

# SIGAR

**Special Inspector General for  
Afghanistan Reconstruction**

**SIGAR 18-09 Inspection Report**

**Afghan Ministry of Defense Headquarters Security  
and Support Brigade: Facility Construction  
Generally Met Contract Requirements, but Three  
Safety-Related Concerns Need to Be Addressed**



**OCTOBER  
2017**

# SIGAR

## Special Inspector General for Afghanistan Reconstruction

### WHAT SIGAR REVIEWED

On September 8, 2011, the Air Force Center for Engineering and the Environment awarded a \$16.5 million cost-plus-fixed-fee task order—number 0049—to Innovative Technical Solutions Inc. (ITSI) to construct facilities for the Ministry of Defense (MOD) Headquarters Security and Support Brigade (HSSB) in Kabul. ITSI was to demolish, renovate, design, and construct 16 facilities, such as a gym, a vehicle maintenance building, and an administration/barrack building, by September 7, 2013. The facilities would accommodate 2,200 Afghan National Army (ANA) personnel. After five modifications, the estimated contract cost increased to \$35.1 million, and the completion date was extended to July 13, 2014. The Air Force closed out this task order in June 2014 before ITSI completed any of the facilities.

On July 30, 2014, the Air Force Civil Engineer Center (AFCEC) awarded Gilbane Federal—the new corporate name for ITSI—a \$10.6 million firm-fixed-price task order to complete the HSSB facilities by July 31, 2015. This task order—number TG06—also required site grading, road construction, and upgrades to the sewage, site water, and storm water management systems.

On July 31, 2015, AFCEC awarded Gilbane Federal an \$18.6 million firm-fixed-price task order—number TG11—to finish construction of the partially completed facilities by March 14, 2016. After three modifications, this task order's cost increased to \$19.8 million. The project was completed in November 2015.

The objectives for this inspection were to determine whether (1) construction was completed in accordance with contract requirements and applicable construction standards, and (2) the facilities were being used and maintained.

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October 2017

### Afghan Ministry of Defense Headquarters Security and Support Brigade: Facility Construction Generally Met Contract Requirements, but Three Safety-Related Concerns Need to Be Addressed

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## SIGAR 18-09 INSPECTION REPORT

### WHAT SIGAR FOUND

The MOD HSSB project cost \$65.5 million, \$49 million more than the original cost estimate, and it was completed more than 2 years after the original completion date. The cost increased even though the scope of the project was narrowed to omit five facilities, including a quick reaction force building and an administration building. AFCEC officials stated that the increased cost was primarily due to ITSI not completing facilities under the first task order, number 0049, and attributed the delay mostly to the ANA's continued occupation of buildings that needed to be demolished in order for the new construction to proceed. When AFCEC closed out task order 0049 in June 2014, it had already paid ITSI \$35.1 million based on the work performed up to the closeout date, even though the contractor had not completed any of the HSSB facilities. This required AFCEC to issue two additional task orders—numbers TG06 and TG11—to complete the project.

SIGAR found that although the MOD HSSB facilities generally met contract requirements, three construction deficiencies may pose safety risks: improperly installed electric heaters in restrooms, oversized circuit breakers in electrical panels, and uninsulated hot water pipes. Specifically,

- Three electric heaters in the administration/barrack building restrooms were installed above the ablution washing stations, which Afghan army personnel use to wash themselves before prayer. AFCEC stated that the electric heaters installed above the ablution washing stations were acceptable because the design for the electrical connections included a ground fault circuit interrupter (GFCI), a safety feature that reduces the risk of electric shock and electrocution. However, the electric heaters were installed with an on-off disconnect switch instead of a GFCI connection. Because the electric heaters are within reach of the wash stations, people with wet hands could be shocked or electrocuted if they touch a faulty heater that does not have GFCI protection. AFCEC stated that the heaters' installation is consistent with the governing code. However, without GFCI protection, the electric heaters with disconnect switches in the ablution areas present a safety hazard to personnel there.
- Based on TG11 task order requirements, 60 circuit breakers—59 in the administration/barrack building and 1 in the fire station—and two main breakers in the administration/barrack building had a higher amperage rating, or were "oversized." In commenting on a draft of this report, AFCEC acknowledged the circuit breakers included in the as-built drawings were different from what was actually installed, but stated that the installed breakers match the equipment they are designed to supply and protect, and do not pose an increased safety risk. However, oversized circuit breakers could allow more electricity to flow than the wires can safely handle. This could melt the plastic coating around the wires, possibly start a fire, as well as increase maintenance costs.

- Exposed hot water pipes in the medical clinic were not insulated. According to the contract's plumbing drawings for the medical clinic, "All hot water piping shall be insulated." AFCEC officials stated that the hot water heater will not deliver water that is more than 120 degrees Fahrenheit. However, both the contract and the International Plumbing Code specifically required insulation on the hot water piping to prevent wasted energy and water, and protect occupants from exposed hot piping within their reach.

Despite the construction deficiencies and late completion, the ANA is using all of the HSSB facilities. Further, the MOD's engineering department manages the operations and maintenance for the headquarters facilities, and its staff is maintaining the HSSB facilities adequately. However, the lack of adequate planning and coordination between AFCEC and Afghan officials during early stages of the medical clinic's design ultimately resulted in the building not meeting all of the user's needs.

## WHAT SIGAR RECOMMENDS

To ensure the safety of ANA personnel at the MOD HSSB, SIGAR recommends that the AFCEC Director take the following actions and report the results back to SIGAR within 90 days:

- 1. Develop an accurate set of as-built drawings for all systems that includes the locations of the electric heaters without GFCI protection, the oversized circuit breakers, and the exposed hot water pipes; provide the updated as-built drawings to the MOD HSSB facility managers; and inform the facility managers of the potential risks to ANA personnel.**

SIGAR received written comments on a draft of this report from CSTC-A and AFCEC. CSTC-A and AFCEC did not concur with any of the four recommendations. The first three were to address safety concerns by (1) installing GFCI connections for electric heaters in ablution wash stations that did not already have them, (2) identifying and replacing oversized breakers, and (3) insulating exposed hot water pipes. AFCEC stated that the electric heaters, breakers, and pipes did not have safety implications, and were constructed in accordance with the codes applicable at the time of construction. Based on AFCEC's comments, SIGAR modified the first recommendation and eliminated the second and third recommendations. Regarding the fourth recommendation to install seismic straps on a ground-floor water heater, CSTC-A and AFCEC stated that the U.S. government did not pay for this replacement water heater or its installation. As a result, SIGAR eliminated this recommendation from the report.



**SIGAR**

Office of the Special Inspector General  
for Afghanistan Reconstruction

October 30, 2017

The Honorable Jim Mattis  
Secretary of Defense

General Joseph L. Votel  
Commander, U.S. Central Command

General John W. Nicholson, Jr.  
Commander, U.S. Forces–Afghanistan and  
Commander, Resolute Support

Major General Robin L. Fontes  
Commander, Combined Security Transition Command–Afghanistan

Mr. Randy E. Brown  
Director, Air Force Civil Engineer Center

This report discusses the results of SIGAR’s inspection of the Ministry of Defense (MOD) Headquarters Security and Support Brigade (HSSB) project in Kabul, Afghanistan. The MOD HSSB project originally involved the renovation or construction of 16 facilities to support the recently constructed MOD headquarters building. We found three construction deficiencies—improperly installed electric heaters in restrooms, oversized circuit breakers in electrical panels, and uninsulated hot water pipes—all of which have safety implications associated with them.

We recommend that the Air Force Civil Engineer Center (AFCEC) Director take the following actions and report the results of these safety issues back to SIGAR within 90 days: develop an accurate set of as-built drawings for all systems that includes the locations of the electric heaters without GFCI protection, the oversized circuit breakers, and the exposed hot water pipes; provide the updated as-built drawings to the MOD HSSB facility managers; and inform the facility managers of the potential risks to Afghan National Army personnel.

The Combined Security Transition Command–Command (CSTC–A) and AFCEC provided written comments on a draft report of this report, which are reproduced in appendices III and IV, respectively. CSTC–A and AFCEC did not concur with any of the four recommendations in the draft report. Our first three were to address safety concerns by (1) installing GCFI connections for electric heaters in ablution wash stations that did not already have them, (2) identifying and replacing oversized breakers, and (3) insulating exposed hot water pipes. AFCEC stated that the electric heaters, breakers, and pipes did not have safety implications, and were constructed in accordance with the codes applicable at the time of construction. Based on AFCEC’s comments, we modified the first recommendation and eliminated the second and third. Regarding the fourth recommendation to install seismic straps on a ground-floor water heater, CSTC–A and AFCEC stated that the U.S. government did not pay for this replacement water heater or its installation. As a result, we eliminated this recommendation from the report. CSTC–A and AFCEC also provided technical comments, which we incorporated as appropriate.



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Office of the Special Inspector General  
for Afghanistan Reconstruction

SIGAR conducted this work under the authority of Public Law No. 110-181, as amended, and the Inspector General Act of 1978, as amended; and in accordance with the *Quality Standards for Inspection and Evaluation*, published by the Council of the Inspectors General on Integrity and Efficiency.

John F. Sopko  
Special Inspector General  
for Afghanistan Reconstruction

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## ABBREVIATIONS

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AFCEC	Air Force Civil Engineer Center
CSTC-A	Combined Security Transition Command-Afghanistan
GFCI	ground fault circuit interrupter
HSSB	Headquarters Security and Support Brigade
ITSI	Innovative Technical Solutions Inc.
MOD	Ministry of Defense

Between 2011 and 2015, the Combined Security Transition Command–Afghanistan (CSTC–A) funded three task orders—0049, TG06, and TG11—to demolish, renovate, design, and construct facilities for the Ministry of Defense (MOD) Headquarters Security and Support Brigade (HSSB), located in Kabul.<sup>1</sup> The Air Force Civil Engineer Center (AFCEC) awarded the task orders to Innovative Technical Solutions Inc. (ITSI), later known as Gilbane Federal. The initial value of the first task order, 0049, was \$16.5 million. That task order required ITSI to complete demolition and design work, upgrade certain systems, and construct 16 facilities, including a gym, vehicle maintenance building, medical clinic, administration/barrack building, fire station, and warehouse. After a series of modifications, five facilities, such as a quick reaction force building and an administration building, were de-scoped from the project. The second and third task orders required the contractor to finish work it did not complete under the first task order. The HSSB project was completed in November 2015 at a cost of \$65.5 million.

The objectives for this inspection were to determine whether (1) construction was completed in accordance with contract requirements and applicable construction standards, and (2) the facilities were being used and maintained.

We conducted our work in Kabul, Afghanistan, from August 2015 through October 2017 in accordance with the *Quality Standards for Inspection and Evaluation*, published by the Council of the Inspectors General on Integrity and Efficiency. The engineering assessment was conducted by our professional engineers in accordance with the National Society of Professional Engineers' *Code of Ethics for Engineers*. Appendix I contains a more detailed discussion of our scope and methodology.

## BACKGROUND

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On September 8, 2011, the Air Force Center for Engineering and the Environment—reorganized as AFCEC in 2012<sup>2</sup>—awarded task order 0049 to ITSI, a U.S. company, to construct the MOD HSSB facilities, which were expected to accommodate about 2,200 Afghan National Army (ANA) personnel. This \$16.5 million cost-plus-fixed-fee task order required:<sup>3</sup>

- demolition and design work;
- upgrading systems such as the sewage, site water,<sup>4</sup> and storm water management systems; and
- construction of 16 facilities: a gym; a vehicle maintenance building; a petroleum, oil, and lubricant storage facility; a barrack; a medical clinic; an appeals court building; an administration/barrack building; a band building;<sup>5</sup> a fire station; a quick reaction force building; a sewage tank expansion; a warehouse; 2 administration buildings; a parking area; and an outdoor fitness and running path.

According to AFCEC officials, after the initial task order was awarded, the ANA continued to occupy buildings designated for demolition, which delayed ITSI from mobilizing and beginning its work. Frequent security

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<sup>1</sup> CSTC–A funded the HSSB project through the Afghanistan Security Forces Fund. AFCEC awarded task order 0049 under contract number FA8903-06-D-8513, and task orders TG06 and TG11 were awarded under contract number FA3002-08-D-0008. We reported on our inspection of the MOD headquarters in February 2016 (see SIGAR, *Afghan Ministry of Defense Headquarters: \$154.7 Million Building Appears Well Built, but Has Several Construction Issues that Should Be Assessed*, SIGAR 16-16-IP, February 11, 2016).

<sup>2</sup> On October 1, 2012, the Air Force Center for Engineering and the Environment, the Air Force Civil Engineer Support Agency, and the Air Force Real Property Agency merged to become AFCEC. Hereafter, we use the AFCEC to refer to these organizations.

<sup>3</sup> According to Federal Acquisition Regulation (FAR) 16.306, a cost-plus-fixed-fee contract allows the government to contract for efforts that might otherwise present too great a risk to contractors. It also provides the contractor only a minimum incentive to control costs; therefore, it requires increased oversight from the contracting office.

<sup>4</sup> Site water is the utility system that supplies drinking water.

<sup>5</sup> The band building has administrative offices, training and band practice areas, and storage for instruments.

incidents that resulted in the compound being locked down also contributed to delays. After five modifications, the task order's estimated cost increased to \$35.1 million, and the scheduled completion date was extended from September 7, 2013, to July 13, 2014. However, AFCEC closed out task order 0049 in June 2014 before ITSI completed any of the HSSB facilities, based on the work performed up to the closeout date.

According to AFCEC officials, because task order 0049 was cost-plus-fixed-fee, it required ITSI only to demonstrate a specific level of effort during the period of performance. The task order did not require ITSI to complete any of the HSSB facilities. AFCEC determined that ITSI met the requirements of the task order by achieving an acceptable level of effort and paid the contractor the full amount of the task order value with little in the way of tangible results. Apparently, AFCEC later recognized this was a weakness of cost-plus-fixed-fee awards, and the next two task orders it awarded for the HSSB project were firm-fixed-price task orders.<sup>6</sup>

On July 30, 2014, AFCEC awarded a \$10.6 million firm-fixed-price task order (number TG06) to Gilbane Federal—the new corporate name for ITSI—to complete the HSSB facilities by July 31, 2015.<sup>7</sup> This task order required Gilbane Federal to complete the system upgrades and unfinished facilities started under task order 0049. Despite de-scoping five facilities—the quick reaction force building, sewage tank expansion, one administration building, parking area, and outdoor fitness and running path—the task order's cost did not decrease.<sup>8</sup> Under TG06, Gilbane Federal completed the petroleum, oil, and lubricant storage facility; the medical clinic; the appeals court building; and the fire station. On April 30, 2015, AFCEC transferred those facilities to CSTC–A. Gilbane Federal had not completed the remaining facilities, such as the gym and vehicle maintenance building, when work under this task order ended in April 2015.

On July 31, 2015, AFCEC awarded an \$18.6 million firm-fixed-price task order (number TG11) to Gilbane Federal to complete the unfinished facilities from task order TG06. After three modifications, TG11's cost increased to \$19.8 million. Gilbane Federal completed the seven remaining facilities—the gym, vehicle maintenance building, barrack, administration/barrack building, band building, warehouse building, and administration building—under this task order, thus completing the project. On November 30, 2015, AFCEC transferred these remaining facilities to CSTC–A.

In summary, of the 16 planned HSSB facilities, Gilbane Federal completed 11, and AFCEC de-scoped 5 facilities from the project. Appendix II lists the facilities de-scoped, not completed, and completed under each of the three task orders.

## THE MOD HSSB CONSTRUCTION PROJECT GENERALLY MET CONTRACT REQUIREMENTS, BUT THREE CONSTRUCTION DEFICIENCIES MAY POSE SAFETY HAZARDS TO OCCUPANTS

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During our site visits to the HSSB facilities on February 6, October 17, and November 21, 2016, we examined the interior walls and ceiling panels, windows, doors, fire extinguishers, fire doors, plumbing, electrical panels, and heating and mechanical equipment in the 11 completed facilities. We found that the construction generally met contract requirements, and there were no visible defects in the floors, walls, or ceilings. Also, the

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<sup>6</sup> AFCEC's use of a cost-plus-fixed-fee contract for task order 0049 appears to have violated Section 16.306 of the Federal Acquisition Regulation. The latter provides that a cost-plus-fixed-fee contract is suitable for use only when the effort involved might otherwise present too great a risk to the contractor. An example would be performing research or exploration. The problem with a cost-plus-fixed-fee contract is that it does not provide any incentive to the contractor to control costs or complete the project. As noted in the text, AFCEC apparently recognized this problem partway through the project and began to issue firm-fixed-price task orders.

<sup>7</sup> Task order TG06's value was \$58 million, which included \$10.6 million for the MOD HSSB facilities. In addition, Gilbane Federal is a wholly owned subsidiary of Gilbane Building Company, one of two operating companies of Gilbane Company Inc. In August 2010, Gilbane Building Company acquired Innovative Technical Solutions Inc., and in January 2012, it changed the company's name to Gilbane Federal.

<sup>8</sup> Documentation was not available with construction costs incurred for any of the de-scoped facilities.

electrical panels and mechanical equipment were installed and functioning. However, we identified three construction deficiencies—improperly installed electric heaters in restrooms, oversized circuit breakers in electrical panels, and uninsulated hot water pipes—and all three have safety implications associated with them.

## Electric Heaters Installed in the Administration/Barrack Building’s Restrooms Are Potential Electrocution Hazards

During our February 6, 2016, site visit, we found three electric heaters in the administration/barrack building that Gilbane Federal installed above the ablution washing stations.<sup>9</sup> Our review of the as-built drawings showed that the electric heaters were installed in the location specified in the drawings.

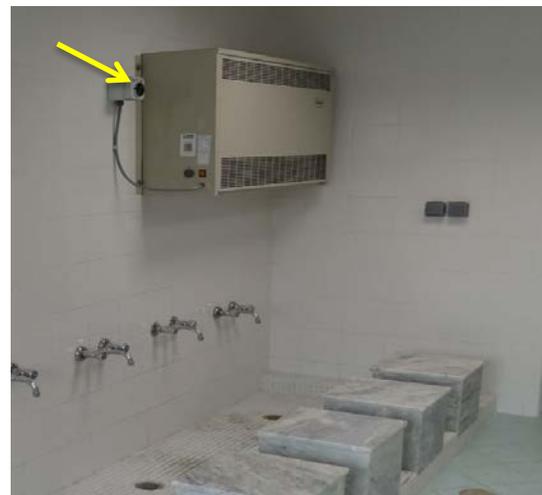
AFCEC indicated that the installed electric heaters above the ablution washing station were acceptable because the design required ground fault circuit interrupter (GFCI) connections for the heaters in this wet area.<sup>10</sup> However, we found that Gilbane Federal installed electric heaters with an on-off disconnect switch, instead of the required GFCI connection (see yellow arrow in photo 1). GFCI connections would protect people from severe or fatal electric shock if they operated the heater with wet hands or touched a heater with a ground fault, but the installed on-off disconnect switches would not.

We reviewed AFCEC’s approved submittals for information about the HEPOL brand of disconnect switches that Gilbane Federal installed. AFCEC approved a material submittal for this device under all three task orders, and each submittal contained the same information. However, we found nothing in the material submittals indicating

that the HEPOL disconnect switches had GFCI safety features. Because the electric heater controls and disconnects are within reach of people with wet hands, people could be shocked or electrocuted if they touch a faulty heater with no GFCI device to stop the accidental flow of electricity through their wet hands and body. In its comments on a draft of this report, AFCEC stated that the heaters’ installation is consistent with the governing code. However, without GFCI protection, the electric heaters with disconnect switches in the ablution areas present a safety hazard to personnel there.

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**Photo 1 - On-Off Disconnect Switch for the Heater Installed Above an Ablution Washing Station**



Source: SIGAR, February 6, 2016

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<sup>9</sup> Ablution is the act of washing before prayer. An ablution washing station allows the person to sit on a square bench to wash the hands, mouth, nose, lower arms, head, ears, and the feet. Because of constraints, we could not inspect the restrooms in all the facilities.

<sup>10</sup> A GFCI is an inexpensive electrical safety device designed to protect people from severe or fatal electric shocks because of a ground fault. A ground fault is an unintentional path of electrical current between a power source and a grounded surface. Electricity always seeks to find a path to the ground. When the human body provides the easiest path to the ground, a person could be burned, severely shocked, or electrocuted when touching a damaged electrical device or coming into direct contact with electricity when wet. A GFCI will “sense” whether there is a difference between two paths of current flowing through an electrical circuit. If the difference is 0.005 milliamps or more, the GFCI operates to prevent a lethal dose of electricity from reaching the human body. GFCIs are designed to stop the flow of electricity before it can affect a person’s heartbeat.

## Some Electrical Panel Circuit Breakers Were Oversized

During our three site visits in 2016, we found that based on task order TG11 requirements, the electrical panel circuit breakers in the administration/barrack and fire station buildings were oversized. Circuit breakers are a type of overcurrent protection device that the National Electric Code requires.<sup>11</sup> For electrical circuits and equipment, overcurrent—or too much current—exists when circuit breakers are oversized and the flow of electricity exceeds the safe electrical rating of the wires or equipment. The wiring’s and equipment’s current rating is the amount of current, rated in amps, that can be safely transmitted before overheating and possibly burning.

When the flow of electricity becomes unsafe, the overcurrent protection device stops the flow of electricity before damage occurs. Installed circuit breakers that have a higher amp rating than designed are considered “oversized” and could allow more electricity to flow than the wires can safely handle. This could cause the plastic coating around the wires to melt and possibly start a fire.

We found 60 circuit breakers—59 in the administration/barrack building and 1 in the fire station—and 2 main breakers in the administration/barrack building that were oversized.

For example, power panel 2 in the administration/barrack building contained 32 oversized circuit breakers for unit heaters. Circuit breakers 4 and 6 were installed with 32 amps, but the contract required that they be 16 amps. Similarly, we found circuit breakers 7 through 36 were supposed to be 16 amps, but 20-amp circuit breakers were installed instead, and water heater circuit breaker 2 was 40 amps, but only required 32 amps. Table 1 shows the oversized circuit breakers that we found in power panels 1, 2, and 4 in the administration/barrack building. We also found that the main breakers in power panels 1 and 4 had 160-amp main breakers installed, but 150-amp main breakers were required. Further, we found that circuit breaker 6 in power panel 1 at the fire station was supposed to be 20 amps, but a 32-amp circuit breaker was installed.

In commenting on a draft of this report, AFCEC acknowledged the circuit breakers included in the as-built drawings were different from what was actually installed, but stated that the installed breakers match the equipment they are designed to supply and protect, and do not pose an increased safety risk. However, the presence of these 60 oversized circuit breakers increases the risk of fire in the administration/barrack building and fire station, as well as maintenance costs to replace damaged wiring.

**Table 1 - Oversized Circuit Breakers in Power Panels 1, 2, and 4**

ADMINISTRATION/BARRACK BUILDING (203)			
<b>Power Panel 1</b>			
Circuit Breaker #	Type	Breaker Size Required	Breaker Size Installed
-	Main Breaker	150AT	160A
3	Unit Heater	16A	20A
32	Electric Water Heater	32A	40A
33	Electric Water Heater	32A	40A
<b>Power Panel 2</b>			
2	Electric Water Heater	32A	40A
4	Unit Heater	16A	32A
6	Unit Heater	16A	32A
7 thru 36	Unit Heaters	16A	20A
<b>Power Panel 4</b>			
-	Main Breaker	150AT	160A
1 thru 24	Unit Heaters	16A	20A

Sources: SIGAR site visits and analysis of contract data from AFCEC

<sup>11</sup> A circuit breaker is a type of overcurrent protection device that is rated for specific amperage. Breakers are installed in a facility’s electrical panels. For each circuit, the required breaker amperage rating is shown in the contract drawings as a number for the rating followed by the letter “A” for amperage. The amperage rating is listed on the breaker’s toggle switch. For example, “20A” is a circuit breaker rated at 20 amps. Overcurrent protection devices protect a circuit by opening when current reaches a value that would cause an excessive rise in the wire’s temperature.

## Insulation Was Not Installed on the Hot Water Pipes in the Medical Clinic

During our February 2016 site visit, we found that the hot water pipes in the medical clinic were not insulated as the contract required. According to the medical clinic's drawings, "All hot water piping shall be insulated." Hot water pipes are insulated to conserve energy and protect people exposed to them from being burned. AFCEC officials stated that the hot water heater would not deliver water that is more than 120 degrees. The "General Facility Requirements" paragraph in task orders 0049 and TG06 required the hot water temperature setting be 120 degrees Fahrenheit. Neither task order granted an exception for omitting insulation on the hot water pipes. However, we found uninsulated hot water pipes on the medical clinic's restroom walls that were within reach of occupants (see photo 2). As a result, both water and energy will be needlessly wasted before hot water reaches plumbing fixtures, and the pipes may become too hot and burn people who come into contact with them.

**Photo 2 - Uninsulated Exposed Piping in the Medical Clinic**



Source: SIGAR, February 6, 2016

## THE MOD HSSB FACILITIES ARE BEING USED AND MAINTAINED

During our site visits, we found that the MOD HSSB facilities were being used. Although the medical clinic was being used, we found that it was not designed to accommodate patients with mobility issues who need to get to the first floor. As a result, the Afghan clinic staff moved all medical and dental services to the ground floor and moved the doctors' and nurses' offices to the first floor.

In addition, the staff expressed concerns that the clinic has inadequate storage space. The only storage area included in the floor plan was in the back of the pharmacy. But it does not meet the staff's general storage needs. As a result, the staff is using a doctor's office on the first floor for storing supplies other than medicine.

Furthermore, the dental room on the ground floor was not constructed with a floor drain. The approved design did not require it, but a drain was needed for the wastewater from dental equipment. The clinic's staff mitigated this deficiency when they moved the dental office to a doctor's office with an adjoining latrine. They created a floor drain by cutting the concrete floor and installing a drain line for the dental equipment and tying it into the latrine's waste line (see photo 3). The lack of adequate planning and coordination with Afghan personnel during the early stages of the medical clinic's design ultimately resulted in the medical staff switching offices to meet their needs.

**Photo 3 - Dental Office Moved to Doctor's Office where Plumbing Drain Line for Equipment Is Connected to Floor Drain in the Latrine**



Source: SIGAR, February 6, 2016

During our February 2016 site visit, we found that the water heater on the first floor of the medical clinic was installed with seismic straps in accordance with the design drawings (see photo 4).<sup>12</sup> However, we found that the water heater on the ground floor was mounted on the wall close to the ceiling with no seismic straps. According to an Afghan official, the ground-floor water heater that we observed mounted on the wall was a replacement water heater that RPC Aldridge Company, an Afghan contractor, installed during the warranty period. In their comments on a draft of this report, AFCEC and CSTC-A stated that RPC Aldridge Company did not install any water heaters under the three task orders and the company was a subcontractor to IDS, the MOD's operation and maintenance contractor. They also stated that the U.S. government did not pay for this replacement water heater or its installation.

Installing the water heater on the wall without seismic straps does not conform to the contract drawings and fails to meet International Plumbing Code requirements (see photo 5).<sup>13</sup> This also creates a safety hazard because Kabul experiences frequent seismic activity. Therefore, the personnel in the clinic may face increased risk of injury if the heater falls over.

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**Photo 4 - First-Floor Water Heater Correctly Installed on the Floor with Seismic Straps**



Source: SIGAR, February 6, 2016

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**Photo 5 - Ground-Floor Water Heater Incorrectly Installed on the Wall Without Seismic Straps**



Source: SIGAR, February 6, 2016

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Despite this, we found that the MOD HSSB facilities were being maintained. According to a MOD headquarters official, the MOD's engineering department manages the operation and maintenance for the headquarters facilities, and has an adequate number of staff to maintain them.

## CONCLUSION

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Despite the MOD HSSB construction project being completed more than 2 years later than planned and costing \$49 million more than originally planned, Gilbane Federal generally met the contract's requirements. However, we identified three construction deficiencies—electric heaters installed above the ablution washing

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<sup>12</sup> In the medical clinic's design drawings, the ground floor is the first level of the building, while the first floor is the second level.

<sup>13</sup> Seismic strapping for a hot water tank involves the use of straps, spacers, and screws, which are used to secure the tank to wall framing. Hot water tanks are heavy and, as a result, are vulnerable to being overturned during an earthquake, which could result in broken water lines, flooding, and electrical fires.

stations with no GFCI connections, power panels containing oversized circuit breakers in the administration/barrack building and fire station, and uninsulated hot water piping in the medical clinic—that all pose safety concerns. These deficiencies need to be addressed immediately to reduce safety risks to HSSB personnel currently using the facilities.

Further, while the facilities are being used, the medical clinic staff had to move medical and dental services from the first floor to the ground floor to resolve patient access issues, and they had to convert one of the doctor's offices into storage space to meet their needs. Such issues demonstrate the need to coordinate with the end user during the design phase of a construction project. To the MOD's credit, the HSSB facilities are being maintained.

## RECOMMENDATIONS

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To ensure the safety of ANA personnel at the MOD HSSB, SIGAR recommends that the AFCEC Director take the following actions and report the results back to SIGAR within 90 days:

- 1. Develop an accurate set of as-built drawings for all systems that includes the locations of the electric heaters without GFCI protection, the oversized circuit breakers, and the exposed hot water pipes; provide the updated as-built drawings to the MOD HSSB facility managers; and inform the facility managers of the potential risks to ANA personnel.**

## AGENCY COMMENTS

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We provided a draft of this report to the Department of Defense for review and comments. CSTC-A and AFCEC provided written comments, which are reproduced in appendices III and IV, respectively. CSTC-A and AFCEC also provided technical comments, which we incorporated into this report, as appropriate.

Our draft report included four recommendations to AFCEC to address safety-related deficiencies at the MOD HSSB that are not in compliance with task orders by taking the following actions:

1. Examine the electric heaters above the ablution wash stations in all HSSB facilities and install GFCI connections that were not present, to limit the risk of electrocution;
2. Examine the electrical panels in all HSSB facilities to identify oversized breakers and replace any that are found with breakers that comply with the as-built drawings;
3. Examine the hot water piping in all HSSB facilities and insulate any exposed hot water piping that does not have insulation; and
4. Determine which entity directed that the water heater on the ground floor of the medical clinic be replaced without seismic straps and why, and ensure that the responsible entity installs the seismic straps.

AFCEC did not concur with any of the four recommendations, and CSTC-A did not concur with the fourth recommendation. Regarding the first three recommendations, AFCEC stated that the electric heaters, breakers, and piping did not have safety implications, and were constructed in accordance with the codes applicable at the time of construction. With respect to the electric heaters based on AFCEC's comments, we modified the first recommendation and eliminated the second, third, and fourth recommendations.

With respect to the GFCI connections, we disagree with AFCEC's statement that the disconnect switch is not a safety issue. As we note in the report, GFCI connections would protect people from an electric shock if they operate the electric heaters with wet hands or touch a heater with a ground fault. The disconnect switch does not offer this protection. However, because the warranty period is over, AFCEC is not likely to recoup the cost for the GFCI connections that Gilbane Federal did not install. As a result, we revised recommendation one to

recommend that AFCEC update the as-built drawings, give these revised drawings to the MOD HSSB facility managers, and alert them of the potential risks.

With respect to the circuit breakers, we disagree with AFCEC's assertion that the oversized circuit breakers do not pose a safety risk. Because the sizes of the circuit breakers installed exceed what the task orders required, there is an increased risk of fire and damage to the electrical wiring. However, because the warranty period is over, AFCEC is unlikely to recoup the cost for the circuit breakers that Gilbane Federal did not install. As a result, we removed recommendation two and incorporated this issue into our revised first recommendation that AFCEC update the as-built drawings, give the revised drawings to the MOD HSSB facility managers, and alert them of the potential risks.

With respect to the uninsulated pipes, we disagree with AFCEC's assertion that the hot water distribution system may never exceed 120 degrees. Because the system does not have a temperature limiting device, the water temperature may rise above 120 degrees Fahrenheit, creating a safety hazard because the exposed hot water pipes are not insulated. However, because the warranty period is over, AFCEC is unlikely to recoup the cost for the insulation that Gilbane Federal did not install. As a result, we removed recommendation three and incorporated this issue into our revised first recommendation that AFCEC update the as-built drawings to reflect as-built conditions, and give the revised drawings to the MOD HSSB facility managers.

Regarding the fourth recommendation to install seismic straps on a ground-floor water heater, CSTC-A and AFCEC stated that the U.S. government did not pay for this replacement water heater or its installation. As a result, we removed this recommendation from the report.

## APPENDIX I - SCOPE AND METHODOLOGY

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This report provides the results of SIGAR's inspection of the Ministry of Defense (MOD) Headquarters Security and Support Brigade (HSSB) facilities in Kabul, Afghanistan. For this inspection, we assessed whether (1) construction was completed in accordance with contract requirements and applicable construction standards, and (2) the facilities were being used and maintained. Specifically, we:

- reviewed contract documents, design submittals, site visit reports, building codes, and other relevant project documentation;
- conducted engineering assessments of the project drawings and construction methods used;
- interviewed U.S. and Afghan government officials concerning the project's construction; and
- conducted site visits on February 6, October 17, and November 21, 2016.

We did not rely on computer-processed data in conducting this inspection. However, we considered the impact of compliance with laws and fraud risk.

In December 2014, SIGAR entered into a cooperative agreement with Afghan civil society partners. Under this agreement, our Afghan partners conduct specific inspections, evaluations, and other analyses. In this regard, Afghan engineers inspected the HSSB facilities in February, October, and November 2016. We developed a standardized engineering evaluation checklist covering items required by the contract and design/specification documents for the HSSB facilities. Our checklist required our partners to analyze the contract documents, scope of work, technical specifications, and design drawings.

We compared the information our Afghan civil society partners provided to accepted engineering practices, relevant standards, regulations, laws, and codes for quality and accuracy. In addition, as part of our monitoring and quality control process, we:

- met with the Afghan engineers to ensure that the approach and planning for the inspection were consistent with the objectives of our inspection and the terms of our cooperative agreement;
- attended periodic meetings with our partners, and conducted our normal entrance and exit conferences with agency officials;
- discussed significant inspection issues with them;
- monitored our partners' progress in meeting milestones and revised contract delivery dates as needed; and
- conducted oversight of them in accordance with SIGAR's policies and procedures to ensure that their work resulted in impartial, credible, and reliable information.

We conducted our work in Kabul, Afghanistan, from August 2015 through October 2017. This work was conducted in accordance with the *Quality Standards for Inspection and Evaluation*, published by the Council of the Inspectors General on Integrity and Efficiency. The engineering assessment was conducted by our professional engineers in accordance with the National Society of Professional Engineers' *Code of Ethics for Engineers*. We conducted this inspection under the authority of Public Law No. 110-181, as amended, and the Inspector General Act of 1978, as amended.

## APPENDIX II - MINISTRY OF DEFENSE HEADQUARTERS SECURITY AND SUPPORT BRIGADE FACILITIES DE-SCOPED, NOT COMPLETED, AND COMPLETED UNDER TASK ORDERS 0049, TG06, AND TG11

Table 2 lists the 16 facilities planned for the Ministry of Defense (MOD) Headquarters Security and Support Brigade (HSSB), and identifies whether they were de-scoped, not completed, or completed under task orders 0049, TG06, and TG11.

**Table 2 - Planned MOD HSSB Facilities and Their Status under Task Orders 0049, TG06, and TG11**

Name and Number of Facility Required	Status		
	Task Order 0049	Task Order TG06	Task Order TG11
Gym (#162)	Not Completed	Not Completed	Completed
Vehicle Maintenance Building (#183)	Not Completed	Not Completed	Completed
Petroleum, Oil, and Lubricant Storage (#183a)	Not Completed	Completed	N/A
Barrack (#198)	Not Completed	Not Completed	Completed
Medical Clinic (#201)	Not Completed	Completed	N/A
Appeals Court Building (#202)	Not Completed	Completed	N/A
Administration/Barrack Building (#203)	Not Completed	Not Completed	Completed
Band Building (#204)	Not Completed	Not Completed	Completed
Fire Station (#206)	Not Completed	Completed	N/A
Quick Reaction Force Building (#210)	Not Completed	De-scoped	N/A
Sewerage Tank Expansion (#211)	Not Completed	De-scoped	N/A
Warehouse Building (#212)	Not Completed	Not Completed	Completed
Administration Building (#213)	Not Completed	De-scoped	N/A
Administration Building (#214)	Not Completed	Not Completed	Completed
Bus and Miscellaneous Parking (#199)	Not Completed	De-scoped	N/A
Outdoor Fitness and Running Path	Not Completed	De-scoped	N/A

Sources: SIGAR analysis of task order documents, including contract modifications and DD1354 real property transfer documents.

## APPENDIX III - COMMENTS FROM THE COMBINED SECURITY TRANSITION– AFGHANISTAN

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NON SENSITIVE INFORMATION RELEASABLE TO THE PUBLIC  
DEPUTY CHIEF OF STAFF SECURITY ASSISTANCE  
COMBINED SECURITY TRANSITION COMMAND – AFGHANISTAN  
KABUL, AFGHANISTAN  
APO AE 09356

DCOS SA/CSTC-A

3 October 2017

MEMORANDUM FOR Special Inspector General for Afghanistan Reconstruction 2350 Crystal Drive, Arlington, VA 22202

SUBJECT: SIGAR: Draft Report for SIGAR Draft Report Inspection (I)-032 – Ministry of Defense Headquarters Support & Security Brigade Expansion Phase II

1. Reference SIGAR Draft Report I-032 (SAB)
2. The purpose of this memorandum is to provide a response to the recommendations made in the SIGAR I-032 Draft Report for Ministry of Defense Headquarters Support & Security Brigade Expansion Phase II.
3. Combined Security Transition Command – Afghanistan (CSTC-A) appreciates SIGAR's efforts to ensure the safety of construction performed at the Afghan Ministry of Defense Headquarters Security and Support Brigade. AFCEC has shared with CSTC-A their responses for recommendations 1-3 and we find their responses adequate and appropriate.
4. Concerning recommendation 4, our research has not been able to identify an individual or agent responsible for replacing this small water heater. The AFCEC contracting officer has no record of any warranty claim against ITSI Gilbane for this item. The USACE O&M contractor, IDS, started covering the MoD HSSB upon turnover of the AFCEC construction to CSTC-A on 30 November, 2015. IDS hired RPC Aldrich as a subcontractor to deliver O&M services on this site. IDS has no record of this water heater replacement action, and so CSTC-A did not pay for it. CSTC-A and USACE non-concur with SIGAR's recommendation directing the installation of a seismic strap on this water heater. SIGAR does not cite any specific International Plumbing Code in their draft report. It is USACE's technical engineering assessment that this product is not a safety hazard and does not require a seismic strap. The 2009 International Building Code (IBC), includes the International Plumbing Code (IPC). Section 502.4 of the 2009 IPC states, "Where earthquake loads are applicable in accordance with the International Building Code, water heater supports shall be designed and installed for the seismic forces in accordance with the International Building Code." The 2009 IBC did not specifically call out a requirement for seismic straps. This is a 25 liter water heater and does not weigh enough to merit such a measure beyond the manufacturer's two wall mounting bracket channels. A seismic strap would be unnecessary and a waste of U.S. Government resources.

NON SENSITIVE INFORMATION RELEASABLE TO THE PUBLIC

DCOS SA

SUBJECT: SIGAR: Draft Report for SIGAR Draft Report Inspection (I)-032 – Ministry of Defense Headquarters Support & Security Brigade Expansion Phase II

5. Point of contact for this memorandum is Jeffrey M. Zielinski at DSN 318-449-9935 or email at [jeffrey.m.zielinski.civ@mail.mil](mailto:jeffrey.m.zielinski.civ@mail.mil).

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Andrew D. Kelly  
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Chief of Staff, DCOS-SA / CSTC-A

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## APPENDIX IV - COMMENTS FROM AIR FORCE CIVIL ENGINEER CENTER



DEPARTMENT OF THE AIR FORCE  
AIR FORCE CIVIL ENGINEER CENTER  
JOINT BASE SAN ANTONIO LACKLAND TEXAS



2 Oct 17

MEMORANDUM FOR SIGAR

FROM: AFCEC/CFS  
2261 Hughes Ave, Ste 4113  
JBSA-Lackland TX 78236-9833

SUBJECT: Response to Draft SIGAR Inspection Report for Afghan Ministry of Defense (MoD)  
Headquarters Security and Support Brigade (HSSB) (I-032)

1. I appreciate the opportunity to review and comment on SIGAR's Afghan MoD HSSB draft report. AFCEC has completed a thorough review of the latest SIGAR report recommending four actions and provides the attached technical response to SIGAR. AFCEC engineers have reviewed as-built drawings and other project documentation to ensure that the findings of this report and AFCEC's response to it demonstrate the highest degree of veracity and lend full context to the issues identified.
2. AFCEC has been supporting SIGAR's audit of the MoD HSSB contracts since August 2015. The SIGAR inspectors have visited the MoD HSSB site on several occasions and were given access to all available contract files, design drawings, contract review correspondence, material submittals and historical data. AFCEC has responded to SIGAR's technical questions and over 25 requests for information.
3. It is AFCEC's assessment that none of the SIGAR findings listed in this report have safety implications. AFCEC's technical review has determined the as-built conditions to be safe and within codes applicable at the time of construction. In regards to directing Gilbane Federal to correct SIGAR's proposed findings, the government's contractual warranty rights have expired and the findings identified in the report do not meet the criteria for a warranty exception.
4. If there are any questions or concerns, please contact the AFCEC POC, Captain Melissa Jumper at melissa.jumper.1@us.af.mil, DSN (312) 969-0821, or COMM: (210) 395-0821.

EDWARD P. PHILLIPS, Col, USAF  
Chief, Strategic Design & Construction Division

Attachment:  
AFCEC Response to Draft SIGAR Inspection Report on the Afghan MoD HSSB

Attachment 1

AFCEC Response to Draft SIGAR Inspection Report on the Afghan MoD HSSB

**BLUF: AFCEC has reviewed SIGAR’s draft report on the Afghan MoD HSSB and disagrees with the recommendations of this audit based on the reasoning detailed in the below paragraphs.**

**1. Discussion on SIGAR’s Identification and Use of As-Built Drawings as the Authority Document for Establishing “Contract Requirements.”**

Of primary importance to understanding the findings of this audit and AFCEC’s response thereto is careful consideration of what documents form the contractual requirements in accordance with the FAR. Upon award of any contract, both the Government and Contractor sign and thereby accept the terms and requirements as specifically outlined in the award document. As such, this award document establishes the foundational requirements of the contract. All contractual requirements are established at that time (contract award) and flow from this source document.

For example, in the case of TG06, the award document includes the verbiage, “In accordance with the provisions and the authority of FAR 52.216-19 Order Limitation (Oct 1995) Clause H032 “Fair Opportunity Task Order Procedures” of the Basic Contract FA3002-08-D-0008 and this Task Order TG06, the contractor shall accomplish the effort described in the Statement of Work (SOW) dated 8 May 2014, entitled ‘Construction of Afghanistan Ministry of Defense (MoD) Complex Kabul, Afghanistan’, attached hereto...”. The same award document also includes a paragraph “Section C – Description/Specifications/Work Statement” which incorporates into the contract the SOW and other requirements documents as they are attached in the award package.

The SOW outlines the “Applicable Documents” which therefore incorporates into the contract the requirement that the final installation comply with the identified codes. For example, in the SOW for TG06 paragraph “2.0 Applicable Documents,” the following became a contractual requirement upon signing of the award document: “The Contractor shall identify and comply with any applicable federal, state, and local statutes; DoD/Air Force/host nation instructions, manuals, handbooks, regulations, guidance, and policy letters, including but not limited to; CSTC-A CJ ENG ANSF Standards dated 31 Oct 2013, 2009 International Building Code (IBC); Unified Facility Criteria (UFC) 04-010-01, DoD Minimum Anti-Terrorism Standards for Buildings; National Electrical Code (NEC) and including all changes and amendments in effect on the date of issuance of this TO.”

This same document, identifies under paragraph “5.3.2 Technical Reports g)” that As-built Drawings are a requirement of the contract. The intent of as-built drawings is to capture the work that was completed as a result of the contract requirements. Therefore, it is to be a graphic representation of the completed contract requirements. However, *it does not follow* that if a detail is shown in the as-built drawings, it was a contractual requirement. Rather, any given detail depicted in the as-built drawing is a contractual requirement if: 1) it is specifically called out in the signed award documents or 2) it is an implied requirement because it is required by a code or other requirement document that has been explicitly incorporated into the award document.

SIGAR Comment 1

As a general illustrative example, a Ground Fault Current Interrupter (GFCI) receptacle is not an explicit requirement of the contracts audited (i.e., neither the SOW nor the Statement of Requirements (SOR) speak to installing GFCI protected receptacles specifically). However, it is an implied requirement, only in specific cases, as they are outlined in the NEC, which was a requirements document incorporated into the contractual requirements by the SOW. Therefore, the Contractor is required to deliver GFCI

protected receptacles in those instances outlined in the NEC in order to fulfill the requirements of the contract. By contrast, the Contractor is not required to deliver a GFCI protected receptacle just because it is identified in the design drawings or as-built drawings.

Therefore, although ideally the as-built drawings would be 100% accurate in depicting all effort undertaken as a result of contract compliance, it is false to conclude that because a detail is depicted in the as-builts, that it was therefore a contractual requirement and that any deviations thereto pose a safety concern and/or contractual deficiency. Furthermore, it is unrealistic to assume that an as-built package with hundreds of drawings covering multiple facilities and site infrastructures, such as those developed for the audited projects, will be entirely error free.

SIGAR Comment 2

Regardless, the **contractual obligation** of the Contractor is to provide a complete, safe, and useable product in accordance with the terms outlined in the contract, not in accordance with the details depicted in the as-built drawings.

Reference: Ref 1 - TG06 Award Document

**2. SIGAR Finding 1:** Three electric heaters in the administration/barrack building restrooms were installed above the ablation washing station, which army personnel use to wash themselves before prayer. AFCEC stated that the electric heaters installed above the ablation washing station were acceptable because the design for the electrical connections included a ground fault circuit interrupter (GFCI), a safety feature that reduces the risk of electric shock and electrocution. However, the electric heaters were installed with an on-off disconnect switch instead of a GFCI connection. Because the electric heaters are within reach of the wash stations, people with wet hands could be shocked or electrocuted if they touch a faulty heater that does not have GFCI protection.

**SIGAR Recommendation:** Examine the electric heaters located above ablation wash stations in all IISB facilities and install GFCI connections, where they are not present, to limit the risk of electrocution.

**AFCEC Response:** AFCEC assessed the available documents and agrees that the design and as-built drawings for the administration/barrack building ablations (Building 203) did specify installation of a GFCI-protected disconnect switch (Ref 2 - Bldg 203 As-Built). However, it is important to consider that the existence of any given element specified on the design or as-built drawings does not necessarily imply that it is required by contract. Rather, the design is a graphic representation of the Designer of Record's (DOR) interpretation of the contractual requirements. If a field change is not correctly or completely carried over to all as-built drawings, a persistence error occurs. In this case, although it appears a persistence error has been made in the as-built drawings, there is no specific contractual requirement for GFCI protection, **because it is not** implied (required) by the contractually adopted code (NEC), as follows:

SIGAR Comment 1

SIGAR Comment 3

Per NEC 90.5 (A), "Mandatory rules of this Code are those that identify actions that are specifically required or prohibited..." The Code could not possibly identify all situations in which GFCI protection is *NOT* required. Therefore, if GFCI protection is not specifically required (or prohibited) within the Code, we can conclude it is not a contractual requirement.

SIGAR Comment 1

Article 424 of the NEC identifies the installation requirements for Fixed Electric Space-Heating Equipment, including those installed in "Damp or Wet Locations", such as the unit heaters installed above the ablation fixtures in Building 203 pointed to in this audit. This same article specifically calls for GFCI protection only in the case of "cables installed in electrically heated floors of bathrooms and in

hydromassage bathtub locations” (NEC para. 424.44 (G)). Additional instances where GFCI protection for personnel is required are outlined in Article 210.8, but this paragraph provides guidance specifically for *receptacles*, not for fixed installations.

Furthermore, this topic was the subject of TG06 RFI 032, in which ITSI established through confirmation with Master Electricians and Electrical Engineers in their employ that the current installation without GFCI is safe and compliant with the NEC. Similar installation had been approved on previous task orders and was approved by the COR in this instance as well, on the same basis (note that approval was provided on 23 March 2015 on the project portal (electronic form) by Loan Harris) (Ref 3 - TG06 RFI-032).

SIGAR Comment 4

Therefore, while there does appear to be an inconsistency between the as-built drawings and the installed conditions with respect to GFCI equipment (or the local equivalent Residual-Current Device (RCD)), the electric heaters were installed in a manner consistent with governing code and approved RFIs. GFCI protection is not required by the NEC in cases of properly rated and installed fixed electrical space-heating equipment in buildings with occupancies such as this, even in wet locations. Compliance with SIGAR’s recommendation at this time would be an unnecessary cost to US taxpayers. As such, AFCEC does not concur with SIGAR’s findings or recommendation on this matter.

SIGAR Comment 5

References: 1) NEC 2008, NEC 2017  
2) Ref 2 - Bldg 203 As-Built  
3) Ref 3 - TG06 RFI-032

**3. SIGAR Finding 2:** Based on TG11 task order requirements, 60 circuit breakers—59 in the administration/barrack building and 1 in the fire station—and two main breakers in the administration/barrack building were oversized. For example, power panel 2 in the administration/barrack building contained 30 oversized circuit breakers, including circuit breakers 4 and 6 for unit heaters that required 16-amp circuit breakers but had 32-amp circuit breakers installed. Installed circuit breakers that have a higher amperage rating than designed are considered “oversized” and could allow more electricity to flow than the wires can safely handle.

**SIGAR Recommendation:** Examine the electrical panels in all HSSB facilities to identify oversized breakers and replace any that are found with breakers that comply with the as-built drawings.

**AFCEC Response:**

A. Regarding the statement: *“Installed circuit breakers that have a higher amperage rating than designed are considered ‘oversized’ and could allow more electricity to flow than the wires can safely handle.”*

It is not accurate to state that, “installed circuit breakers that have a higher amperage rating *than designed*” are oversized. Rather, a circuit breaker with a higher rating than that of the conductors and other distribution devices it protects would be “oversized,” regardless of whether it be *as-designed* or *as-installed*. At this juncture, the concern is with the ratings of the *installed* distribution equipment, as compared to the size of the *installed* Overcurrent Protection Device (OCPD). The requirements for such protection, including guidance for the correct sizing of breakers is established in the NEC Article 240 “Overcurrent Protection”, compliance with which is a contractual obligation, in accordance with the logic outlined in Section 1 above. In order to ensure safe conditions for power delivery, OCPDs such as the circuit breakers in question, must be sized correctly to match the maximum current-carrying capacity of the equipment it is protecting. The primary role of the circuit breaker is not to protect the load, but rather to protect the distribution equipment (conductors, receptacles, switches, etc). However, the demand

SIGAR Comment 6

required by the load (in this case, a unit heater) must be considered when designing the circuit, to ensure that the required capacity can be safely and effectively delivered to the load.

B. Regarding the statement: *“Based on TG11 task order requirements, 60 circuit breakers—59 in the administration/barrack building and 1 in the fire station—and two main breakers in the administration/barrack building were oversized. For example, power panel 2 in the administration/barrack building contained 30 oversized circuit breakers, including circuit breakers 4 and 6 for unit heaters that required 16 amp circuit breakers but had 32-amp circuit breakers installed.”*

SIGAR’s report provided a specific example of “oversized” circuit breakers, circuits numbered 4 and 6 on Power Panel 2 (PP2/4 and PP2/6) in Building 203 (administration/barrack building). The as-built drawings for this facility indicate a 16-amp (16A) breaker is installed on these circuits, but SIGAR’s report indicates that a 32A breaker is actually installed on site. The SIGAR report, therefore, has concluded that the installed breaker is “oversized.” Circuits PP2/4 and PP2/6 are dedicated circuits, each supplying only one unit heater. Based on the information presented in the as-built drawings, the equipment being fed by these circuits is specifically “UH-05” which equates to the Sabro Electric Heater Model CH600 (Ref 2 - Bldg 203 As-Built). The submitted data sheet for this equipment establishes that this heater will require 18.2A given a 220VAC (Volts Alternating Current) supply, or up to 19.6A at 240VAC (Ref 4 - Bldg 203 Unit Heaters). As such, a 16A breaker would be inadequate (undersized) to support this equipment. This inadequacy was noted for the cases of equipment “UII-05” and “UII-06” during construction in TG11 RFI-002 (Ref 5 - TG11 RFI-002).

SIGAR Comment 7

Furthermore, the conductor size associated with each of these circuits is indicated on the as-built panel schedule to be 3x6.0mm<sup>2</sup>. Three conductors in a sheath with a cross-sectional area of 6.0mm<sup>2</sup> are rated to carry around 35A before overheating becomes a concern. In this case, the installed breaker (32A) will open before that maximum capacity is reached, protecting the conductor and preventing a potential fire hazard. The unit heater equipment will never draw more than that its rated current, unless a fault condition exists. Therefore, in this case, it appears that the circuit breakers on PP2/4 and PP2/6 have been matched well with the equipment they are designed to supply and protect, and are neither oversized, nor undersized. The installed infrastructure does not pose an increased safety or maintenance risk and is code (and by implication, contract) compliant.

As another specific example of oversizing, SIGAR’s report has also cited two main panel breakers in the same building (#203) stating *“the main breakers in power panels 1 and 4 had 160-amp main breakers installed, but 150-amp main breakers were required.”* To examine this conclusion further, it is important to keep in mind that circuit breakers, such as the ones pointed to in this audit, are commonly sized in specific thresholds, which match the current carrying capacities of conductors and other such distribution equipment commonly available in the same market. For example, the NEC paragraph 240.6 (A), identifies the standard sizes for fuses and fixed trip circuit breakers to be “15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250, 300, 350, 400, 450, 500, 600, 700, 800, 1000, 1200, 1600, 2000, 2500, 3000, 4000 5000, and 6000 amps.” However, these common sizes readily available in the US and whose installation is primarily governed by codes such as the NEC, often do not exactly match the common sizes readily available in Afghanistan, where products were often imported from the EU (metric) and whose installation was typically governed by the IEC, EN or BS 7671. The commonly available preferred values for the rated current of similar devices governed by the EN and IEC are 6A, 10A, 13A, 16A, 20A, 25A, 32A, 40A, 50A, 63A, 80A, 100A, 135A, 160A, 200A, 250A, 400A, etc. As with many projects executed in Afghanistan, the DOR was often designing based on their experience with US products and with design tools developed for NEC installation. Unfortunately, it was not typical for the construction subcontractor to subsequently propose US-sourced products, and as such,

some changes from the design were often necessitated. This being the case, adjustments to the electrical design were often implemented in the field. Field changes such as this do not automatically render the distribution system unsafe, nor does it imply that the construction contractor has not met their contractual requirements. In fact, if all affected products are procured from the European market, they will all be nominally designed with the same standard rating thresholds in mind and can be easily coordinated with each other to render a safe and useable system. Therefore, the main panel breakers cited to be 150A (as designed) vs 160A (as installed) are not oversized and continue to be safe in use.

In this report, SIGAR recommends based on their findings that AFCEC should “*Examine the electrical panels in all HSSB facilities to identify oversized breakers and replace any that are found with breakers that comply with the as-built drawings.*” This is taken to intend that, where any discrepancies exist between actual installed breakers and the as-built drawings, an installed breaker should be replaced to match the ratings identified in the as-built drawings, without consideration for the load that is being serviced or the ratings of the installed distribution equipment. The implications of such action would be costly, unnecessary, and could render the affected load unusable due to undersizing of the breaker (constant trips), as is outlined above.

SIGAR Comment 6

In addition, a warranty inspection was conducted in March 2016, as a result of previous inquiries on this matter in conjunction with this SIGAR audit. At that time, AFCEC initiated a warranty call with Gilbane to verify all circuit breakers in Building 203. The resulting findings were that all breakers were appropriately sized in accordance with all installation factors, governing safety codes, and approved RFIs. This was outlined in Gilbane’s response to SIGAR’s initial findings in the course of this audit (Ref 6 - MOD HSSB (I-032) Gilbane Responses 4.13.17). As a result, it has now been twice-established in the field that there are no operational or maintenance concerns with the current installation.

Therefore, it is the position of AFCEC that the findings of this report on this matter are incorrect and implementation of the recommendations made by the report would lead to unnecessary additional cost for US taxpayers, as well as an unstable interior electrical distribution system in the impacted buildings. The information gathered by SIGAR auditors during their site visits, taken in totality with all project documentation, and with consideration being given to the context and real factors that impact an electrical design and installation in Afghanistan by US contractors, it is clear that the construction contractor worked to install a safe and useable electrical distribution system as contractually required, and that Government oversight was executed in such a way as to ensure as much.

- References: 1) NEC Article 240 Overcurrent Protection  
2) Ref 2 - Bldg 203 As-Built  
3) Ref 4 - Bldg 203 Unit Heaters  
4) Ref 5 - TG11 RFI-002  
5) Ref 6 - MOD HSSB (I-032) Gilbane Responses 4.13.17

**3. SIGAR Finding:** Exposed hot water pipes in the medical clinic were not insulated. According to the contract’s plumbing drawings for the medical clinic, “All hot water piping shall be insulated.” AFCEC officials stated that the water heater will not deliver water that is more than 120 degrees Fahrenheit. However, both the contract and the International Plumbing Code specifically required insulation on the hot water piping to prevent wasted energy and water, and protect occupants from exposed hot piping within their reach.

**SIGAR Recommendation:** Examine the hot water pipes in all HSSB facilities and insulate any exposed hot water piping that does not have insulation.

**AFCEC Response:** AFCEC concurs with the statement that the design and as-built drawings specify that hot water piping is to be insulated (Ref 7 - Bldg 201 As-Built and Ref 8 - Bldg 201 Design). However, AFCEC does not concur with the recommendation to insulate the exposed hot water piping. The 2009 IPC Section 607.2 requires that where the developed length of hot water piping from the source of hot water supply to the farthest fixture exceeds 100 feet, the hot water supply system shall be provided with a method of maintaining the temperature in accordance with the International Energy Conservation Code (IECC). The developed piping length in the medical clinic is less than 100 feet from the hot water source to the point of use. Therefore, insulation is not required on this piping. The 2009 IPC 607.2.1 requires circulating hot water system piping shall be insulated. The system in the medical clinic is not a circulating system; therefore, there is no code requirement to insulate the pipes. As previously stated, the hot water system is designed to deliver water at a temperature no greater than 120 degrees Fahrenheit. This temperature does not present a safety hazard to the user. In terms of energy conservation, insulation will not assist in maintaining the temperature of the water that is sitting in the pipes without circulation. Therefore, it is the position of AFCEC that since the recommendations outlined in the report are not required by any code, implementation of the recommendations made by the report would lead to unnecessary additional costs for US taxpayers and would provide no additional safety or environmental benefits.

SIGAR Comment 8

SIGAR Comment 9

- References: 1) 2009 IPC Section 607.2  
2) 2009 IECC  
3) Ref 7 - Bldg 201 As-Built  
4) Ref 8 - Bldg 201 Design

**4. SIGAR Finding:** The water heater on the ground floor of the medical clinic was mounted on the wall, close to the ceiling, without seismic straps. The water heater's installation without seismic straps does not comply with the contract design drawings. It also violates the International Plumbing Code's requirements for water heater seismic supports. Further, it is a significant safety risk because Kabul has the most seismic activity of all major cities in Afghanistan.

**SIGAR Recommendation:** Determine which entity directed that the water heater on the ground floor of the medical clinic be replaced without seismic straps and why, and ensure that the responsible entity installs the seismic straps.

**AFCEC Response:** It is AFCEC's assessment that this product was not installed as part of the AFCEC-executed contracts included in this audit based on a review of the design and as-built drawings. Therefore, AFCEC has no information regarding this particular water heater or the installation procedures that were followed. The end-user is responsible for adhering to the warranty call procedures. It should be noted that the contractor who reportedly installed this hot water heater, RPC Aldridge Company, is the O&M contractor for this project. CSTC-A further researched this issue and determined that the US Government was not billed for the installation of this hot water heater as an O&M action. Additionally, RPC Aldridge Company personnel do not recall installing this particular hot water heater. Therefore, AFCEC believes that the US Government has performed due diligence in an effort to determine the installation details of this hot water heater and that the US Government has no obligation to further investigate this issue.

SIGAR Comment 10

However, AFCEC does offer the following technical assessment of the user-installed water heater: The 2009 IBC, which includes the IPC, states in Section 502.4 that "*Where earthquake loads are applicable in accordance with the International Building Code, water heater supports shall be designed and installed for the seismic forces in accordance with the International Building Code.*" The installation details

shown in the design document are for stand type electric water heaters anchored to the wall with seismic straps. Seismic straps are used to prevent free-standing hot water heaters from tipping over. The hot water heater in question is a very small (25-liter) wall-mounted unit attached to the building structure and is not subject to tipping over if properly mounted to the wall. Seismic installation requirements for non-structural mechanical and electrical components attached to the structure are outlined in American Society of Civil Engineers, 7-10, Paragraph 13.6.1. The mounting brackets and anchors are to be designed in accordance with these requirements.

Again, as previously stated, it does not appear that the US Government installed this equipment and therefore has no information regarding specifics of the mounting assembly or the installation procedures and is not obligated to expend additional US taxpayer dollars researching the issue.

References: 1) 2009 IBC Section 502.4  
2) American Society of Civil Engineers, 7-10, Paragraph 13.6.1  
3) Ref 7 - Bldg 201 As-Built  
4) Ref 8 - Bldg 201 Design

## SIGAR's Response to the Air Force Civil Engineer Center's (AFCEC) Comments

**SIGAR Comment 1:** AFCEC's post-construction response contradicts the statements of work for the three task orders. See section 2.0, "Applicable Documents," which states, "The current 95%, 100% design, redlines, and specifications provided in Appendix B are the governing documents for construction." It also states, "In the case of a conflict between any applicable code and the 95% or 100% design, the approved 95% or 100% design will govern."

**SIGAR Comment 2:** The design and construction requirements for the inspected facilities changed frequently during the project. We based our inspection on the final approved record of completed construction. AFCEC's contracting officer's representative approved the as-built drawings, indicating that they accurately reflected the completed construction. We disagree with AFCEC's position that (1) the approved design drawings do not specify construction requirements that are to be followed, (2) the as-built drawings do not represent the approved design for completed construction with all approved design changes, and (3) it is unrealistic to expect that the contracting officer's representative's reviewed and approved as-built drawings reflect the approved and completed construction requirements.

**SIGAR Comment 3:** The "Statement of Specifications" for task order 0049 required the electrical connections for all fans in wet areas to be connected to ground fault current interrupter (GFCI) compliant circuits. As a result, the 100 percent design drawings, dated August 8, 2012, for the task order showed GFCI connections in the ablation areas for electric resistance heaters, which had internal fans. In addition, the approved design drawings for the second and third task orders—TG06 and TG11—showed GFCI connections for all electric heaters in the ablation areas, even with the frequent design changes. The task orders required the drawings to be the governing documents for construction. The task orders also stated that requirements in the drawings took precedence over referenced codes. Therefore, we contend that GFCI connections should have been installed.

**SIGAR Comment 4:** AFCEC did provide documents showing that an approved deviation relieved the contractor from installing GFCI connections in the ablation electric heaters, as the design drawings required. AFCEC approved this deviation under task order 0049 to allow the contractor to substitute a disconnect switch for the required GFCI connection for the electric water heaters in the mechanical rooms. In March 2015, a quality assurance engineer alerted Gilbane Federal and AFCEC that electric heaters in the bathrooms had disconnect switches instead of the GFCI connections required in the approved design. AFCEC subsequently approved Gilbane Federal's request to substitute disconnects for GFCI connections for the electric heaters in the bathrooms. AFCEC based this approval on the premise that "the water heater equipment and installation is the same scenario as the unit heater equipment and installation."<sup>14</sup> However, the two scenarios are not the same because it is unlikely that building occupants will be operating the water heaters in the mechanical rooms while their hands and feet are wet.

**SIGAR Comment 5:** In a May 1, 2017, email to us, AFCEC indicated that the electric heaters installed above the ablation washing stations were acceptable because GFCI connections for the heaters in this wet area were installed. However, this explanation is at odds with AFCEC's assertion in its October 2017 comments that the GFCI connections were in fact not required. Furthermore, AFCEC's assertion that the electric heater installation complies with the National Electric Code does not address the fact that the heaters, which have exposed disconnects and electrical cords, were installed in wet areas and within reach of individuals using the ablation stations, yet are not on GFCI-protected circuits. As we note in the report, GFCI connections would protect people from an electric shock if they operate the electric heaters with wet hands or touch a heater with a ground fault. The disconnect switch that was installed does not offer this protection. However, because the warranty period has expired, AFCEC is unlikely to recoup the cost for the GFCI connections that Gilbane Federal did not install. As a result, we revised recommendation one to recommend that AFCEC update the as-built

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<sup>14</sup> The "unit heater equipment" AFCEC references are the electric water heaters installed in the mechanical rooms.

drawings , give these revised drawings to the Ministry of Defense (MOD) Headquarters Security and Support Brigade (HSSB) facility managers, and alert them of the potential risks.

**SIGAR Comment 6:** CSTC–A turned building 203 over to the MOD in November 2015, and AFCEC provided us the as-built drawings, dated November 17, 2015, to show the construction that was completed in accordance with the final approved design and all approved changes. We based our inspection on this last set of drawings. The notes on the electrical drawings indicate that the breaker sizes shown in the electric panel schedules were the result of electrical calculations. SIGAR’s finding and safety concern is that the amperage ratings on the installed breakers exceed the correctly-sized breakers specified on the approved design drawings. However, because the warranty period has expired, AFCEC is unlikely to recoup the cost for the circuit breakers that Gilbane Federal did not install. As a result, we eliminated recommendation two and incorporated this issue into our revised first recommendation that AFCEC update the as-built drawings to show where the oversized circuit breakers are, give the revised drawings to the MOD HSSB facility managers, and alert them of the potential risks.

**SIGAR Comment 7:** AFCEC’s response is based on information presented in the as-built drawings, but both AFCEC and SIGAR have confirmed that the as-built drawings do not reflect the actual installation. Therefore, the wire sizes may not have been installed as indicated, and the equipment sizes may not have been installed in the locations shown.

**SIGAR Comment 8:** We agree that the 2009 version of the International Plumbing Code only required insulation on hot water piping for hot water recirculating systems. <sup>15</sup> However, the statements of work for the task orders state, “In the case of a conflict between any applicable code and the 95% or 100% design, the approved 95% or 100% design will govern.” The scopes of work, statements of requirements, and design drawings specified that pipes for hot water systems be insulated.

**SIGAR Comment 9:** We do not agree with AFCEC’s assertion that the hot water distribution system may never exceed 120 degrees. Because the system does not have a temperature limiting device, the water temperature may rise above 120 degrees Fahrenheit, creating a safety hazard because the exposed hot water pipes are not insulated. However, because the warranty period has expired, AFCEC is unlikely to recoup the cost for the insulation that Gilbane Federal did not install. As a result, we eliminated recommendation three and incorporated this issue into our revised first recommendation that AFCEC update the as-built drawings, give the revised drawings to the MOD HSSB facility managers, and alert them of the potential risks.

**SIGAR Comment 10:** According to the information we obtained, RPC Aldridge installed the replacement water heater. Furthermore, in their comments, CSTC–A and AFCEC stated that the U.S. government did not pay for this replacement water heater or its installation. As a result, we revised the report to reflect that this is an operation and maintenance issue and eliminated recommendation four.

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<sup>15</sup> A recirculating hot water system ensures that heated water is always available for use when needed.

## APPENDIX V - ACKNOWLEDGMENTS

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- advance U.S. interests in reconstructing Afghanistan.

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