FA8903-04-D-8672. This contract, issued November 21, 2003, was a small business indefinite delivery/indefinite quantity contract with a total not to exceed amount of \$4,000,000,000 and a guaranteed minimum amount of \$15,000. The Air Force Materiel Command issued the contract to the Environmental Chemical Corporation International (ECCI).

The Al Kut Training Academy project was issued under Task Order (TO) 0017 to construct and renovate a secure training facility near Al Kut, Iraq. TO 0017, issued November 3, 2004, was a cost plus fixed fee agreement with a total not to exceed amount of \$7,515,177, a field completion date of March 3, 2005 and a TO completion date of May 1, 2005. The project's cost and construction time period increased significantly from the original project concept.

The TO 0017 had six task order modifications, listed below:

- Modification 01, dated March 11, 2005, increased the performance period for the TO out to July 31, 2005, increased the period of performance for the construction work out to May 31, 2005 and incorporated new invoicing procedures.

¹ Contract documentation is comprised of the basic contract and modifications, Statement of Work, Statement of Requirements and Specifications, and Implementation Work Plan. While some project information is unique to a specific document, similar information is often redundant between some or all the documents.

- Modification 02, dated June 6, 2005, revised the scope of work to include a Iraqi National Guard (ING) training area, Iraqi Department of Border Enforcement (DBE) headquarters building, increased the contract amount to \$21,791,177, and extended the period of performance for the construction work and the TO out to September 30, 2005 and November 30, 2005, respectively.
- Modification 03, dated August 24, 2005, revised the Statement of Work, increased the contract amount to \$22,749,217, changed the invoice instructions and increased the period of performance for the construction work and the TO out to October 30, 2005 and December 30, 2005, respectively.
- Modification 04, dated September 30, 2005, revised the scope of work, increased the contract amount to \$22,837,705, and extended the period of performance for the construction work and the TO out to January 31, 2006 and March 31, 2006, respectively.
- Modification 05, dated March 3, 2006, revised the scope of work, increased the contract amount to \$22,958,920, and extended the period of performance for the construction work and the TO out to April 30, 2006 and May 31, 2006, respectively.
- Modification 06, dated May 24, 2006, extended the period of performance for the TO out to August 15, 2006.

Project Objective

The initial objective of Task Order 0017 was to plan, construct, and renovate a complete secure training academy that included perimeter walls, barracks, office space, classrooms, a dining facility, fencing, firing ranges, a laundry and a physical conditioning field near Al Kut, Iraq for Iraqi security and safety forces. Subsequently, the project's objective expanded and finally included training facilities, housing, classrooms, offices, dining facilities, a clinic, a gymnasium, a warehouse, a laundry, and other support facilities for the cadets and instructors of the Iraqi Police (IP), DBE, and ING.

Description of the Facility (pre-construction)

The description of the Al Kut Training Academy facility (pre-construction) was based on discussions with ECCI managers and information obtained from the contract file. The project site is located approximately 180 kilometers southeast of Baghdad and across the Tigris River from the city of Al Kut. The facility was to be constructed on a small part of an old Iraqi military base. Currently, the base is used by Multi-National Forces-Iraq (MNF-I) coalition forces. The construction site is secure within the guarded perimeter of the existing MNF-I base. In addition, the flat site with some existing structures and road access posed no significant obstacles to construction.

Prior to construction, structures at the project's location included a number of deteriorated masonry buildings that previously could have been used as classrooms, dining facilities, and a gymnasium. Although looted and vandalized, the existing structures were evaluated and considered structurally sound. Suitable electrical, water, and wastewater systems were not available on site. Therefore, the design and fabrication of these systems was required by the contract. Site Photos 1 and 2 show the site before construction.



Site Photo 1. Site pre-construction (Photo courtesy of ECCI).



Site Photo 2. Site pre-construction (Photo courtesy of ECCI).

Scope of Work

The scope of work written in the initial Statement of Work (SOW) was to plan and construct, or renovate a complete secure training academy including perimeter walls, barracks, classrooms, a dining facility, office space, a firing range, a laundry, a clinic, a gymnasium, utilities, and a physical conditioning field near Al Kut. The Statement of Requirements and Specifications (SORS) provided additional details to the SOW and included more specific construction and renovation requirements. Requirements to design and install electrical, water, and wastewater systems were added in the SORS.

The major construction tasks included the following categories:

- Perimeter Security
- Utility Systems
 - Water treatment and distribution
 - Electric power distribution
 - Septic system
- Building and road construction and renovation

Site Assessment

On 3 and 4 July 2006, SIGIR inspectors performed an on-site assessment of the Al Kut Training Academy. The assessment team conducted substantive discussions with the contractor's project manager, project engineers, and construction manager responsible for Quality Control (QC) reporting. In addition, the team conducted discussions with the government's Quality Assurance Representatives (QAR) on site. More general discussions were conducted with Civilian Police Assistance Training Team (CPATT) personnel operating the academy at the time. All personnel involved in our discussions were helpful and forthright. The team observed and photographed work that was completed or in progress.

At the time of the site visit, construction on the Al Kut Training Academy project was almost complete. The facility was in use for the intended purpose of training IP, ING, and DBE personnel. All of the buildings were constructed. However, a major barracks building was not in use due to significant subcontractor work activities to repair damages which were the result of previous construction deficiencies. While the utility systems were operating, plans to correct deficiencies in the wastewater and electrical systems were in progress at the time of our site visit.

Work Completed

Perimeter Security

The SORS required a three meter tall perimeter security fence consisting of a Concrete Masonry Unit (CMU) wall with foundation, fixed metal V-brackets at the top with six strands of razor wire and one roll of concertina wire the length of the wall. An Entry Control Point (ECP) was required to meet coalition force protection standards for vehicle and personnel access. In addition, perimeter and exterior building lighting was required to provide overlapping illumination to enable the guard force to observe activities outside the facility and among building entries and courtyards.

The assessment team found that perimeter security for this project was complete at the time of the assessment. In lieu of the CMU block wall specified in the SORS, pre-cast reinforced concrete T walls, approximately three meters (m) tall were used to construct the security wall. Although different, the pre-cast T wall construction appeared to be consistent with the intent of the SOW. A roll of concertina wire was secured on top of the perimeter wall. While different from what was specified in the SORS, the assessment team found that the concertina wire should be effective and should meet the intent of the SOW. The ECP was complete and consisted of a personnel barrier, vehicle barrier, and a guard post staffed with armed guards. The ECP operations appeared effective. Three other gated entrances provided emergency and backup entrance to and egress from the facility. Although the team did not observe the facility after dark, the perimeter lighting system in-place appeared sufficient. Site Photos 3 and 4 show the perimeter security including “T” walls, lighting, gate, and concertina wire.



Site Photo 3. “T” wall fence, lights, and gate.



Site Photo 4. Perimeter security fence with concertina wire.

Utility Systems

Water Treatment and Distribution

The contract called for the design and installation of a complete water supply system for the Al Kut Training Academy. The contractor was required to design and build a water treatment and distribution system with a current maximum capacity of 750 thousand liters per day and a future system capacity of 1.5 million liters per day. The contractor's February 2006 work plan stated that the water supply and distribution system would contain four (4) 75,000 (300,000 total) liter steel storage tanks to provide water for the IP, IBP, and ING facilities.

At the time of the assessment, the water treatment and distribution system was complete. Water was pumped from the Tigris River to the treatment plant that included three clarification tanks, a chlorination system, pumps, sand filters, and support equipment. Treated water was pumped to holding and pressurization tanks to facilitate distribution. The water treatment system appeared to meet the intent and requirements of the contract. The water treatment system is displayed in Site Photos 5 and 6.



Photo 5. Drinking water treatment plant.



Site Photo 6. Water treatment plant chlorination system.

Electrical Power Distribution

In compliance with the SORS, the contractor was required to design and construct an electric power generating and distribution system to meet the needs of the IP buildings.

The assessment team found that two 2.2 MW diesel generators were initially installed to provide sufficient power for the IP buildings and dining facility. These generators were, however, relocated to another ECCI site and replaced with two 1.0 MW generators in late April 2005. One of the 1.0 MW IP generators is displayed in Site Photo 7. However, the contractor has since decided to add a third 1.0 MW generator to the power production system in order to ensure sufficient power capacity and increased emergency or standby capability.



Site Photo 7. IP area 1.0 MW electric generator.

In addition, the SORS required the contractor to design and construct a separate electric power generating and distribution system to meet the needs of the ING area. The team found that the contractor installed two-500 KW generators to meet the separate needs of the ING compound. In addition, one-400 KW generator was on site and in the commissioning process during our site visit. The additional 400 KW generator will provide increased power production and emergency backup capabilities for the ING area. Site Photo 8 shows the ING facility generators.



Site Photo 8. Two-500 KW (left) and one-400 KW (right) ING area generators.

Septic System

Contract documentation called for the contractor to plan, design, and construct a complete sanitary sewer system for the site occupants. Requirements for the system included testing the constructed systems, conformance to International Plumbing Code, and repair of damaged or defective underground sewer piping. In accordance with the contractor's work plan, the sanitary wastewater system was comprised of three (3) septic tanks with a 70,000 liter total capacity.

The contractor's original design was a simple septic system comprised of three main tanks. Based on the SIGIR engineer's calculations and a review of the contractor's design, the septic tank capacity varied significantly from actual requirements. In short, the septic tanks installed were substantially undersized. As the population of the academy increased during the early stages of facility operation, the unexpected waste volume and on-site drainage limitations spawned a serious problem. The soil proved to be hard with little drainage capacity and the contractor's design for the septic tank systems did not call for drain fields. During the assessment, the contractor's Program Manager confirmed that a perc test (percolation test) to determine the soil absorption rate for a septic drain field or "leach field" was never conducted. Site Photo 9 shows the nonporous soil.



Site Photo 9. Machine polished trench sidewall soil.

Rather than utilizing a drain field system, the permeable septic tanks were designed to depend on pump trucks to remove excess effluent. However, the contractor's design did not meet requirement because it did not support academy needs in terms of daily volume. When coupled with insufficient soil drainage and limited pump truck capacity, substantial excess waste water overflowed from the septic system. Site Photo 10 shows waste water overflow standing on academy grounds.



Site Photo 10. Standing waste water (Photo courtesy of ECCI).

The site assessment disclosed that the main source of the waste water overflow was a septic tank manhole. As a temporary solution to the standing waste water problem, the contractor excavated a surface ditch to drain overflow from the manhole source through the facility to a storm water drainage ditch which empties into a nearby reed filled canal referred to as the “Dead River”. The overflow drainage ditch is shown in Site Photo 11.



Site Photo 11. Surface ditch moving waste water from septic tank manhole to “Dead River”.

To alleviate the problem over the long term, a SOW modification pending at the time of our site visit called for a buried pressure line connecting the three separate septic tanks in order to pump the effluent underground to the “Dead River”. While original septic tank sizing and placement did not accurately account for soil conditions or daily volume input, the pending SOW, as modified, will alleviate the overflow problem.

Building and Road Construction and Renovation

The original Task Order, SOW, and SORS requirements included:

- Construct barracks for 765 people
- Construct barracks for 50 instructors
- Construct office space for 60 people plus storage
- Renovate 15 existing classrooms
- Repair exterior classroom overhangs
- Replace existing concrete walkway covers with metal covers
- Construct one dining facility for 675 people
- Construct a laundry facility

In addition, the contractor was required to plan and construct new work for the complete renovation of the installation’s road network system. The road plan was to provide for a network of roads connecting adjacent buildings, parking areas, and other areas of work.

At the time of the assessment, most of the new building construction, renovation, and road construction was complete. While some lingering rework issues in a cadet dormitory precluded 100% operational capability at full capacity, those issues were pending complete resolution at the time of our site visit. The assessment team observed selected aspects of new construction and renovation work. They performed inspections of the cadet and instructor's barracks, classrooms, IP headquarters building, DBE headquarters building, clinic, and gymnasium. Site Photos 12 to 17 show some of their observations.



Site Photo 12. IP area cadet barracks.



Site Photo 13. IP area cadet barracks rooftop.



Site Photo 14. IP area instructor barracks.



Site Photo 15. Patient evaluation room in clinic.



Site Photo 16. Supply warehouse.



Site Photo 17. Renovated gymnasium.

Many construction deficiencies, which ranged from minor to serious, were observed and photographed during the site visit. Examples included paint overspray on lights, windows, and door hardware; poor quality masonry work; crumbling concrete; improperly installed light fixtures and bathroom doors; exposed electric wiring; and poor quality hardware throughout the facility that was rusting or breaking after only a few months of use. Much of the observed workmanship and materials quality did

not meet the International Building Code, International Electrical Code, International Plumbing Code, and International Mechanical Code standards for construction referred to in the SORS. Selected deficiencies will be addressed in later sections of this report.

Concrete

Concrete specifications written in the SORS required a 28 day compressive strength of at least 28 Mega Pascal (MPa) or approximately 4,000 pounds per square inch (PSI). Reinforced slab specifications required a 15 by 15 centimeter (cm) mesh of 12-gauge or larger wire. Concrete structures were required to be free of excessive voids or cracks and casting procedures to avoid stress cracking. Expansion joints were required for slabs that exceeded 3m by 3m and the soil under concrete was required to be compacted to 100% maximum density by the Standard Proctor Method ASTM D 698.

While on site, the assessment team observed that a section of roadway was poured with no hydration until much later in the day. July afternoon temperatures at Al Kut often exceed 110 degrees Fahrenheit. In addition, the team observed that the concrete was not cast to the full thickness of the roadway along the long edge of the casting. Rather, the fresh concrete was layered unevenly over the existing roadway. Site Photo 18 shows the casting just described. Several meters away on the same road, a SIGIR Inspector easily pulled up several pieces of cured cement by hand, without the aid of a tool. The concrete aggregate appeared too large and likely was mixed with an insufficient quantity of water, resulting in concrete that was weak and crumbly. Site Photo 19 shows a piece of concrete removed by hand while Site Photo 20 shows the crumbly nature of the roadway.



Site Photo 18. DBE area roadway.



Site Photo 19. Concrete piece pulled from roadway by hand.



Site Photo 20. Roadway where piece was removed.

Patchwork installations should conform to applicable flatwork standards in terms of materials and workmanship. The team observed numerous examples of concrete patchwork that was either too thin or placed unevenly and not to code. Site Photo 21 shows an example of such work.



Site Photo 21. Uneven patchwork in Academy HQ sidewalk.

During the site visit, the team observed horizontal fractures that ran along almost the entire perimeter of the newly constructed middle and eastern barracks building foundations. Site Photos 22 and 23 show the described fractures. In addition, similar, but less obvious, horizontal fissures were observed on the second floors of the dormitories.



Site Photo 22. Horizontal fracturing along foundation of middle barracks.



Site Photo 23. East barracks horizontal foundation fracture.

During the assessment, the team was told by the contractor's Project Manager that concrete placement was conducted using small batches mixed by hand. Small hand batch mixing and improper joining techniques could have contributed to the horizontal fractures due to lack of consistency between the numerous small batches mixed by hand. For practicality reasons, each small batch was not subjected to a slump test.

Work in Progress

Perimeter Security

Perimeter security for this project appeared complete at the time of the assessment. Therefore, no work was in progress.

Utility Systems

Prior to our assessment, the utilities systems were completed. However, modifications to address design problems and deficiencies were in progress. Specifically, a third 400-KW generator was on site to increase power production capacity and provide emergency backup capability in the ING area. Installation and commissioning was in progress at the time of the assessment. In addition, a third 1 MW generator to supplement the two 1 MW generators providing power to the IP area was on order at the time of our assessment. However, delivery was not expected until after the August peak power season.

Based on the team's observation and discussions with the contractor's Program Manager and the AFCEE Program Manager, work to correct septic tank design deficiencies was in progress at the time of our site assessment. Excavation of a trench for a Polyvinylchloride (PVC) pipeline to connect the stand alone septic tanks in the IP and DBE areas was in progress. The pipeline and pump will transport all of the grey water off site.

Building and Road Construction and Renovation

At the time of the assessment, the contractor's management team was working with the customer to resolve the building deficiencies. It appeared that rework to correct known deficiencies was nearly complete.

Work Pending

Utility Systems

At the time of the assessment, the utilities systems were operational; however, some modifications were pending for the wastewater and electrical systems. Completion of the PVC pipeline to connect the septic tanks and pump installation to transport the grey water off site was pending at the time of the assessment. The new construction will need to be evaluated for effectiveness after completion. The new 1 MW generator on order for the IP area was pending installation and commissioning at the time of the site visit.

Building and Road Construction and Renovation

At the time of the assessment, all the buildings had been turned over to the customer. However, the contractor's Program Manager stated that a recent design calculation determined that one additional air conditioner unit was needed to supplement the three existing units at the gym.

Project Quality Management

Contractor's Quality Control Program

The basic contract, Statement of Work (SOW), and Task Order (TO) required the contractor to submit a site specific Quality Program Plan (QPP) containing a Health and Safety Plan and Construction Quality Plan (CQP) for review and approval by the government. In addition, the contractor was required to perform Quality Control (QC) functions throughout the planning, construction, installation, testing, and commissioning phases of the project.

Specific requirements of the Construction Quality plan included:

- a chart showing lines of authority
- a qualification disclosure for QC personnel
- a list of definable features of work
- a three phase inspection system schedule and implementation
- disclosure of QC activities and a deficiency tracking system
- disclosure of testing, pre-final and final inspection, and turnover procedures

The contractor was required to conduct a pre-final inspection and publish findings in a pre-final inspection report. Accordingly, a final inspection and report that focused on the pre-final findings was also required. The final inspection report was required to (1)

certify that all items of the design had been implemented and that construction was complete and (2) include a record of “signed and sealed” as-built drawings and specifications verifying that all development standards had been met. The contractor was required to present a completed Defense Department (DD) Form 1354 in order to transfer real property after the final inspection was conducted. A construction warranty was included in accordance with Federal Acquisition Regulations (FAR) 52.246.21.

As required, the contractor submitted a site specific QPP on 7 December 2004. However, a government approved QPP was not in the files turned over to the SIGIR team. As the contractor’s Project Manager (PM) and the AFCEE PM advised that all project documents were in the files turned over to SIGIR, there was no evidence presented that the QPP was formally approved by the government.

Government Quality Assurance

Quality Assurance (QA) is the system by which the government fulfills its responsibility to be certain that the Contractor Quality Control system is functional and effective. Project and Contracting Office (PCO) Standard Operating Procedure (SOP) CN-100, Construction Contractor QC/QA Inspection and Reporting, specifies requirements for an adequate and effective Government QA program. PCO SOP CN-102, Contractor Quality Control/Quality Assurance Construction Deficiency Tracking, provides more specific guidance pertaining to the mechanics of a QC/QA deficiency tracking system and relevant Quality Assurance Representative (QAR) responsibilities. On-site QA personnel should monitor a contractor’s processes to track construction deficiencies in order to assure acceptable corrective action while maintaining an audit trail and also to ensure that new work is not placed on unacceptable work.

The project files turned over to SIGIR by the contractor’s PM and the AFCEE PM did not contain a U.S. Government's Quality Assurance (QA) plan. Again, the contractor’s PM and AFCEE PM advised that all project documents they had were turned over to SIGIR.

Quality Management

Quality Management (QM) is all QC and QA control and assurance activities instituted to achieve the quality established by the contract requirements. Accordingly, obtaining quality construction is a combined responsibility of the construction contractor and the government. Their mutual goal must be a quality product conforming to the contract requirements. A cooperative and professional working relationship should be established in order to realize this common goal.

The assessment team verified the contractor did not implement an effective deficiency tracking system during critical periods of construction. Accordingly, there was no assurance that the contractor provided effective oversight. At the same time, government QA personnel did not effectively interact with contractor personnel in order to ensure a level of QM compliant with contract requirements and applicable regulations. While overall project completion grew from 25% on 1 May 2005 to 97% on 31 August 2005, the QC and QA records provided to the SIGIR team indicate that only 11 QA and no QC reports were prepared during the period. The table below summarizes the overall percent complete reported by the contractor and dating of QC/QA reporting during the aforementioned timeframe.

2005	* Overall % Comp.	Comp. % Increase By Mo.	**QC Reports-Dates Verified	***QA Reports-Dates Verified
April	25%	Baseline %	1-23	None
May	48%	13%	None	26-28, 31
June	78%	30%	None	1-7
July	88%	10%	None	None
Aug.	97%	9%	20-31	1-31

Table 1. QC and QC Report Dates and Completion Percentage

- * Per Review of Contractor Daily Project Status Reports (DPSR)
- ** Per Review of Contractor Daily Quality Control Report (DQCR)
- *** Per Review of Title II Daily Quality Assurance Reports (DQAR)

As a result, routine construction deficiencies not detected and corrected as they occurred turned into much larger rework issues. For example, dormitory building D-1 was accepted via DD Form 1354 dated 31 August 2005. However, extensive rework was required within the bathroom to correct the defective construction that should have been detected, monitored, and corrected during construction (Site Photo 24). Specifically, the connections between the smaller diameter feeder drain lines and the larger diameter main drain line system were not water tight because positive connection (glued or threaded) reducers and fittings were not used until the deficiency was corrected in March 2006 (Site Photo 25).



Site Photo 24. Extensive rework in progress (Photo courtesy of ECC).



Site Photo 25. Reducers and fittings, before rework, were not water tight (Photo courtesy of ECC).

In another very similar example, dormitory building D-4 was accepted via DD1354 on 9 December 2005, but a serious plumbing leak was not reported by QA personnel until 20 April 2006. A photo taken by the government representative on 20 April 2006 shows that substantial water volume migrated subsurface within the second story floor to the outside walls of the building (Site Photo 26).



Site Photo 26. Water stains from improper plumbing (Photo courtesy of ECC).

Comparisons of acceptable and not acceptable workmanship for the same task demonstrate the impact of inadequate QM oversight. In the first comparison, the metal roof cover material (Site Photo 27) fastened with too few and improperly located hooks/fasteners to secure the roof cover was compared to properly fastened tin (Site Photo 28) where a fastener was located at tangent points between the tin and the angle iron frame. The second comparison shows water damage to a plywood door improperly hung too close to a wet floor area in a bathroom (Site Photo 29) compared to a door in an adjacent stall properly hung approximately 1” above the floor (Site Photo 30).



Site Photo 27. Tin fastened without sufficient number of fasteners.



Site Photo 28. Tin laid flat with sufficient number of fasteners.



Site Photo 29. Water damaged door installed too close to the floor.



Site Photo 30. Undamaged door hung with sufficient clearance.

The assessment team observed numerous examples of installations not meeting standards, which if not corrected could lead to significant safety issues. For example, an electric wire splice (Site Photo 31) should have been enclosed in a weather proof box to comply with required codes. In addition, an electric breaker box installed on an exterior wall not sealed from the weather (Site Photo 32) could short-circuit and start a fire or cause serious injury.



Site Photo 31. Unsafe electric wire splice not secured in an enclosed box.



Site Photo 32. Weather exposed circuit breaker box.

During fieldwork, the assessment team verified that the contractor implemented a deficiency tracking system in February 2006 to detect, monitor, and correct construction deficiencies. In addition, the government's QA team implemented a system to monitor the status of the pending corrections. As such, this report will not include a finding or

recommendation to implement an effective deficiency tracking system or improve related QM procedures. In addition, we verified that the contractor used better materials and an improved drain pipe design when correcting the aforementioned leaks in dormitories D1 and D4 (Site Photo 33).



Site Photo 33. Reworked drain lines with upgraded material and improved “Y” design.

Project Sustainability

Sustainability was addressed in the contract and task order. Specifically, the U.S. Government’s plan is to turn over operations of the facility to the Iraqi Government after project completion. The initial contract required a one-year construction warranty on all materials and workmanship for the buildings and facilities constructed or renovated. The task order required as-built drawings depicting buildings and footprints, operation and maintenance manuals in English and Arabic, manufacturers’ warranties, a preventive maintenance plan, and mechanical systems training and manuals. While latent defects could become problematic, long term sustainability will be enhanced by the government’s action to obtain an extended warranty coverage period to off-set the effects of any latent defects.

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.

With one significant exception, all major components reviewed during this limited scope assessment were sufficiently designed to construct a fully operational training academy. However, the sewer system design package, a critical project component, submitted by the contractor and approved by the government prior to construction proved to be inadequate. This occurred because the design option chosen was not suitable for the site conditions and requirements. If a percolation test would have been performed, designers would have known that the soil at the build site did not have sufficient drainage or leeching capability. In addition, liquid volume requirements were not accurately calculated during the design phase. Accordingly, the absence of accurate information pertaining to soil conditions and liquid volume requirements led to an inadequate initial sewer design. As a result, substantial amounts of septic system waste water overflow drained and pooled in some of the Al Kut Training Academy low ground. At the least, a nuisance with potential health risk to academy personnel was created. During the assessment, the inspector's confirmed that a properly approved design modification to correct the situation was pending full implementation.

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

The construction and rehabilitation of the facility appeared to meet the standards of design except for construction of some waste water piping, concrete work, and other areas of construction workmanship. The newly constructed waste water pipes in the dormitories leaked because they were not joined with water tight fittings. The assessment team found crumbling concrete in a roadway and sidewalk patchwork that was uneven or thin. In addition, the assessment team observed instances of exposed electrical wiring, bathroom doors being hung without enough floor clearance, improperly hung light fixtures, and poor quality hardware being used throughout the facility. The workmanship and material quality did not always meet the International Building Code, International Electrical Code, International Plumbing Code, or International Mechanical Code standards referred to in the Statement of Requirements and Specifications.

During the assessment, the team verified that the contractor's Program Manager assigned to the project in March 2006 was addressing construction quality issues. For example, the aforementioned plumbing leaks in dormitories D1 and D4 were corrected by replacing leaking pipes and fittings with heavier pipe material and water tight fittings. As a result, project progress was slower than anticipated and substantial rework was required to meet the standards of the design. In addition, latent construction deficiencies not evident when accepted by the government could become problematic in the future.

3. Determine whether the Contractor's Quality Control plan and the Government Quality Assurance Program were adequate.

Quality Management (QM) practices were not completely effective during critical periods of construction because the contractor did not implement a deficiency tracking system to ensure that construction deficiencies were identified, tracked, and corrected in a timely manner. At the same time, Quality Assurance personnel did not establish an effective working relationship with contractor personnel in order to ensure a level of QM compliant with contract requirements. While overall project completion grew from 25% on 1 May 2005 to 97% on 31 August 2005, QC and QA records provided to the SIGIR team indicate that only 11 QA and no QC reports were prepared during this period. As a result, latent construction deficiencies not evident when accepted by the government subsequently turned into much larger

rework issues. In addition, numerous examples of substandard workmanship quality were observed, with some having the potential to become significant safety issues.

4. Determine if project sustainability was addressed.

Sustainability was adequately addressed in the contract and task order. Specifically, the U.S. Government's plan is to turn over operations of the facility to the Iraqi Government after project completion. The initial contract required a one-year construction warranty on all materials and workmanship for the buildings and facilities constructed or renovated. The task order required as-built drawings depicting buildings and footprints, operation and maintenance manuals in English and Arabic, manufacturers' warranties, a preventive maintenance plan, and mechanical systems training and manuals. As a result, the Al Kut Training Academy personnel should be able to operate the facility over the long term. However, sustainability could be enhanced by extending the warranty coverage period to cover any latent defects. This was recommended by the assessment team and the Air Force Center for Engineering Excellence Program Manager initiated action to obtain a warranty extension.

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

The Al Kut Training Academy project has met general objectives. At the time of our assessment, construction was almost complete. Dormitories, an office, a dining facility, a laundry facility, two ranges, a perimeter barricade with secure entrances, and classrooms had been constructed or renovated. An electrical power distribution system, a water treatment and distribution system, and a septic system had been installed. As a result, the facility was in use for the intended purpose of training Iraqi military and law enforcement personnel.

Recommendations and Management Comments

While conclusions for objectives 1, 2, and 3 were, in part, negative, the assessment team verified that government or contractor officials took or initiated appropriate corrective actions. For example, the government's Program Manager responded to SIGIR's verbal recommendation provided during field work and initiated action to obtain a warranty extension as a hedge against latent construction defects. In addition, the conclusions for objectives 4 and 5 were favorable. As a result, this report does not include any recommendations for corrective action and management comments were not required. The U. S. Army Corps of Engineers, Gulf Region Division reviewed the draft report and offered no additional information and had no comments.

Appendix A. Scope and Methodology

We performed this project assessment from June through August 2006 in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team included two engineers and an auditor.

In performing this Project Assessment we:

- Reviewed contract documentation to include the following: Task Order, Task Order Modifications, Contract documentation, Implementation Work plan and Scope of Work;
- Reviewed the design package (drawings and specifications), Quality Control Plan, Contractor's Quality Control Reports, USACE Quality Assurance Reports, Construction Progress Photos, Punch Lists, and Property Transfer documents;
- Interviewed the Contractor's Project Manager, Construction Manager, Project Engineer; Government Quality Assurance Representatives and the AFCEE Project Manager; and
- Conducted an on-site assessment and documented results at the Al Kut Training Academy Construction and Renovation Project near Al Kut, Iraq.

Appendix B. Acronyms

AFCEE	Air Force Center for Environmental Excellence
AFMC	Air Force Materiel Command
CQP	Construction Quality Plan
CMU	Concrete Masonry Unit
CPATT	Civilian Police Assistance Training Team
DBE	Department of Border Enforcement
DD	Department of Defense
ECCI	Environmental Chemical Corporation International
ECP	Entry Control Point
EO	Executive Orders
FAR	Federal Acquisition Regulations
IBC	International Building Code
ING	Iraqi National Guard
IP	Iraqi Police
km	Kilometer
KW	KiloWatt
m	Meter
MPa	MegaPascal
MW	MegaWatt
MNF-I	Multi-National Forces – Iraq
MNSTC-I	Multinational Security Transition Command – Iraq
NEC	National Electrical Code
NFPA	National Fire Protection Association
NTP	Notice to Proceed
PSI	Pounds per Square Inch
PVC	Polyvinylchloride
QA	Quality Assurance
QAR	Quality Assurance Representative
QC	Quality Control
QM	Quality Management
QPP	Quality Program Plan
SIGIR	Special Inspector General for Iraq Reconstruction
SOW	Statement of Work
SORS	Statement of Requirements and Specifications
TO	Task Order
UFC	Uniform Fire Code
WERC	Worldwide Environmental Restoration and Construction

Appendix C. Report Distribution

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Deputy Comptroller (Program/Budget)

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Principal Deputy to the Assistant Secretary of the Army for Acquisition,

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Deputy Assistant Secretary of the Army (Policy and Procurement)

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Commanding General, Joint Contracting Command – Iraq/Afghanistan

Commanding General, Multi-National Corps – Iraq

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Appendix D. 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:

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