

DAHUK REHABILITATION CENTER
DAHUK, IRAQ

SIGIR PA-06-070
JANUARY 08, 2007



SPECIAL INSPECTOR GENERAL FOR IRAQ RECONSTRUCTION

January 08, 2007

MEMORANDUM FOR DIRECTOR, IRAQ RECONSTRUCTION MANAGEMENT
OFFICE
COMMANDING GENERAL, MULTI-NATIONAL
SECURITY TRANSITION COMMAND - IRAQ
COMMANDING GENERAL, GULF REGION DIVISION,
U.S. ARMY CORPS OF ENGINEERS

SUBJECT: Report on Project Assessment of the Dahuk Rehabilitation Center, Dahuk,
Iraq (Report Number SIGIR-PA-06-070)

We are providing this project assessment report for your information and use. We assessed the design and construction work being performed at the Dahuk Rehabilitation Center, Dahuk, Iraq 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 underway and in order to enable appropriate action to be taken, if warranted. The assessment team included an engineer/inspector and an auditor/inspector.

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

We appreciate the courtesies extended to our staff. If you have any questions please contact Mr. Brian Flynn at brian.flynn@sigir.mil or at 914-360-0607. For public or congressional queries concerning this report, please contact SIGIR Congressional 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-06-070

January 08, 2007

Dahuk Rehabilitation Center Dahuk, Iraq

Synopsis

Introduction. This project assessment was initiated as part of our continuing assessments of Security and Justice sector reconstruction activities. The overall objectives were to determine whether selected sector 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/inspector and an auditor/inspector.

The objective of the Dahuk Rehabilitation Center project was to finish discontinued construction of a modern self-contained prison facility designed to house 1,490 inmates in such a manner that juveniles and women, inmates with light sentences, inmates with heavy sentences, and inmates with maximum security sentences would all be housed in separate areas of the prison facility. The project initially started in late 2000, but was discontinued in mid-2001 because of political and funding issues.

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

Conclusions. The assessment determined that:

1. The contract's design and specifications were specific enough to construct the facility. This condition resulted from the government's prudent evaluation of pre-existing conditions and current requirements. Specifically, the current project was to complete a project which was previously started in 2000, but was never completed and was eventually halted in 2001. Prior to award of the current contract, the U.S. Army Corps of Engineers performed an inspection of previously completed work to establish or baseline new contract requirements. In addition, drawings and submittals from the previous contract represented the normal 90% design requirement of the current contract and the contractor assumed "ownership" of all previous design work which included designs, drawings, specifications, and other non-construction services. As a result, it was very likely that the project would be successfully completed without major issues related to inadequate design.

2. The contractor's performance met with the standards of the design because of effective project planning and work execution. Closely supervised craft specific crews performed the construction work while effective quality management practices ensured adherence to design standards. As a result, the likelihood is high that the project will be completed in compliance with design standards if past construction and oversight practices are continued.
3. The contractor's Quality Control and the U.S. Government's Quality Assurance programs were adequate because the Quality Control/Quality Assurance systems employed by the contractor and government ensured effective Quality Management during construction. In accordance with requirements, the contractor submitted a timely Quality Control program, effective 26 December 2005 that included a site specific Quality Control plan, a Health and Safety plan, and a Security plan. In addition, the inspectors confirmed that Quality Control and Quality Assurance functions were performed by the same persons since the project's beginning. The benefit of such continuity was apparent during the assessment team's on-site visit. Specifically, Quality Control and Quality Assurance personnel were well informed about the history and progression of the project and its percent completed as reported by the contractor and it was representative of the actual progress, which was corroborated by the Quality Assurance Representative's documentation. As a result, project construction, when completed, will likely comply with contract terms.
4. Project sustainability was adequately addressed in the contract. In addition to completing construction of the main facility that included a power generating and distribution system, and heating and cooling plant, the contractor was required to provide, for completion by others, a design package for interior roads, sidewalks, gardens, sports fields, three main water tanks, a septic system with two main septic tanks, a perimeter wall with watch towers and gates, exterior parking, remote water well with piping and delivery system, and additional items required for a complete and useable facility. The inclusion of an extensive design package, that is located in the contract requirements, should increase cohesiveness of the follow-on tasks if they are required to be completed by an array of different contractors.

The contract included specific language pertaining to warranties: "The Contractor shall provide and certify warranties in the name of the appropriate Ministry for all material or equipment, which includes any mechanical, electrical and/or electronic devices, and all operations for 12 months after installation. Provide any other commonly quoted extended warranties for material, equipment and machinery purchased." When completed, the facility should be sustainable, self-sufficient, and able accommodate 1,490 inmates in the manner originally planned.

5. When completed, the Dahuk Rehabilitation Center project should meet its intended objective to finish discontinued construction of a modern self-contained prison facility designed to house 1,490 inmates in such a manner that juveniles and women, inmates with light sentences, heavy sentences, and maximum security sentences would all be housed in separate areas of the prison facility. The project initially started in late 2000 and was discontinued in mid-2001 because of political and funding issues. Project results should be consistent with original objectives because the project was adequately designed before construction started and project management, contractor Quality Control and Government Quality Assurance practices during construction have been

effective. As a result, the facility should efficiently and effectively house inmates as planned if past construction and oversight practices continue.

Recommendations and Management Comments. This report does not contain any negative findings or recommendations for corrective action; therefore, management comments are not required. The results of this assessment were discussed with the Commander, Gulf Region North District, shortly before the assessment team departed the Mosul Area Office. We would like to express our appreciation for the courtesies offered by all U.S. Army Corps of Engineers personnel. Their assistance with logistics, travel, and access to information made for an effective and efficient project assessment and site visit. Gulf Region Division officials reviewed this report and had no comments nor offered any additional information.

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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 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 United States Government's Quality Assurance (QA) programs were adequate;
4. Sustainability was addressed; and
5. Project results were consistent with original objectives.

Pre-Site Assessment Background

Contract and Costs

According to information provided by the Resident Engineer (RE), the contract for the Dahuk Rehabilitation Center (DRC) project was awarded and administered by the U.S. Army Corps of Engineers (USACE) Gulf Region Division (GRD) – Northern District (GRN) under contract W917BE-06-C-0003, dated 15 December 2005. The contract was a negotiated firm-fixed price (FFP) design and construct contract with a period of performance to end 300 days following the date (26 December 2005) the contractor received the official Notice to Proceed (NTP). Accordingly, the initial project was scheduled for completion on 30 October 2006.

Contract W917BE-06-C-0003 was awarded to Biltek Construction LTD, a Turkish company, in the approximate amount of \$5.6 million.

CLIN #	Description of Deliverable	Amount
0001	Design and complete construction of main facility in accordance with the Statement of Work (SOW).	\$5,326,399
0002	Design and construct electrical and civil works for power plant and equipment IAW SOW.	241,036
0003	Design, no construction, for all else needed for a complete and useable facility in accordance with the SOW.	66,368
	Contract Total	\$5,633,803

Project Objective

The objective of the Dahuk Rehabilitation Center project was to finish discontinued construction of a modern self-contained prison facility designed to house 1,490 total inmates in such a manner that juveniles and women, inmates with light sentences,

inmates with heavy sentences, and inmates with maximum security sentences would all be housed in separate areas of the prison facility. The project initially started in late 2000, was discontinued in mid-2001 because of political and funding issues.

Description of the Facility (pre-construction)

According to the USACE RE and a review of contract documentation, the Dahuk Rehabilitation Center project was started in late 2000 by the Iraqi Government and halted in mid-2001 due to lack of funding and political issues. However, the foundation concrete, columns' concrete, tie beams for both floors, and the roof slab for both floors had been completed before the initial construction was halted.

The DRC is located in the Zerka district, on the west side of Dahuk City. The DRC sits on a site of approximately 60,000 m² (15 acres). The main building area is approximately 21,000 m² (226,000 sq ft) on the ground floor and 17,000 m² (183,000 sq ft) on the 2nd floor.

Scope of Work of the Contract

The contract's SOW included three distinct lump sum contract line items (CLIN Items). Accordingly, the contractor was required to provide all of the design, labor and material to complete CLIN Items 1, 2, and 3 and utilize the existing plans and specifications of the work previously started and stopped as a 90% design submission. The SOW specified the contractor as the 'Designer of Record' with the responsibility to complete the facility. In addition, the contractor was required to design interfaces between any other contractors providing 'furnished by others' items or work.

CLIN Item 1 included the design and complete repair of the existing structure based on a pre-construction deficiency assessment conducted by the USACE, including the main structure, grounds, and all associated utilities; excluding the power plant, equipment, and water tanks. Additionally, design completion included all necessary modifications to existing drawings in order to match dimension measurements with the actual existing physical structure.

The complete design documentation packages were submitted after approval by the contractor's engineer. Included in the design documentation packages were:

- Modification (as required) to the aforementioned existing 90% drawings.
- Overall site, grading, and drainage plans.
- Septic system plan.
- Underground piping/electrical routing plan.
- Plan location drawings¹ for all electrical distribution boards and panels.
- Detailed design and specifications for telephone, computer, sound, video surveillance, and fire alarm systems.

CLIN Item 2 included the complete design and construction of a power and equipment plant that was specifically excluded from CLIN Item 1. In addition, CLIN Item 2 required the contractor to complete any necessary design modifications

¹ Electrical distribution board and panel drawings identify circuits and spares; equipment; electrical load list; cable list detailing size, specification, and destination of each end; and circuit grounding.

to the existing drawings in order to match the actual dimensions of existing physical structures.

As a minimum, the required design completion documentation included:

- Modification (as required) to the aforementioned existing 90% drawings.
- Equipment layout drawings for the power and equipment plants.
- Plan drawings for all electrical distribution boards and panels within the power and equipment plants.
- Electrical distribution board and panel drawings showing each circuit and spares; electrical load list for all power consumers within the power and equipment plants; cable list showing size, specification, and destination of each end.
- Wire/Cable termination drawings, schedules, and grounding drawings.
- Specifications for all equipment.
- Pipe routing and all other drawings required to complete the design for power and equipment plants.

CLIN Item 3 included requirements for the contractor to provide designs only, without any construction, for:

- Interior roads and sidewalks.
- Gardens, sports fields, and exterior parking.
- Three main water tanks, two main septic tanks, and a septic system.
- A perimeter wall with watch towers and gates.
- A remote water well with piping to deliver well water to the facility.
- All else required for a complete and useable facility as defined in the SOW.

Contract Part 3 - DESCRIPTIONS OF DRC ELEMENTS was provided for reference only and was superseded by approved drawings and submittals. The following was copied directly from the contract and not edited.

“Main Building (capacity for 1490 inmates)

The main building contains two stories, a ground floor and a first floor, and is partitioned as follows:

A – Restraint Cells: There are 92 cells for group restraint, each with 2 levels. The upper level is sleeping quarters for 16 inmates and the lower level is the latrine, bath and rest area. There are 18 cells for individual restraint.

B – Workshops: There are many halls used for workshops such as carpentry, electricity, sewing and free hand.

C – Kitchen: The kitchen is a large working area with many ordinary and frozen store rooms.

D – Laundry: The laundry facility is furnished with washers and dryers.

E – Meeting and Lecture Hall: This area is to be used for general media purposes, interviews, and large formal meetings.

F – Prisoners Family Meeting Area: This includes separate meeting areas for heavy charged (>5 year sentence), light charged (<5 year sentence), females, and teenage inmates.

G – Internal School: This includes 6 classrooms, teacher’s rooms, and a headmaster’s room.

H – Administration Area: This is divided offices for deputies and managers.

I – Employee Ward Area: This is separated into separate male and female wards, as well as a kitchen and rest rooms.

J – Hospital Area: This is a small area containing separate male and female wards, doctor’s and examination rooms, an X-ray room, and a pharmacy.

K – Lawyers Meeting Rooms: Two rooms are provided for lawyer/inmate meetings.

L - This area contains separate sleeping areas, dining areas, and restrooms for the male and female guard force.

Main Entrances

There are two entrances at the front of the DRC, each with a sliding steel gate. Each gate contains a small door for pedestrian entrance.

Power Supply Building

This building contains the main generators, power supply equipment, and transformers, and will be supplied by fuel tanks.

Chillers & Boilers Building

This building is used for air conditioning the main building and for supplying hot water.

Guard Towers, Buildings and Fences

Nine (9) guard towers will be installed along the perimeter. The DRC will be surrounded by two walls, with a road in between. The internal wall will be 4 m high and the external wall 6 m high.

Sports Yards and Gardens

Sports yards for the inmates will contain space for football, basketball, volleyball. Additionally there will be yards and gardens around the facility – no trees, low grass only.

Garages and Shelters

These will be used for administration staff cars and VIP visitors.

Water Well

A new water well providing a minimum of 30 gallons per minute will feed the facility.”

Site Assessment

Work Completed

At the time of the site assessment, the project was reported as 60% complete. The facility’s structural concrete framework was completed before the project was halted in 2001. Accordingly, the concrete skeleton from the previous work served as a starting point for new construction covered by the current contract. The photo below, courtesy of the U.S. Army Corps of Engineers (USACE) dated 26 December 2005, shows the concrete framework previously completed.



**The Dahuk Rehab Facility at the pre-construction stage for the current contract.
(Photo courtesy USACE.)**

The USACE performed an assessment of the existing concrete structure to provide key information on issues needed to baseline subsequent contract requirements. The assessment included inspection of all columns, beams, slabs, and roofs. In addition, the USACE documented the inspection results or condition analysis of structural members in a spreadsheet supported by pictures of each specific inspection point. The itemized list below transcribed from the USACE assessment spreadsheet describes the pre-award condition of the structure. The spreadsheet breaks down each condition by type, number of items, columns, beams, and slabs per floor.

Ground Floor/ Columns

S.N	Condision	Number of items
a	Segregation	48
b	rebar exposed	36
c	Segregation and exposed reinforced steel bars	4
d	Big Segregation	2
e	core test taken	1
f	small cracks in some locations	11
g	segregation&cracks	1
h	weak cloumn top, Steel bars exposed	8
i	wood pices in column	1
j	Critical cracks	1

Ground Floor/ Beams

S.N	Condision	Number of items
a	rebar exposed	21
b	Big Segregation	22
c	Segregation	94
d	Segregation and exposed reinforced steel bars	31
e	Weak bond with big Segregation	4
f	Weak bond with Segregation	4
g	Weak bond with small crack	1
h	width of beam bigger than required in some locations	1

Ground Floor/ Slabs

S.N	Condision	Number of items
a	rebar exposed	6
b	Big Segregation	1
c	Gap in the slab	1
d	Segregation	9
e	Segregation and exposed reinforced steel bars	13

First Floor/Column

S.N	Condision	Number of items
a	Big Segregation	4
b	Cracks and exposed bars at top	1
c	small cracks in some locations	18
d	rebar exposed	2
e	Segregation	32
f	Segregation and exposed reinforced steel bars	9
g	Weak at top and bottom	1
h	weak bond and Exposed reinforced steel bars	1
i	Weak top, Exposed reinforced steel bars	2

First Floor/Beams

S.N	Condision	Number of items
a	rebar exposed	37
b	Big Segregation	19
c	Big Segregation and Exposed reinforced steel bars	7
d	Big Segregation, weak bond	2
e	Big Segregation, weak bond and Exposed reinforced steel bar	5
f	small cracks in some locations	4
g	Segregation	102
h	Segregation & rebar exposed	76
i	Segregation, weak bond	3
j	Weak bond	6
k	Weak bond with big Segregation	3
l	Weak bond with Segregation	1

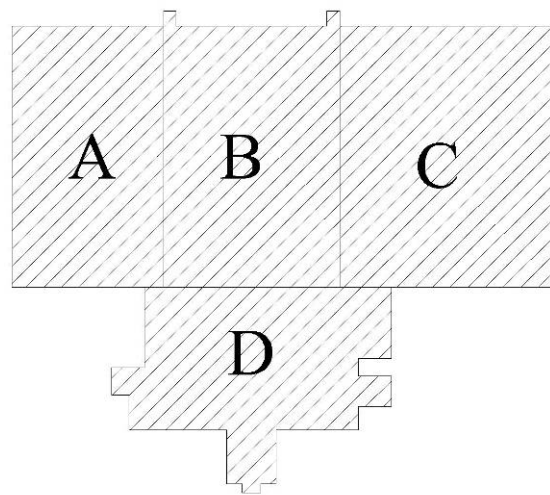
First Floor/Slabs

S.N	Condision	Number of items
a	Big Segregation and Exposed reinforced steel bars	1
b	Crack 2 m length	1
c	small cracks in some locations	1
d	rebar exposed	4
e	Segregation	3
f	Segregation & rebar exposed	6

USACE pre-award structural condition analysis summary (Courtesy of USACE)

To ensure that all specific repair requirements were known, the USACE provided the assessment to the contractor to ensure complete disclosure to the contractor. Accordingly, contract language stated, *“The contractor shall address beams, columns, floors and roof renovation using submitted approved solutions, procedures and materials. After approval the contractor shall make the repairs.”*

Each floor of the two story facility was divided into blocks A, B, C, and D. The diagram below shows facility blocks A, B, C, and D from the contractor’s ground floor layout drawing. At the time of our assessment, the contractor had already completed repairs on the existing buildings, installation of the external walls, installation of the internal walls, and installation of waste water and rain water pipes. In addition, rough-in installation of domestic water supply system pipes for the entire building (both floors - blocks A, B, C, and D) was complete.



Ground floor plan for blocks A, B, C, and D (sketch courtesy of USACE)

Based on a current schedule, provided by the RE at the time of the assessment team’s site visit, tasks completed or in-process included the following in addition to the aforementioned.

- All concrete slab grading.
- Blocks C and D roof insulation.
- Blocks A and D mosaic floor tile installation on both floors.
- Pre-fabrication of iron door and window frames with protection bars for blocks A, B, and D.
- Interior wall plastering of ground floor blocks B and D and both floors in block C.
- Block A mosaic floor tile installation on stair steps.
- Ceiling plastering of the ground and second floors of blocks B, C, and D and block A ground floor.
- Installation of the sidewalk around the existing building, lecture hall marble counter, entrance revolving door, and garage door.
- Mechanical works.

- All ducting except ground floor block C.
- All power distribution system cable trays and ladders.
- All electrical systems, except block B computer system and block E camera system.

Work in Progress

On 31 July 2006, the assessment team visited the Dahuk Rehabilitation Facility. Site Photo 1 shows the entrance of the facility. During the site visit, the assessment team observed a variety of activities that included civil, mechanical, and electrical work.

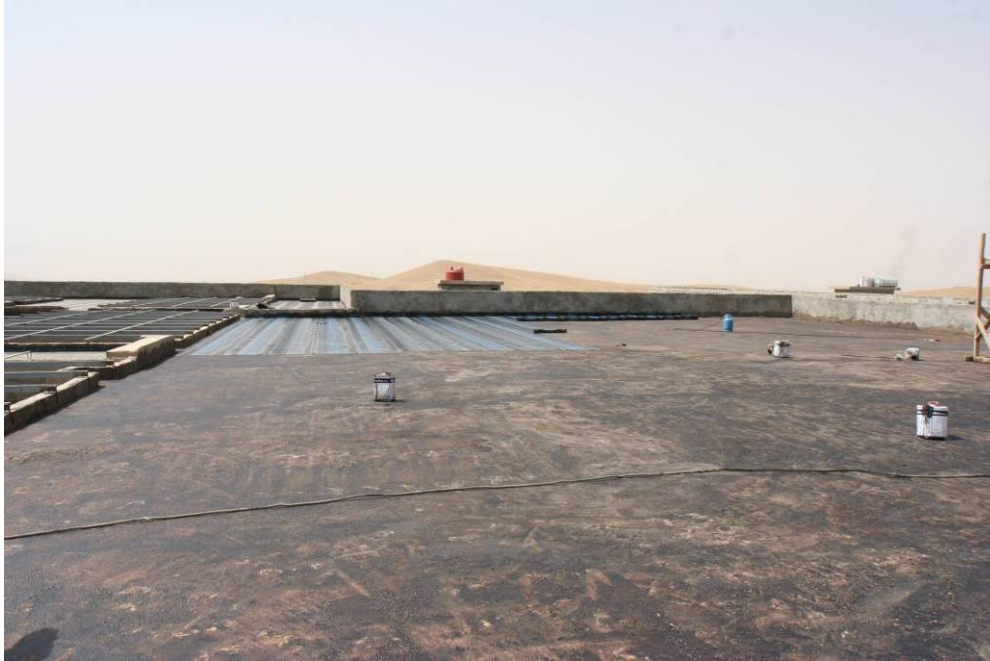


Site Photo 1. Main entrance to the Dahuk Rehabilitation Facility.

Civil Work

Roof

Work on the facility is divided into two levels and a roof. To weatherize the roof surface of the building, the contractor applied a multi-layered bituminous sealant waterproofing membrane coating to the roof. The initial bituminous layer was applied in a liquid form to serve as a primer for subsequent rolled material layers. Site Photo 2 shows the thorough application of liquid bituminous primer to the roof.



Site Photo 2. In the forefront, a first layer of primer/sealer was applied in liquid form.

Application of the bituminous waterproofing membrane was applied as the last step in the process. The roll material membrane, approximately a meter wide, was applied using a “torch-on” hot material technique to securely attach the membrane to the roof surface. Site Photo 3 shows the evenness of the overlapping seam and the flat lie of the membrane. In addition, the membrane material appeared free from voids and pockets, and was cleanly attached to the geometry of the inner roof corner.



Site Photo 3. Bituminous waterproofing membrane.

Site Photo 4 is a large scope display of the membrane's adhesiveness to the roof forming a strong membrane surface bond along with even seams. Based on the assessment team's observation, the membrane was properly installed and evenly distributed with straight and parallel seams over the entire roof.



Site Photo 4. Large scale view of bituminous waterproofing membrane.

Security Protection Bars

The contractor established a fabrication room to construct reinforced frames with metal bars for windows and doors. This room became the manufacturing and inventory center for all security bars to be installed throughout the rehabilitation facility. Using a variety of metal working tools, the contractor fabricated security protection bars for windows, doors, and other openings from raw metal stock in a shop environment to control quality. Site Photo 5 displays the pre-fabrication shop where workers ground, cut, and welded raw steel in order to build opening frames and protection bar assemblies that were uniform and square.



Site Photo 5. Pre-fabrication shop for security protection bar assemblies.

Installation of the pre-fabricated protection bars throughout the facility was the next construction step observed by the assessment team. In Site Photo 6, security protection bars were installed in the large windows on the left side of the picture while the smaller windows on the right side were pending installation.



Site Photo 6. Ground floor installation of security protection bar assemblies.

Security protection bar assemblies were manufactured in the shop to fit the various opening sizes throughout the facility. Site Photo 7 shows the inside of a window waiting the installation of a pre-fabricated protection bar assembly. The assessment team observed that security bar spacing was uniform within the frame and the assembly was painted before installation in an effort to reduce future corrosion. In addition, steel reinforcement mesh was installed inside the concrete masonry unit (CMU) wall.



Site Photo 7. Pre-fabricated security protection bar assembly staged for installation.

Stairs

Site Photos 8 and 9 show stairwells in pre-finished condition. Site Photo 8 shows steel reinforcement mesh attached to the exterior of the Concrete Masonry Unit (CMU) wall awaiting application of the finishing layer of concrete. The mesh will improve bonding between the CMU wall and the finish layer while reducing cracking in the finish layer. Site Photos 8 and 9 show that the steps were cast level and square. In addition, the absence of concrete separation or honey-combing attests to the structural integrity of the casting.



Site Photo 8. Pre-finish front view of poured concrete stairs.



Site Photo 9. Pre-finish side view of poured concrete stairs.

Finishing

Finishing was the final stage of the structural construction process. The facility structure is comprised of concrete columns, CMU walls, concrete slabs, and concrete

beams. The application of a finish layer of concrete is one of the finishing steps that must be accomplished on the walls of the facility to create a smooth appearance. In Site Photo 10, workers apply a thin coat of concrete or plaster to the wall of the facility. The finished surfaces appeared smooth, uniformly thick, and straight with even corners. Site Photo 11 shows finished interior walls while Site Photo 12 displays a finished external wall (left side of image) and unfinished external wall (right side of image).



Site Photo 10. Workers finish an interior wall with a thin layer of concrete (plaster).



Site Photo 11. Concrete finished interior walls.



Site Photo 12. Left side of photo shows completed exterior finish work, while right side shows an unfinished wall.

Most interior floors were to be finished with terrazzo tile. Although not complete, floor tiling was progressing at the time of our site visit. Site Photo 13 shows a section of the floor finished with terrazzo tile that appeared to be properly installed.

Specifically, all tiles observed by the assessment team were aligned, uniformly spaced, and level.



Site Photo 13. Terrazzo floor tile was used to finish most floors in the facility.

Site Photo 14 shows a wooden frame installed in a doorway. The left side of the photo shows that self-hardening epoxy foam was used to securely position the wooden frame inside the CMU wall opening. Subsequently, the CMU block will be plastered and voids around the frame filled in. The final step will be to install the finished frame and door.



Site Photo 14. “Roughed-in” wooden doorway frame was positioned before finishing CMU wall.

Mechanical Work

Duct and Cable Tray Work

Much like the process to pre-fabricate security protection bar assemblies mentioned earlier in this report, the assessment team found that the contractor established a ductwork fabrication room or shop. The fabrication shop was equipped with proper tools and was large enough to effectively function as the manufacturing center for sheet metal pieces and ductwork used throughout the rehabilitation facility. In Site Photo 15, a worker uses a “sheer bar” to cut sheet metal stock to a proper dimension in order to facilitate shaping in subsequent fabrication steps.



Site Photo 15. Centralized sheet metal shop was used to pre-fabricate ducts and other metal assemblies.

Site Photo 16 shows an insulated duct and cable tray attached to the ceiling in preparation of final construction. During the site assessment, the inspectors observed that the ducts, trays, and pipes were hung with hangers and were attached an equal distance apart and level. In addition, hangers appeared to be made with new materials of sufficient size.



Site Photo 16. Ducts and cable trays throughout the facility appeared professionally installed.

Site Photo 17 shows the professional construction techniques used throughout the facility to install cable trays and ducts. Duct insulation wrap appeared complete and smooth. All cable trays and ductwork observed were level and hung an equal distance from the ceiling.



Site Photo 17. Cable tray and duct work were neatly installed in a confined area.

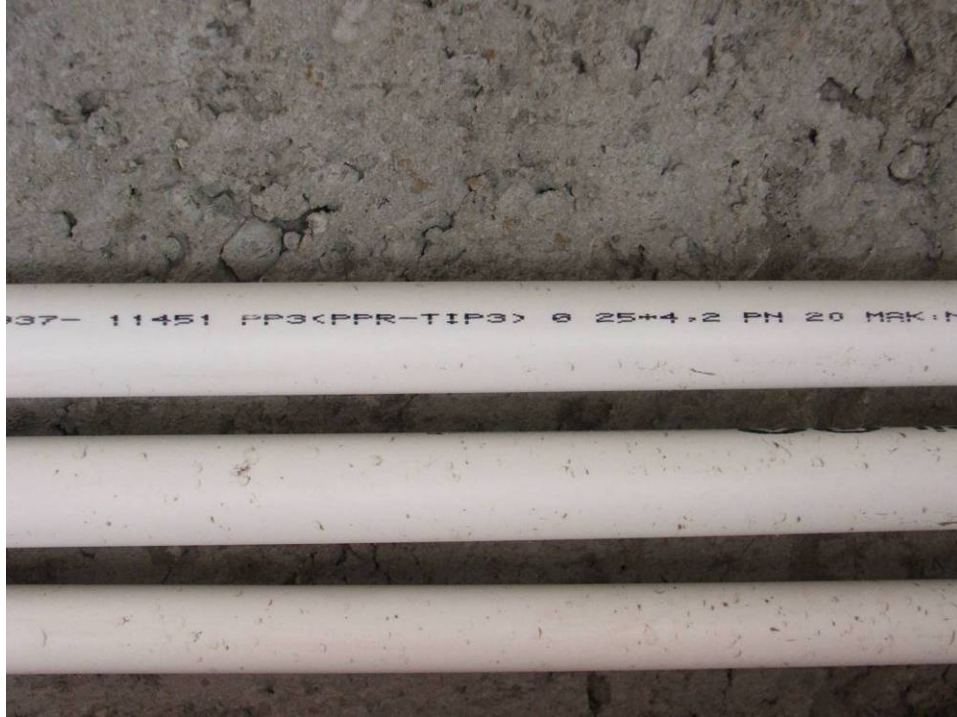
Plumbing

At the time of the assessment team's visit, the installation of the wastewater pipes, rainwater pipes, and domestic water supply system pipes were complete. The contractor was in the process of conducting pressure tests on the domestic water supply system pipes. In Site Photo 18, a pressure meter is attached to a pressurized domestic water line.



Site Photo 18. Domestic water line pressure test was in progress.

Site Photo 19 is a close-up of an exposed section of domestic water supply system (cold, hot, and circulation lines) PolyVinylChloride (PVC) pipe. After successful pressure testing, the exposed piping can be covered with plaster as part of the finishing process. The RE confirmed that a record of successful pressure tests was retained to document completed pressure testing throughout the facility. In addition, coding on the pipe documented that the pipe met requirements.



Site Photo 19. PVC pipe was used for most domestic water pipe (cold, hot, and circulation) applications.

In Site Photos 20 and 21, domestic water piping runs along the floor and wall of a bathroom area waiting successful pressure testing before applicable wall or floor finishing could be completed. The photo shows even installation of clean new PVC piping. In addition, the pipes were fitted cleanly together in a professional manner.



Site Photo 20. PVC pipe run along the floor was pressure tested before installation of floor tile.



Site Photo 21. Wall installation of bathroom area domestic water pipes before finishing.

While not completed at the time of the assessment team's visit, pipe work installation for a firefighting system was in progress. In Site Photo 22, piping for the firefighting system was hung from a corridor ceiling. As with the cable trays and ductwork, firefighting piping was placed in parallel on evenly spaced hangers.



Site Photo 22. Corridor contains firefighting system piping.

Installation of rainwater piping was completed by the time of the assessment team's site visit. Site Photo 23 shows the basin on the topside of the roof where the rainwater will collect and Site Photo 24 shows the positive connection rainwater piping used to drain the roof. It appeared that the drain pipe was securely attached to the wall.



Site Photo 23. Topside view of rainwater collection basin with drain piping.



Site Photo 24. Bottom side view of collection basin showing positive rainwater drain piping.

Work Pending

At the time of the assessment team's site visit, the RE confirmed that work pending included the following general categories or tasks.

- Installation of block B roof insulation.
- Installation of concrete roof tile for blocks C and D.
- Installation of mosaic and terrazzo tile on stair steps in block C.
- Installation of terrazzo baseboards in ground floor blocks C and D and second floor blocks B and C.
- Installation of stair rails.
- Installation of glass in doors and windows.
- Interior painting.
- Concrete pad for main fuel tank.
- Installation of firefighting pipes in block D ground.
- Installation of plumbing fixtures.
- Power plant civil works.
- Installation of the high pressure boiler.
- Installation of heat exchanger.
- Installation of storage, fuel and expansion tanks.
- Installation of hyronic heating and cooling systems pumps.
- Installation of pumps and hydrants.
- Installation of the laundry facility.
- Installation of exterior lighting.

Project Quality Management

Contractor's Quality Control Program

USACE Engineering Regulation (ER) 1180-1-6, Construction Quality Management, defines Contractor Quality Control (CQC) as the construction contractor's system to manage, control, and document his/her own, his/her supplier's, and his/her subcontractor's activities to comply with contract requirements.

In accordance with the contract dated 15 December 2005 and minutes for the Pre-Construction Conference conducted 20 December 2005, the contractor was required to perform all Quality Control (QC) functions throughout the duration of the contract (design, construction, installation, testing, commissioning, etc.) until accepted by the USACE as complete. In accordance with requirements, the contractor submitted a timely Quality Control Program effective 26 December 2005 that included a site specific Quality Control plan (QCP), a Health and Safety plan, and a Security plan. The inspector reviewed QC reports between January and July 2006 and QCP (Appendix H) and verified that the QC manager's responsibilities were performed by the same person disclosed in the QCP.

The QCP was reviewed and found to be comprehensive and sufficiently detailed. In addition, the QCP included appendices to effectively organize and disclose QC requirements, instructions, and processes.

OCP APPENDICES

APPENDIX A - PROJECT'S DEFINABLE FEATURES OF WORK

APPENDIX B - Q.C. AUTHORIZATION LETTERS

APPENDIX C - SAMPLE QUALITY CONTROL PROCEDURES

APPENDIX D - QUALITY CONTROL FORMS

APPENDIX E - LIST OF REQUIRED TESTS

APPENDIX F - SUBMITTAL FLOW CHART

APPENDIX G - SHOP DRAWING FLOW

APPENDIX H - PROJECT and QC DEPARTMENT ORG. CHART

The contract included specific language pertaining to warranties: "The Contractor shall provide and certify warranties in the name of the appropriate Ministry for all material or equipment, which includes any mechanical, electrical and/or electronic devices, and all operations for 12 months after installation. Provide any other commonly quoted extended warranties for material, equipment and machinery purchased."

Government's Quality Assurance Program

USACE Engineering Regulation (ER) 1180-1-6, Construction Quality Management, defines Quality Assurance (QA) as the system by which the government fulfills its responsibility to be certain the CQC is functioning and the specified end product is realized. 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. Based on a discussion with the USACE Resident Engineer and a review of Quality Assurance daily reports, the inspectors confirmed that QA functions were adequately performed by the same team of two Quality Assurance Representatives since the project first started in late December 2005.

Quality Management

Engineering Regulation (ER) 1180-1-6 defines Quality Management (QM) as all control and assurance activities instituted to achieve the quality established by the contract requirements. 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.

Based on the inspector's review of QC and QA daily reports written January through July 2006 and discussions conducted with the Resident Engineer and Quality Assurance Representatives, the assessment team found that the contractor's Quality Control and the U.S. Government's Quality Assurance programs were effective. QC/QA reports were sufficiently complete and detailed. In addition to daily reports, documentation supporting effective quality control included mechanical and civil works test results and certifications for materials and equipment. Unresolved or

deficiencies that could remain unresolved without impeding project progress were recorded in an adequate log that tracked applicable dates and described the current status of the initial problem. QA reports were formal and complied with USACE requirements. Accordingly, they included some general administrative detail not found in QC reports. A review of the Pre-Construction Conference Minutes signature page confirmed that the aforementioned QC/QA personnel participated in the Pre-Construction Conference. The benefit of such continuity was apparent during the assessment team's on-site visit because QC and QA personnel were well informed about the project's history, evolution, and status as of 31 July 2006.

The assessment team observed that work crews were closely supervised by foremen level personnel. In addition, the contractor set-up several shops equipped along craft lines to perform certain tasks well suited to centralized production or prefabrication. For example, a protection workshop was used to pre-fabricate metal bar stock into secure panels to cover windows, doors, and other openings to prevent inmate escape or access to unauthorized areas of the facility. In the shop environment, quality and design compliance could be assured because each fabricated panel could be inspected and reworked as necessary. In another shop, wooden window and door frames were pre-fabricated for subsequent installation throughout the facility. In our last example, sheet metal ducts were pre-fabricated and inspected in a shop organized much like the protection workshop. Although not a bona-fide QC or QA function, the contractor's use of equipped shops contributed to the quality control process.

Project Sustainability

Based on a review of the contract, design submittals, and a discussion with the USACE RE, the assessment team found that project sustainability was adequately addressed in the contract. In addition to completing construction of the main facility that included a power generating and distribution system, and heating and cooling plant, the contractor was required to provide, for completion by others, a design package for interior roads, sidewalks, gardens, sports fields, three main water tanks, a septic system with two main septic tanks, a perimeter wall with watch towers and gates, exterior parking, remote water well with piping and delivery system, and all else required for a complete and useable facility. In the judgment of the inspectors, the inclusion of an extensive design package from a single source in contract requirements will very likely increase the efficiency and effectiveness of the follow-on tasks if completed by an array of other contractors.

The contract included specific language pertaining to warranties: "The Contractor shall provide and certify warranties in the name of the appropriate Ministry for all material or equipment, which includes any mechanical, electrical and/or electronic devices, and all operations for 12 months after installation. Provide any other commonly quoted extended warranties for material, equipment and machinery purchased." When completed, the facility should be sustainable, self-contained, and able to accommodate a total of 1,490 various class inmates in the manner originally planned.

Conclusions

We reached the following conclusions for assessment objectives 1, 2, 3, 4, and 5. Appendix A provides details pertaining to Scope and Methodology and the limitations of this project assessment.

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

The contract's design and specifications were specific enough to construct the facility. This condition resulted from the government's prudent evaluation of pre-existing conditions and current requirements. Specifically, the current project was to complete a project previously started in 2000 but halted in 2001. Prior to award of the current contract, the USACE performed an inspection of previously completed work to establish or baseline new contract requirements. In addition, drawings and submittals from the previous contract represented the normal 90% design requirement of the current contract and the contractor assumed "ownership" of all previous design work which included designs, drawings, specifications and other non-construction services. As a result, it is likely that the project will be successfully completed without major issues related to inadequate design.

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

The contractor's performance met with the standards of the design because of effective project planning and work execution. Closely supervised craft specific crews have performed the construction work, while effective quality management practices have ensured adherence to design standards. As a result, it is likely that the project will be completed in compliance with design standards.

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

The contractor's Quality Control and the U.S. Government's Quality Assurance programs were adequate because the QC/QA systems employed by the contractor and government ensured effective Quality Management during construction. In accordance with requirements, the contractor submitted a timely Quality Control Program effective, 26 December 2005, which included a site specific Quality Control plan (QCP), a Health and Safety plan, and a Security plan. In addition, the inspectors confirmed that QC and QA functions were performed by the same persons since the project's beginning. The benefit of such continuity was apparent during the assessment team's on-site visit. Specifically, QC and QA personnel were well informed about the history and progression of the project and its percent completed, as reported by the contractor, and it was representative of the actual progress and was corroborated by the Quality Assurance Representative's documentation. As a result, project construction, when completed, will likely comply with contract terms.

4. Determine if project sustainability was addressed.

Project sustainability was adequately addressed in the contract. In addition to completing construction of the main facility that included a power generating and distribution system, and heating and cooling plant, the contractor was required to provide, for completion by others, a design package for interior roads, sidewalks, gardens, sports fields, three main water tanks, a septic system with two main

septic tanks, a perimeter wall with watch towers and gates, exterior parking, remote water well with piping and delivery system, and all else required for a complete and useable facility. The inclusion of an extensive design package, that is located in the contract requirements, should increase cohesiveness of the follow-on tasks if they are required to be completed by an array of different contractors.

The contract included specific language pertaining to warranties: “The Contractor shall provide and certify warranties in the name of the appropriate Ministry for all material or equipment, which includes any mechanical, electrical and/or electronic devices, and all operations for 12 months after installation. Provide any other commonly quoted extended warranties for material, equipment and machinery purchased.” When completed, the facility should be sustainable, self-sufficient, and able to accommodate 1,490 inmates in the manner originally planned.

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

When completed, the Dahuk Rehabilitation Center project should meet its intended objective to finish discontinued construction of a modern self-contained prison facility designed to house 1,490 total inmates in such a manner that juveniles and women, inmates with light sentences, heavy sentences, and maximum security sentences would all be housed in separate areas of the prison facility. The project, initially started in late 2000, was discontinued in mid-2001 because of political and funding issues. A desirable outcome will likely result because the project was adequately designed before construction started. Equally important, project management, contractor Quality Control and Government Quality Assurance practices during construction have been effective. As a result, the facility, if completed in accordance with past construction and oversight practices, should efficiently and effectively house inmates in the modern conditions contemplated by planners.

Recommendations and Management Comments

This report does not contain any negative findings or recommendations for corrective action; therefore, management comments are not required. The results of this assessment were discussed with the Commander, Gulf Region North District, shortly before the assessment team departed the Mosul Area Office. We would like to express our appreciation for the courtesies offered by all U.S. Army Corps of Engineers personnel. Their assistance with logistics, travel, and access to information made for an effective and efficient project assessment and site visit. Gulf Region Division officials reviewed this report and had no comments nor offered any additional information.

Appendix A. Scope and Methodology

We performed this project assessment from late July through December 2006 in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team included an engineer/inspector and an auditor/inspector.

In performing this Project Assessment we:

- Reviewed contract documentation to include the following: the Contract, Statement of Work, and Pre-construction Conference Minutes;
- Reviewed the design package (drawings and specifications), the Quality Control plan, and Quality Control and Quality Assurance Reports;
- Interviewed the USACE Resident Engineer and Quality Assurance Representatives;
- Conducted an on-site assessment on 31 July 2006; and
- Briefed the results of fieldwork with the USACE GRN Commander and Resident Engineer before we departed the Mosul Area Office.

Appendix B. Acronyms

CLIN	Contract Line Item Number
CMU	Concrete Masonry Unit
CQC	Contractor Quality Control
DRC	Dahuk Rehabilitation Center
ER	Engineering Regulation
FFP	Firm Fixed Price
GRD	Gulf Region Division
GRN	Gulf Region Northern District
IRRF	Iraq Relief and Reconstruction Fund
Km	Kilometer
m ²	square meters
MAO	Mosul Area Office
NTP	Notice To Proceed
PCO	Project and Contracting Office
PVC	Poly Vinyl Chloride
QA	Quality Assurance
QAR	Quality Assurance Representative
QC	Quality Control
QCP	Quality Control Plan
QM	Quality Management
RE	Resident Engineer
SIGIR	Special Inspector General for Iraq Reconstruction
SOW	Scope of Work
SOP	Standard Operating Procedure
USACE	United States Army Corps of Engineers

Appendix C. Report Distribution

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U.S. Ambassador to Iraq

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Deputy Secretary of Defense

Director, Defense Reconstruction Support Office

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Deputy Chief Financial Officer

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)

Assistant Secretary of the Army for Financial Management and Comptroller

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Commanding General, Gulf Region Division

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House Committee on Government Reform
 Subcommittee on Management, Finance and Accountability
 Subcommittee on National Security, Emerging Threats and International Relations
House Committee on International Relations
 Subcommittee on Middle East and Central Asia

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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