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Closeout Report

Kandahar Helmand Power Project (KHPP)

COMPONENT 5

REBUILD KAJAKI DAM SUBSTATION AND LOCAL DISTRIBUTION SYSTEM



Submitted by: Black & Veatch Special Projects Corporation (BVSPC)
Federal Services Division
Kandahar Helmand Power Project (KHPP)
USAID Contract Number 306-C-00-11-00506-00

Submitted to: Office of Economic Growth and Infrastructure (OEGI)
U.S. Agency for International Development (USAID)
Great Massoud Road
Kabul, Afghanistan

Submittal Date: 07 February 2014
Revision 01: 01 May 2014
Revision 02: 24 June 2014
Revision 03: 12 August 2014
Final Revision: 17 September 2014

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Attachments

Document # (if applicable)	Description (Note: The Section references below are the BVSPC-USAID Contract sections wherein specific deliverable requirements are located.)	Status	In Closeout Package?
a-00	Closeout Report Attachment File Directory.	Complete	Yes
a-01	Contract Closeout Procedures Manual (CCPM).	Complete	Yes
a-02	Security Plan [Section F.4.B(A)] - Site Specific.	Complete	Yes
a-03	Implementation Plan - Work Plan (Section F.4.B-B).	Complete	Yes
a-04	Health and Safety Plan and Procedures (Section C.4.6; Section F.4.B-C).	Complete	Yes
a-05	Quality Control Plan (Section C.4.5; Section F.4.B-C).	Complete	Yes
a-06	Warranty Administration Plan (Section C.4.11; FAR 52.246.21).	Complete	Yes
a-07	Construction Manual (Section C.4.10).	Not Applicable	N/A
a-08	Construction/Final Schedule (Section C.4.10; Section F.4.B-C) - Component Specific.	Complete	Yes
a-09	Photo Album.	Complete	Yes
a-10	Small Business Utilization Subcontracting Plan (Section H.23; Section J - Attachment 19; FAR 52.219-8).	Complete	Yes
a-11	Operations and Maintenance Manuals (Section C.4.11; Section F.4.B-C).	Complete	Yes
a-12	Performance Monitoring and Evaluation Plan – each Component, as stipulated by COR (Section C.4.13).	Not Applicable	N/A
a-13	Branding Implementation Plan (Section F.4 B,C; Section D.2).	Complete	Yes
a-14	Environmental Plan (Section H.16).	Complete	Yes
a-15	Environmental Compliance Documentation Schedule (Section H.16).	Complete	Yes
a-16	Environmental Closeout Report (Section H.16) - Site Specific.	Complete	Yes
a-17	Environmental Reports (Section F.4.B-C) -- Annual Reports until Mod 10 (16-Feb-2013), and then Quarterly Reports.	Complete	Yes
a-18	Weekly Highlight Report (Section F.4.B-B).	Complete	Yes
a-19	Short Term Report - STTA Trip reports (Section F.4.B-B) - Site Specific.	Not Applicable	N/A

Document # (if applicable)	Description (Note: The Section references below are the BVSPC-USAID Contract sections wherein specific deliverable requirements are located.)	Status	In Closeout Package?
a-20	Design Submittals (Section F.4.B-C): Original Scope - 10%, 30%, and 60% Submittal Final Scope - Attachment d-01	Complete	Yes
a-21	Inspection and Equipment Test Reports (Section F.4.B-C) - Site Specific.	Not Applicable	N/A
a-22	Concrete Strength tests: Steel reinforcements test reports (Section F.4.B-C) - Site Specific.	Not Applicable	N/A
a-23	Testing and Commissioning Report (Section F.4.B-C) - Site Specific.	Not Applicable	N/A
a-24	As-Built Construction Drawings (Section C.4.11; Section F.4.B-C) - Site Specific.	Not Applicable	N/A
a-25	Training Reports - Component Specific.	Complete	Yes; included in d-05
a-27	Final Closeout Report (Section C.4.11; Section F.4.B-C).	Complete	Yes
Tasks for Component 5: Rebuild Kajaki Dam Substation and Local Distribution System (Section C.3.1.5)			
b-01	30% design package for Kajaki Substation per Modification 6 (Submission Confirmation Document).	Complete	Yes
b-02	Procure five (5) 20 kV field reclosers per Attachment 20. Procure one (1) bypass switch for each field recloser (Material Transfer Documents Submission Confirmation).	Complete	Yes
b-03	Conduct emergency repairs on the existing 13.8 kV line serving local distribution from the Kajaki HPP and utilize DABS staff to reduce costs and to conduct on-the-job training to the maximum extent possible. Submit a report of training upon completion of repairs along with recommendations for continued Da Afghanistan Breshna Sherkat (DABS) training focusing on medium voltage repairs (USAID Acceptance of Assessment & Training Report Submissions).	Complete	Yes
Deliverables for Component 5: Rebuild Kajaki Dam Substation and Local Distribution System (Section F.4.A)			
d-01	Provide 30% design submittal (30% Drawing Submittals).	Complete	Yes
d-02	Provide equipment per Section C.3.1.5 with notification of material delivery to COR (Material Inspection and Transfer Documentation).	Complete	Yes
d-03	Assessment of electrical faults at the Kajaki powerhouse and recommendation for resolution (Assessment Reports).	Complete	Yes
d-04	Emergency repairs and upgrades on 13.8 kV local distribution line at Kajaki Dam completed - Witness completion according to government-approved plan (Emergency Repairs Report).	Complete	Yes
d-05	Training Report of DABS staff on medium voltage repairs.	Complete	Yes
c-05	Subcontract/Purchase Order Matrix which Indicates Closeout Status.	Complete	Yes
g-06	USAID Final Disposition Instructions.	Complete	Yes; m-03
g-07	Complete and Submit Handover/Disposal documents to USAID.	Complete	Yes; d-02

Document # (if applicable)	Description (Note: The Section references below are the BVSPC-USAID Contract sections wherein specific deliverable requirements are located.)	Status	In Closeout Package?
m-01a	SUBSTANTIAL COMPLETION: 1) Certificate of Substantial Completion with Schedule of Defects (if applicable).	Not Applicable	N/A
m-01b	FINAL INSPECTION AND ACCEPTANCE 1) Final Punch List (if applicable). 2) Final Completion and Acceptance Certificate. 3) Draft Bilateral Agreement with Supporting Documentation.	Complete	Yes
m-01c	WARRANTY PERIOD & FINAL WARRANTY INSPECTION: 1) Warranty Certificate	Complete	Yes
m-02	Prime Contract original signed copy in files KC.	Complete	Yes
m-03	Copy of all Fully Executed Prime Contract Modifications and Change Orders in electronic folder.	Complete	Yes
m-04	USAID Closing Statement Letter and BV Response Letter.	Not Received from USAID	N/A
m-05	Copy of Closeout Documentation - List of Closeout Documents handed over to USAID.	Complete	Yes

1 KANDAHAR HELMAND POWER PROJECT (KHPP) OVERVIEW

1.1 KHPP Background

The purpose of the Kandahar Helmand Power Project (KHPP) contract, issued by the United States Agency for International Development (USAID) on 9 December 2010, was to increase the supply and reliability of electrical power in the areas in southern Afghanistan served by the South East Power System (SEPS), particularly the City of Kandahar. The contract was to support the SEPS reconstruction and thereby increase the quality of life of the people in Kandahar and Helmand Provinces. The KHPP was conceived as a critical component of the United States' government's Counterinsurgency (COIN) strategy in southern Afghanistan. KHPP is a part of a larger United States (US) government sponsored program involving multiple USAID Implementers, the US Army Corps of Engineers (USACE), and other Donors to improve the SEPS and connect it with other electrical grids in Afghanistan.

A reliable, sustainable electric power generation, transmission, and distribution system in Kandahar and Helmand Provinces is an important objective of the Government of the Islamic Republic of Afghanistan (GIROA). The system is expected to fuel economic growth not currently possible, especially in Kandahar City, the second largest city in Afghanistan and a center for education, health care, manufacturing, and transportation. Kandahar City has an electrical supply shortfall of at least 40 megawatt (MW) for its approximately 850,000 residents.

SEPS as a system is composed of multiple generation islands, an aged transmission system, and multiple distribution systems in southern Afghanistan serving 380,000 of the 1.7 million people residing in the region. Diesel generator sets and the Kajaki Hydroelectric Power Plant (HPP) provide the majority of the electrical power generation in the system. The 222 kilometers (km) SEPS transmission system operates at 110 kilovolts (kV), medium voltage distribution at 20 kV, and low voltage distribution at 400 volts (V). Kandahar City represents the largest power demand node within SEPS.

The Kajaki HPP was the first significant generation source installed in SEPS. Kajaki HPP, supported by the US government, went online in the mid-1970s. Prior to execution of the KHPP contract, its power was delivered to Kandahar City through one aged 25 megavolt amperage (MVA) transformer located at the Kandahar Breshna Kot (BK) Substation. In 2003, USAID began rehabilitation of the Kajaki HPP. At peak production, the Kajaki HPP currently provides 32 MW (during high water periods), with 12 MW of power serving Kandahar City and 20 MW of power transmitted to the remaining distribution nodes served by the SEPS transmission backbone.

To supplement generation for Kandahar City during the Kajaki HPP rehabilitation, USAID facilitated the installation of fourteen (14) KTA-50 diesel generators at the BK Substation in late 2003. Five (5) additional diesel generators owned by Da Afghanistan Breshna Moasessa (now known as Da Afghanistan Breshna Sherkat, or DABS) were installed at BK in 2008. This upgrade was done to increase the short term generation capacity, as the rehabilitation efforts at Kajaki HPP had been prolonged due to continued insurgent

activities and, the Kandahar City power supply was taking on increasing importance in the International Security Assistance Force's (ISAF's) COIN strategy in the area.

As of this report date, the BK Substation diesel generators have a combined generating capacity of 20.5 MW at peak production due to new units either provided by or installed by USAID. These units consist of the 10.5 MW MTU units, 5 MW of aged derated KTA-50 units, and 5 MW provided by aged derated QSK-60 units. The new 10.5 MW MTU units were installed and commissioned by the KHPP.

1.2 KHPP Summary of Scope of Work

The KHPP scope of work initially contained six (6) Components with ten (10) Subcomponents, outlined below, which, integrated with other work on SEPS, were designed with the purpose of increasing and improving the sustainability and reliability of electric supply provided by the SEPS:

Component 1. Improve Kandahar Power Distribution System

- Subcomponent 1: Replace the Kandahar Breshna Kot Substation.
- Subcomponent 2: Refurbish Kandahar City Medium Voltage (MV) Distribution System.
- Subcomponent 3: Construct a new Kandahar East Substation to (1) enhance the reliability of the system serving Kandahar, and (2) serve as a receiving point for an expected link between the SEPS and the North East Power System (NEPS), which is Afghanistan's major source of lower cost, imported power from the Central Asian Republics.
- Subcomponent 4: Construct a transmission line between the Kandahar Breshna Kot Substation and the new Kandahar East Substation.
- Subcomponent 5: Replacement of Aged Diesel Generators at the Breshna Kot Substation.

Component 2. Build Durai Junction Substation

- Subcomponent 1: Build a new Substation at Durai Junction.
- Subcomponent 2: Procure equipment for additional Substations.

Component 3. Program Support and Program Management

Component 4. Transportation, Installation, Operation and Maintenance of Kandahar (also known as Shorandam) Industrial Park Diesel Power Plant (also known as SIPD).

Component 5. Rebuild the Kajaki Dam Substation and Local Distribution System

Component 6. Installation and Commission Kajaki Unit 2

- Subcomponent 1: Perform inventory assessment of Government Furnished Equipment (GFE).

- Subcomponent 2: Repair GFE, and provide missing and additional new equipment for completing Kajaki Unit 2 installation.
- Subcomponent 3: Install and commission Kajaki Unit 2.

USAID issued the KHPP contract to Black & Veatch Special Projects Corporation (BVSPC) to provide engineering, procurement, construction, and all material, equipment and/or services necessary to successfully complete each of the Components and Subcomponents in accordance with the requirements of the contract.

BVSPC was tasked with developing appropriate engineering design and construction methodologies, being responsible for procurement, design, construction, quality control, testing, and commissioning. Additionally, BVSPC provided the support services needed to implement those activities (security, life support, ground and air movements, etc.). BVSPC was also responsible for issuing relevant warranties for the equipment and work provided under each Component and Subcomponent. Sustainability of the infrastructure being developed was one of the key deliverables of the KHPP. Drawing from previous Operation and Maintenance (O&M) training programs that BVSPC implemented on behalf of USAID through the Afghanistan Infrastructure Rehabilitation Program (AIRP), BVSPC was required to recommend and, in most instances, implement the training and skills development needed to sustain the efforts undertaken in this contract.

In addition, BVSPC was to provide spare parts' inventory necessary for DABS to perform the required operation and maintenance of installed equipment for each Component and its Subcomponent. These recommendations were, in select instances, to be submitted to USAID prior to initiation of the respective subcomponent, and were to be based on the BVSPC assessment of the capability and intent of the recipient to execute required O&M functions.

As KHPP was implemented, the security situation in the southern region of Afghanistan changed. While Regional Command Southwest and the US Marines achieved substantial success in clearing the Upper Sangin Valley in late 2011, enabling KHPP to execute the first contractor convoy to Kajaki in several years, the region was impacted by significant increases in anti-government activity in 2011 to 2012 as the GIRoA, with ISAF support, increasingly imposed GIRoA control over the region. As a result, companies and organizations willing to work in the region significantly increased their pricing to accommodate the higher risk and security costs by escalating their "risk premium" with their standard pricing. In addition, commodity costs and construction costs within Afghanistan increased more rapidly than expected during 2011. The unexpected cost increases impacted all implementing agencies from KHPP to USACE, and diminished the collective capability of all agencies involved to meet initial objectives.

Recognizing these budgets would not allow delivery of all Components and Subcomponents, USAID, in concert with Regional Command South, reviewed the KHPP program in mid-2011 to determine what adjustments could be made to retain core program objectives aligned with the COIN strategy while cutting projected costs. This review produced the realignment and de-scoping of select project activities. The net result was the de-scoping of Subcomponent 1.3, construction of a new Kandahar East Substation and 1.4, construction of a transmission line between the Kandahar BK Substation, and the new

Kandahar East Substation, with the intent to transfer these activities to USAID’s Power Transmission Expansion and Connectivity (PTEC) program, which was then under development. In addition, the scope of Subcomponent 1.2 was adjusted to eliminate planned additional connections to the Kandahar distribution system, thereby avoiding potential “negative COIN impact” until such time additional sustainable, non-diesel based generation to supply additional customers could be supplied (Kajaki Unit 2 and the NEPS to SEPS connection to provide lower cost imported hydropower).

The elimination of the substation at Kandahar East and the transmission line was accompanied by a realignment of Subcomponent 1.5, the placement of fourteen (14) MTU generators, representing 21MW of installed capacity, at the Kandahar East location. With the implementation of the diesel power “bridging solution” in Kandahar City by US Forces Afghanistan, which added two (2) 10 MW diesel plants in early 2011 operating in separate island modes located at (1) Bagh-e-Pohl and (2) Shorandam Industrial Park; and increasing concern about the sustainability of additional diesel generation within Kandahar City, the installation of the 14 MTU units was suspended until USAID could further assess options to maximize the impact of and use of the diesels. USAID worked with DABS and ISAF on appropriate alternate uses for the units while maintaining overarching program objectives and mitigating sustainability challenges. Implementation Letter 46, issued in August 2012 and agreed to bilaterally by USAID and DABS, allocated the units to various DABS load centers and set forth conditions for installation and sustainment. Refer to the Closeout Report for Subcomponent 1.5 for the ultimate disposition of all MTU diesel generators.

Following the adjustment of KHPP scope, all six (6) original Components remained in the contract, but with the original ten (10) Subcomponents reduced to eight (8).

1.3 KHPP Contract Evolution

Table 1 provides a history of the changes which have occurred in the Prime Contract between BVSPC and USAID as the needs and demands adjusted due to changing ground conditions in order to maximize benefits to the people of Afghanistan.

Table 1: History of Changes in USAID Contract No. 306-C-00-11-00506-00

Contract	Date	Description
Initial Contract Award	09 Dec 2010	This contract will support USAID, Afghanistan Mission’s Kandahar Power Initiative (KPI).
Contract Modification 01	1 Feb 2011	The purposes of this modification were to add the following in Section H: Special Provisions/Special Contract Requirements to the listed contract as follows: <ul style="list-style-type: none"> • Use of Synchronized Pre-deployment and Operational Tracker (SPOT) for Contractors Supporting a Diplomatic or Consular Mission Outside the United States (Supplement to FAR 52.225-19). • Serious Incident Reporting in Afghanistan. • Gender Integration Requirements.

Contract	Date	Description
Contract Modification 02	17 Mar 2011	The purposes of this modification were to: <ul style="list-style-type: none"> • Revise Section B.5: Indirect Cost based on BVSPC latest approved Negotiated Indirect Cost Rate Agreement (NICRA) for FY2010. • Revise Section H.22: Consent to Subcontracts to incorporate the approved Subcontracting Plan dated 28 February 2011. • Change the project name from “Kandahar Power Initiative (KPI)” to “Kandahar Helmand Power Project”(KHPP).”
Contract Modification 03	27 Jun 2011	The purposes of this modification were to: <ul style="list-style-type: none"> • Incorporate the following clause: <i>The Contractor shall comply with and adhere to all USAID Afghanistan Implementing Partner Notices. Copies of the notices are provided to implementing partners at the time of issuance. Copies are also available upon request from your Cognizant Contracting Officer.</i> • Remind the Contractor of the recently issued Implementing Partner Notice No. OAA-IP- 2011 – 004 which incorporates Mission Order No. 201.04 entitled, "National Security Screening (Non-US Party vetting).”
Contract Modification 04	17 Jul 2011	The purposes of this modification were to: <ul style="list-style-type: none"> • Incorporate no cost changes in Sections C and F. • Incorporate the FAR Clause 52.209-9 under PART II – CONTRACT CLAUSES. SECTION I – CONTRAT CLAUSES
Contract Modification 05	19 Jul 2011	The purpose of this modification was to provide funding in the amount of [REDACTED], thereby bringing the total obligated amount to [REDACTED].
Partial Suspension of Work	09 Aug 2011	Partial suspension of work affecting: <ul style="list-style-type: none"> • Subcomponent 1.3 • Subcomponent 1.4 • Subcomponent 1.5 • Component 4
Change Order – Scope of Work	08 Sep 2011	SOW changes affecting: <ul style="list-style-type: none"> • Subcomponent 1.3 • Subcomponent 1.4 • Subcomponent 1.5 • Component 4
Change Order – Amendment 01	20 Sep 2011	Changes affecting: <ul style="list-style-type: none"> • Component 1, Subcomponent 1.3
Change Order – Amendment 02	22 Sep 2011	Changes affecting: <ul style="list-style-type: none"> • Subcomponent 1.5 - Diesel Generators
Change Order – Amendment 03	01 Oct 2011	Changes affecting: <ul style="list-style-type: none"> • Subcomponent 1.5 – Diesel Generators • Extension of the Submission Deadline
Change Order – Amendment 04	13 Oct 2011	Changes affecting: <ul style="list-style-type: none"> • Subcomponent 1.5 – Diesel Generators
Change Order – Amendment 05	16 Oct 2011	Changes affecting: <ul style="list-style-type: none"> • Subcomponent 1.5 – Diesel Generators
Change Order – Amendment 06	22 Oct 2011	Changes affecting: <ul style="list-style-type: none"> • Subcomponent 1.5 – Diesel Generators

Contract	Date	Description
Contract Modification 06	12 Nov 2011	The purposes of this modification were to: <ul style="list-style-type: none"> • Provide incremental funding in the amount of [REDACTED], thereby increasing the total obligated amount from [REDACTED] to [REDACTED]. • Revise Section B.5: Indirect Cost based on BVSPC's approved provisional rates for FY2011. • Revise Sections C, F and J.
Change Order – Scope of Work	06 Feb 2012	SOW changes affecting: <ul style="list-style-type: none"> • Subcomponent 1.1 • Subcomponent 1.5
Contract Modification 07	26 Sep 2012	The purposes of this modification are to: <ul style="list-style-type: none"> • Provide incremental funding in the amount of [REDACTED], thereby increasing the total obligated amount from [REDACTED] to [REDACTED]. Modify PART I-THE SCHEDULE I. SECTION B-SUPPLIES OR SERVICES AND PRICE/COSTS, paragraph (c).
Contract Modification 08	29 Sep 2012	The purposes of this modification were to: <ul style="list-style-type: none"> • Provide incremental funding in the amount of [REDACTED], thereby increasing the total obligated amount from [REDACTED] to [REDACTED]. Modify PART I-THE SCHEDULE I. SECTION B-SUPPLIES OR SERVICES AND PRICE/COSTS, paragraph (c).
Contract Modification 09	30 Sep 2012	The purposes of this modification were to: <ul style="list-style-type: none"> • Correction to Modification 8 to provide incremental funding in the amount of [REDACTED], thereby decreasing the total obligated amount from [REDACTED] to [REDACTED]. • Provide incremental funding in the amount of [REDACTED], thereby increasing the total obligated amount from [REDACTED] to [REDACTED].
Partial Suspension of Work	28 Jan 2013	Partial suspension of work affecting: <ul style="list-style-type: none"> • Subcomponent 6.3
Contract Modification 10	14 Feb 2013	The purpose of this modification was to revise Sections B, C, F, H, I, J and contract attachments.
Contract Modification 11	29 Sep 2013	The purposes of this modification were to extend the period of performance from 30 September 2013 to 31 December 2013, revise budgets, and clarify deliverables in multiple sections.
Contract Modification 12	24 Dec 2013	The purpose of this modification was to add Subcomponent 6.4, Technical Assistance to USAID on Kajaki Unit 2 on budget implementation until 30 November 2015 and to extend all remaining Subcomponents to 28 February 2014.
Contract Modification 13	06 Aug 2014	The purpose of this modification was to finalize agreements on fee, Durai Junction cure cost absorbed by BVSPC, applicable NICRA, and clarify Tasks and Deliverables as needed.

See **Attachment m-03** for the documentation listed in the table above.

The key to effectiveness throughout the implementation of KHPP has been to maintain the flexibility to meet new opportunities to enhance program impact as the succession of operations in southern Afghanistan changed. In partnership with USAID, BVSPC maintained significant flexibility and made adjustments as needed and directed to deliver significant benefit to the people served by the SEPS.

1.4 KHPP Contract Coordination and Communication

At the inception of the KHPP, USAID coordinated the relationship with DABS-Kabul to maintain communication and reporting of KHPP activity and progress. BVSPC maintained communication and reporting of KHPP field activity with the DABS-Kandahar Director and his direct reports. BVSPC continued to coordinate and maintain liaison with Kandahar DABS, as well as Regional Command South (RC-S) and Regional Command Southwest (RC-SW) as requested by the COR and the USAID Onsite Managers (OSM). BVSPC worked directly with DABS in Kandahar and Helmand Provinces, throughout the implementation of the KHPP. The COP and the Transmission and Distribution Lead and Generation Lead (“Leads”) coordinated the communications with all stakeholders in Kandahar and Helmand addressing with each issues of concern as needed. The COP and COR communicated and coordinated all issues of implementation between themselves usually on a daily basis.

In order to establish USAID field presence for the project, and facilitate two-way reporting and communication, USAID designated one OSM for each of the two Regional Commands. The OSMs played a strong role in enhancing communications between all stakeholders in Kandahar and Helmand Provinces. The OSM reported to the COR, while maintaining coordination lines of communication with BVSPC Leads and Managers. The BVSPC Construction Managers and the O&M Managers, meanwhile, worked directly with their counterparts in Kandahar DABS, and also communicated mutual needs and concerns in coordination with Leads. The working relationships between BVSPC staff and the Kandahar DABS Director, senior managers, and DABS staff, in coordination with the COR and OSM, were consistently positive and productive.

2 COMPONENT 5: REBUILD THE KAJAKI DAM SUBSTATION AND LOCAL DISTRIBUTION SYSTEM

2.1 Objectives

The original overall objective of Component 5 was to provide more a reliable power supply to SEPS from Kajaki Hydro Power Plant and better protect the plant from external electrical faults. USAID directed BVSPC to facilitate regular long term maintenance programs by improving worker safety and minimizing maintenance related system outages. Prior to the issuance of the KHPP contract, there was a major fault issue with the Unit 1 turbine at the Kajaki HPP. The cause of the issue was believed to be an electrical fault that occurred external to the powerhouse. BVSPC was requested to evaluate the issues, assess alternatives, including temporary solutions, recommend an appropriate solution for Contracting Officer’s Representative (COR) approval and, upon receipt of that approval, proceed with USAID instructions.

2.2 History

The Kajaki Dam Substation and Local Distribution System work was conceived as a critical component of improving reliability of both the 110 kV transmission system and to the local 13.8 kV and 20 kV distribution systems. The new 110 kV Substation would provide system protection to quickly isolate faults before the Kajaki Hydro Power Plant was impacted and to provide reliable sectionalizing capability when a fault occurs or maintenance is required.

The Substation was to be designed and constructed to enable the capacity for the second power block at Kajaki, thus providing an additional 150 MW of generation. The Substation was also to be designed and constructed to prepare for additional 110 kV transmission lines, specifically a line to Musa Qa'la, Tirin Kot, or Kandahar. In addition the Substation design and construction were to be designed to remove the 13.8 kV loads from the existing generator bus and add the loads to a new 20 kV power transformer located within the substation. This relocation would also limit the faults experienced by the existing generators.

The existing 13.8 kV distribution lines, along with the transfer of the load, were to be re-designed for 20 kV. Material was to be procured by BVSPC, and the lines would then be constructed by DABS. With the voltage conversion, the Tangi Substation was to be rebuilt, adding capacity, switching capabilities, and system protection capability. In addition to this distribution work, additional replacement and expansion of the 20 kV distribution systems towards Musa Qa'la was to be provided, including a 20 kV express feeder and rebuilding the 20 kV existing facilities.

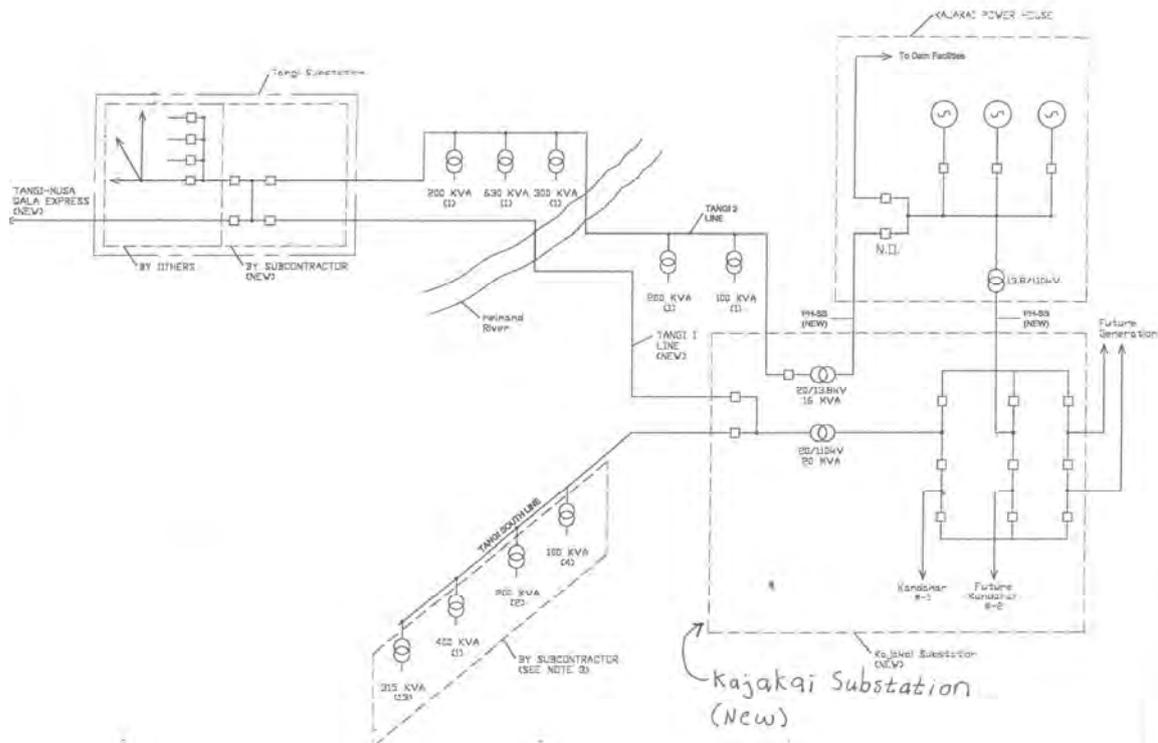
In summary, the original scope of work for this project consisted of four discrete tasks:

1. Rebuild Kajaki Dam Substation using a breaker-and-a-half configuration per Figure 1, Attachment 9 - Diagram D-6 Kajakai Substation Single Line included within the Prime Contract between USAID and BVSPC.
2. Replace the Tangi Substation with a 20 kV radial H-configuration Substation.
3. Provide materials for a new dedicated 20 kV distribution line from Tangi Substation to the new Kajaki Substation for installation by DABS.
4. Provide materials for a new 42 kilometer (km) 20 kV express distribution line from the new Tangi Substation to the existing Musa Qa'la Substation.

The original scope of work also included a study of the existing distribution system to identify a mechanism to better protect the power plant from external electrical faults. This study will be considered Task 5 for this section .

The first task initiated by the project team was to perform an onsite assessment of the distribution system and its interconnection, both physically and electrically, to the Kajaki Hydro Power Plant. BVSPC finalized its onsite assessment identifying work to improve the reliability of the Kajaki distribution system. USAID then requested BVSPC to identify the risks associated with the deteriorated circuit breaker connected to the Kajaki 13.8 kV bus and the options to improve this system.

Figure 1: Attachment 9 – Diagram D-6 Kajakai Substation Single Line



Simultaneously to the onsite assessment, BVSPC provided the proposed locations for the new Tangi and Kajaki Substations to USAID. BVSPC also provided USAID with a recommendation on the voltage level for the Tangi Express Line. BVSPC, working with USAID and the onsite assessment Power Plant and Substation teams, provided three preferred locations for the new Kajaki substation. BVSPC issued USAID the Kajaki Fault Mitigation Proposal with five options and a recommendation for reducing the distribution system electrical faults impacting the Kajaki Hydro Power Plant.

The USACE examined the distribution system and recommended an alternative to reduce the faults to USAID simultaneously as the BVSPC work. At the request of USAID, BVSPC provided a review of this approach. USAID notified BVSPC on 25 May 2011 of USACE's intent to install one 25 kV underground switchgear on the distribution system at Kajaki adjacent to the power plant. USAID also requested BVSPC to provide life support, materials, and technical support for this USACE work at Kajaki.

BVSPC engineering staff continued the conceptual design necessary to issue a tender for the engineering, procurement, and construction (EPC) of the new Tangi and Kajaki substations simultaneous to the distribution study work. This subcontract was developed as KJKI.73.1001. Following receipt of the results of the tenders for the Durai Junction and Kandahar Breshna Kot Substations, it was discovered that sufficient design and construction firms did not seek work in the southern Afghanistan marketplace. This

determination was based on the fact that only two qualified bidders submitted tenders for the Durai Junction and the Breshna Kot (EPC) tenders.

BVSPC and USAID jointly determined the Tangi Substation and Kajaki Substation design work and procurement work will be performed by BVSPC to minimize the risk of the project should one of the other Substation Subcontractors fail to perform. Construction work would then be tendered. Detailed design began on the civil, structural, electrical, and control and protection systems for the Substation. In addition, procurement subcontract scopes of works were developed as follows with this design:

1. KJKI.71.0201 - Site Works
2. KJKI.63.6001 - Kajaki and Tangi Structures and Equipment
3. KJKI.64.0213 - Control Enclosure and Control System Panels and Equipment

BVSPC developed a scope of work to tender the design and procurement of materials for the 20 kV distribution system feeder work to be constructed by DABS simultaneously as the Tangi and Kajaki Substation work. This scope of work was prepared under Subcontract No. KJKI.73.0603. The scope of this work was based on use of the Ministry of Energy & Water (MEW)/DABS design and material standards. Further investigation into the marketplace revealed a lack of qualified service providers due to the timeframe required and the volume of the materials to be procured. BVSPC then began identifying the material requirements and developing procurement-only subcontracts, No. KJKI.63.7500 - Tangi - Musa Qala 20 kV Distribution Equipment and No. KJKI.63.7502 - Kajaki - Tangi 20 kV Distribution Equipment.

Kajaki Dam Camp security and maintenance costs and resources were provided initially under Component 5. The site security transferred from the USAID AIRP program to KHPP on 11 June 2011.

USAID notified BVSPC to begin tendering a Subcontractor's camp at Kajaki. USAID also questioned the size of the guard force at Kajaki and, issued requests for information to understand scope and schedule changes should USACE decide to build a 110 kV transmission line from Kajaki to Musa Qa'la. Detailed responses and drawings were provided. USAID also requested USACE to align its technical specifications with the KHPP requirements. BVSPC performed multiple reviews of USACE technical specifications in support of USAID's efforts to align all southern Afghanistan SEPS work.

USAID notified BVSPC that the installation of the PSC by USACE isolated some of the faults on the distribution system; however, USAID requested BVSPD to identify additional fault isolation options.

With the completion of the Kajaki site civil design and the issuance of the Site Works tender, USAID requested other options for locating the Substation. BVSPC presented several alternatives, including comments to USAID's request to consider building the Substation on an aerial platform.

BVSPC issued 10%, 30%, and 60% design submittals to USAID, and provided responses to comments and inquiries from both USACE and USAID's quality assurance (QA) representatives.

On 17 November 2011, USAID issued Modification 6, rescoping this Component as follows:

1. Added an objective to provide facilities which enable regular long term maintenance programs.
2. Changed the configuration of the Substation from a breaker-and-a-half configuration to a ring bus, and eliminated the need for future expansion design of the Substation.
3. Requested to reconsider the new Substation site.
4. Reduced the transmission line capacity of the Substation.
5. Changed the distribution system configuration at the Substation.
6. Replaced the new Tangi Substation with procurement of field reclosers for DABS to install.
7. Changed the distribution scope to include providing materials for a dedicated 20 kV line from Kajaki Substation across the Helmand River to the existing Tangi Feeder, with construction by DABS.
8. Removed the scope of the distribution work between Tangi and Musa Qa'la, indicating USACE would provide these materials.
9. Added a specific list of 20 kV materials (**Attachment 20**) for use by DABS to rebuild the distribution system in the Kajaki and Tangi areas.
10. Added lineman training.
11. Added specific convoy and air transport scheduling information.

On 22 December 2011, all work on Component 5 was suspended by USAID, except the procurement of reclosers and bypass switches. One scope of work item was added, which was to complete a 30 percent design package, including a site estimate and cost estimate for the Modification 6 Substation located at the west edge of the existing Kajaki Dam Camp.

USAID issued a clarification to its 22 December 2011 letter stating that long lead-time procurement activities should continue, as well as the security of the GFE and the operation and maintenance (O&M) of the camp on 29 December 2011. BVSPC was also requested to obtain costs for cancelling manufacturing of equipment under production.

On 26 April 2012, USAID extended the suspension of the Component 5 work through 21 June 2012 to allow time to review the available options for project completion. On 31 May 2012, USAID partially revoked the suspension and directed work to continue on the 13.8 kV system within the Kajaki Dam Camp, as well as install one recloser within the camp and incorporate training into the repair work, utilizing DABS labor to the extent possible in order to reduce labor cost and maximize capacity building.

USAID issued technical and scope clarifications for Component 5 on 20 July 2012. This clarification removed the requirement that KHPP install the reclosers, and clarified that the distribution system improvement work should focus only on eliminating the most unsafe conditions using material from USACE to the extent possible. The clarification also emphasized the need to complete the lineman training and to utilize DABS staff to complete the repairs. The extension of all other Component 5 work was extended through 01 October 2012. This suspension extension was issued to allow time to review available options for project completion. The recloser and bypass switches were procured, manufactured, and shipped by air freight to Afghanistan. On 21 October 2012, USAID notified B&V that all unfinished work for this Component is descoped, with the exception of

the urgent repairs on the 13.8 kV system. The descoping came about due to USACE adopting the Kajaki and Tangi Substation work as part of their SEPS Helmand program. This notification also transferred the costs for BVSPC providing USAID technical reviews of USACE technical submittals to Subcomponent 1.1.

BVSPC completed its assessment of the 13.8 kV distribution system within the camp and provided a prioritized list of work to USAID. The urgent upgrades were completed in the fourth quarter of 2012. The work was completed by DABS staff using materials provided by USACE, DABS, and KHPP Subcomponent 1.2.

The original location for the recloser was within the District Governor’s compound adjacent to the Helmand River crossing of the 13.8 kV Tangi Feeder. This site required demining, as the location was outside the work zone of KHPP. This location would have allowed the District Governor’s compound, Forward Operating Base, and local water supply pump to remain in service when the Tangi feeder tripped; however, the site proved to be very congested for construction with minimal aerial lift equipment during construction. A site for the recloser installation was then chosen adjacent to the Kajaki warehouse which had been rehabilitated by KHPP.

The recloser and its bypass switch were installed with materials provided by KHPP Subcomponent 1.2 and using DABS local staff . The recloser has provided an additional sectionalizing point to prevent power outages in Tangi and Musa Qa’la from impacting the camp and Kajaki local loads.

These improvements have (1) provided an additional sectionalizing location for DABS troubleshooting, (2) improved the reliability of the power system within the Kajaki Dam Camp, and (3) decreased fuel usage and therefore the expense of diesel fuel for camp operations.

2.3 Component 5 – Modifications and Change Order History

Changes/modifications to the Prime Contract impacting Component 5 are listed in Table 2:

Table 2: Component 5 – USAID Contract Modification History

Source & Date	Task	Change & Date
Original Contract 09 Dec 2010	Task i: The Contractor shall rebuild Kajaki Dam Substation installing a breaker-and-a-half configuration. Design shall utilize indoor gas-insulated metal enclosed switchgear (GIS). The Substation shall also contain protection, control, metering, and communication systems necessary to operate the Substation and protect the transmission line to Durai Junction. The Contractor shall construct the new Substation to the east and adjacent to the existing station. Rock removal is expected to be required for the development of the new site. The Contractor shall demolish the existing Substation and locate the new 110/20 kV transformer in its place.	Task i Deleted and Replaced 12 Nov 2011

Source & Date	Task	Change & Date
Contract Modification 06 12 Nov 2011	Task i: Delete and replace with the following: The Contractor shall assess the existing Kajaki Dam Substation for feasibility of installing a ring bus configuration. Design shall utilize outdoor air insulated substation (AIS) technology. The Substation shall also contain protection, control, metering, and communication necessary to operate the Substation and for protecting the transmission line to Durai Junction. The Contractor shall submit existing Substation assessment for review, along with recommendation for siting of new Substation, if required, no later than 30 November 2011. The assessment shall include a schedule and cost estimate for the recommended substation option.	SOW Deletion 18 Jan 2012
Full NTP – Subcomponents 6.2 and 6.3 18 Jan 2012	Task i: Descope of Component 5. This scope has been taken over by USACE.	SOW Change 29 Feb 2012
Request for a Proposal – Contract Modification no.7 29 Feb 2012	Task i: Contractor shall complete and submit a 30% design package per Modification 6 of this contact no later than 11 February 2012. No additional work shall be completed until either (a) closeout of the Component, or (b) USAID requests design to continue. However, procurement, delivery, and storage of major equipment shall continue. Major equipment includes two (2) 20 kV switchgear units and field reclosers per Attachment 20.	SOW Change 14 Feb 2013
Contract Modification 10 14 Feb 2013	Task i: Contractor must complete and submit a 30% design package for Kajaki Substation per Modification 6.	
Original Contract 09 Dec 2010	Task ii: Utilizing the breaker-and-a-half configuration, allow the new Substation to remove circuit breakers from service for maintenance while still maintaining full power transfer functionality. Electrical loads and power generation shall be protected by their own circuit breakers and protective relays. Attachment 8 – Diagram D-6 Kajaki Substation Single Line, provides additional information.	Task ii: Deleted and Replaced 12 Nov 2011

Source & Date	Task	Change & Date
<p>Contract Modification 06 12 Nov 2011</p>	<p>Task ii: Delete and replace with the following: If not technically feasible to rebuild the existing Substation with the above features, the Contractor shall construct a new Substation on a site coordinated with DABS and approved by the Contracting Officer's Technical Representative (COTR). If a new Substation is constructed and, if technically feasible, the Contractor shall reuse the existing Substation box structure as a transmission structure for the 110 kV transmission line. The new Substation shall have the following features:</p> <ul style="list-style-type: none"> a) For 110 kV line positions as follows: (1) single 110 kV line position from Kajaki Powerhouse, (2) a single line position to serve the 110 kV line to Durai Junction (3) 110/20 kV transformer and its switchgear, and (4) a single 110 kV line position to serve the new Musa Qa'la Substation with the 110 kV line and the Musa Qa'la Substation to be provided by others b) New 110/20 kV transformer and 20 kV switchgear with four distribution feeders. The switchgear feeders shall be as follows: <ul style="list-style-type: none"> a. Kajaki Powerhouse. b. Kajaki Village. c. Tangi Village, consisting of protected spurs to Lerkand and Konjak. d. Musa Qa'la, consisting of protected spurs to Baghni and Aazan. The Contractor shall move all local loads currently fed from the Kajaki Hydro Powerplant generator bus (station service system) to the Substation. Using one of the new distribution feeders and DABS crews to the maximum extent possible, convert remaining 13.8 kV systems to 20 kV. Approximately 5 20 kV/400 V transformers will be required for this conversion. c) Using the ring bus configuration, the new Substation shall be capable of having circuit breakers removed from service for maintenance while still maintaining their full power transfer functionality. Electrical loads and power generation shall be protected by their own circuit breakers and protective relays. Revised Attachment 9 – Diagram D-7 Kajaki Substation Single line Diagram, included in this modification, provides additional information. 	<p>SOW Deletion 18 Jan 2012</p>
<p>Full NTP – Component 6.2 and 6.3 18 Jan 2012</p>	<p>Task ii: Descope of Component 5. This scope has been taken over by USACE.</p>	<p>SOW Change 29 Feb 2012</p>
<p>Request for a Proposal – Contract Modification 07 29 Feb 2012</p>	<p>Task ii: The Contractor will, upon direction by USAID, review USAID's technical provisions for the Substation equipment and SEPS. B&V shall advise USAID on these provisions and provide engineering analysis on protection requirements in the SEPS system.</p>	<p>SOW Change 14 Feb 2013</p>
<p>Contract Modification 10 14 Feb 2013</p>	<p>Task ii: Procure and provide secure storage for five (5) 20 kV reclosers per Attachment 20. Procure one (1) bypass switch for each field recloser.</p>	

Source & Date	Task	Change & Date
Original Contract 09 Dec 2010	<p>Task iii: The Substation shall have the following features:</p> <ul style="list-style-type: none"> a) Space for future connection of a second powerhouse and the addition of another transmission line. b) An air insulated 20 kV box structure Substation next to the 110 kV GIS Building with a 110 kV/20 kV 20 MVA step-down transformer. c) Installation of Government Furnished Equipment (GFE) 13.8 kV/20 kV 16 MVA transformer installed next to the 110 kV/20 kV transformer. The transformer shall serve as a backup source to energize the Tangi distribution line. The Contractor shall procure and install an additional 20 kV Substation equipment to get the transformer in an operational condition. d) Local loads currently fed from the generator bus (station service system) shall be moved to the Substation. e) The GIS, heating, ventilation and air conditioning (HVAC) systems, Supervisory Control and Data Acquisition (SCADA) systems, ac/dc station service systems, etc., shall be sized for the ultimate configuration, i.e., a three-unit Kajaki generating station. The Contractor shall ensure the systems are all configured such that future additions to the power plant may be installed with minimal outages to the impacted systems. 	Task iii: Deleted and Replaced 12 Nov 2011
Contract Modification 06 12 Nov 2011	<p>Task iii: Delete and replace with the following: The Contractor shall replace the Tangi Substation with the field reclosers to provide isolation and sectionalizing. The protection devices shall be capable of identifying and isolating faulted sections of lines, and shall be provided to DABS for installation. Reclosers are planned for the spurs to Lerkand, Konjak, Baghnim, Aazan, and near Musa Qa'la. The Contractor shall coordinate the final location for these five reclosers with DABS. The switchgear presently planned for Tangi shall be utilized at the Durai Junction Substation or other location approved by the COTR.</p>	SOW Deletion 18 Jan 2012
Full NTP – Subcomponents 6.2 and 6.3 18 Jan 2012	<p>Task iii: Descope of Component 5. This scope has been taken over by USACE.</p>	SOW Change 14 Feb 2013
Contract Modification 10 14 Feb 2013	<p>Task iii: The Contractor must conduct emergency repairs on the existing 13.8 kV line serving the local distribution from the Kajaki HPP. The extent of repairs must be on the approximate 1 km segment from the Kajaki HPP to the Contactor's laydown yard. Repairs should focus on terminations and service connections, standardizing connections, and eliminating unsafe conditions. Materials for repairs should be drawn from USACE inventory in Kandahar to the maximum extent possible. In coordination with DABS Helmand and DABS Kandahar, the Contractor must use DABS staff to reduce costs and conduct on-the-job training to the maximum extent possible. Submit a report of training upon completion of repairs, along with recommendations for continued DABS training focusing on medium voltage repairs.</p>	
Original Contract 09 Dec 2010	<p>Task iv: Replace the Tangi Substation with a four-position, 20 kV, air insulated radial H-configuration Substation. The new station shall have ac and dc station service system and control and relaying panels in the existing Control Building. Coordinate with DABS regarding timing of DABS furnishing and installation of a new 20 kV switchgear lineup to ensure streamlined implementation. A SCADA system is not required at the Tangi Substation.</p>	Task iv: Deleted and Replaced 12 Nov 2011

Source & Date	Task	Change & Date
Contract Modification 06 12 Nov 2011	Task iv: Delete and replace with the following: The Contractor shall provide materials for a new dedicated 20 kV line (Tangi 1) from the Kajaki Substation across the Helmand River for interconnection to the existing Tangi feeder. The Contractor shall assist DABS as required with the river crossing. The connection to the existing Tangi feeder will be completed by DABS with materials provided by the Contractor.	SOW Deletion 18 Jan 2012
Full NTP – Subcomponent 6.2 and 6.3 18 Jan 2012	Task vi: Descope of Component 5. This scope has been taken over by USACE.	SOW Change 14 Feb 2013
Contract Modification 10 14 Feb 2013	Task vi: Scope of work deleted.	
Original Contract 09 Dec 2010	Task v: Provide materials for a new dedicated 20 kV line (Tangi 1) from the Kajaki Substation to the Tangi Substation for installation by DABS.	Task v: Deleted and Replaced 12 Nov 2011
Contract Modification 06 12 Nov 2011	Task v: Delete and replace with the following: Rather than provide materials for a 42 km express feeder to Musa Qa'la, the Contractor shall provide materials, tools, and construction equipment for maintenance and improvements of the 20 kV system in the Kajaki and Tangi areas for implementation by DABS. The materials will focus on cross arms, insulators, conductor and hardware in accordance with recent condition assessments by DABS Helmand. Materials, tools, and equipment to be procured shall be per Attachment 20, included with this modification, and will be provided for installation by DABS. Maintenance materials for the express feeder to Musa Qal'ah will be provided by the US Army Corps of Engineers.	SOW Deletion 18 Jan 2012
Full NTP – Subcomponents 6.2 and 6.3 18 Jan 2012	Task v: Descope of Component 5. This scope has been taken over by USACE.	SOW Change 14 Feb 2013
Contract Modification 10 14 Feb 2013	Task v: Scope of work deleted.	
Original Contract 09 Dec 2010	Task vi: Provide materials for the 42 km 20 kV express line from the Tangi Substation to the Musa Qala Substation for installation by DABS.	Task vi: Deleted and Replaced 12 Nov 2011
Contract Modification 06 12 Nov 2011	Task vi: Delete and replace with the following: The Contractor shall conduct apprentice level training of DABS personnel in fundamentals of transmission and distribution work methods. Training shall include, but not be limited to: <ul style="list-style-type: none"> • Erecting distribution structures. • Installing and replacing sagging conductors. • Selecting and installing hardware. • Safety. <p>The Contractor shall submit a training plan to include schedule and estimated costs for review and approval by the COTR.</p>	SOW Deletion 18 Jan 2012
Full NTP – Subcomponents 6.2 and 6.3 18 Jan 2012	Task vi: Descope of Component 5. This scope has been taken over by USACE.	SOW Change 14 Feb 2013

Source & Date	Task	Change & Date
Contract Modification 10 14 Feb 2013	Task vi: Scope of work deleted.	
Original Contract 09 Dec 2010	<p>Task vii. The Contractor shall submit a construction schedule to contain the following information at a minimum:</p> <ol style="list-style-type: none"> I. Earliest start time for construction. II. Improvements and earliest implementation time that helicopter supported activities can be made to better protect the powerhouse from external electrical faults. III. Earliest time that wheeled vehicles will need access to Kajakai Dam. IV. Number and frequency of convoys needed, number and type of vehicle in each convoy, and time intervals between convoys. Do not include calendar dates for this item. V. Quantity of materials and list of equipment needed to be taken to Kajakai Dam by wheeled vehicle. VI. Work that can be supported by air movements only. <p>The Contractor shall coordinate the final construction schedule with USAID, ISAF, and DABS. Notice to Proceed for construction shall not be issued until final construction schedule is determined.</p>	Task vi: Deleted and Replaced 12 Nov 2011
Contract Modification 06 12 Nov 2011	<p>Task vii. The Contractor shall submit a construction schedule to contain the following information at a minimum:</p> <ol style="list-style-type: none"> I. Earliest start time for construction. II. Improvements and earliest implementation time that helicopter supported activities can be made to better protect the powerhouse from external electrical faults. III. Earliest time that wheeled vehicles will need access to Kajakai Dam. IV. Number and frequency of convoys needed, number and type of vehicle in each convoy, and time intervals between convoys. Ddo not include calendar dates for this item. V. Quantity of materials and list of equipment needed to be taken to Kajakai Dam by wheeled vehicle. VI. Work that can be supported by air movements only. <p>The Contractor shall coordinate the final construction schedule with USAID, ISAF, and DABS. Notice to Proceed for construction shall not be issued until final construction schedule is approved by the COTR.</p>	SOW Deletion 18 Jan 2012
Full NTP – Subcomponents 6.2 and 6.3 18 Jan 2012	Task vii: Descope of Component 5. This scope has been taken over by USACE.	SOW Change 14 Feb 2013
Contract Modification 10 14 Feb 2013	Task vii: Scope of work deleted.	
Source & Date	Deliverable	Change & Date
Original Contract 09-Dec-2010	Deliverable 1: Construction of Kajaki Substation and local distribution system completed and commissioned. - 30 months following NTP	Deleted and Replaced 14 Feb 2013
Contract Modification 10 14 Feb 2013	Deliverable 1: Provide 30% design Submittal - 01 February 2012	

Source & Date	Task	Change & Date
Original Contract 09-Dec-2010	Deliverable 2: Construction Schedule submitted - 60 days following NTP	Deleted and Replaced 14 Feb 2013
Contract Modification 10 14 Feb 2013	Deliverable 2: Provide equipment per section C.3.1.5 - 16 months following NTP	
Original Contract 09-Dec-2010	Deliverable 3: Helicopter supported Improvements to better protect the powerhouse from external electrical faults - 30 days following NTP	Deleted and Replaced 14 Feb 2013
Contract Modification 10 14 Feb 2013	Deliverable 3: Assessment of electrical faults at the Kajaki powerhouse and recommendations for resolution - 01 March 2011	
Contract Modification 10 14 Feb 2013	Deliverable 4: Emergency repairs and upgrades on 13.8 kV local distribution line at Kajaki Dam completed - 01 April 2013	Deleted and Replaced 29 Sep 2013
Contract Modification 11 29 Sep 2013	Deliverable 4: Emergency repairs and upgrades on 1 kV local distribution line at Kajaki Dam completed - 15 October 2013	
Contract Modification 10 14 Feb 2013	Deliverable 5: Training report of DABS staff on medium voltage repairs - 01 January 2013	

2.4 Deliverables

A listing of major milestones scheduled and achieved for the work required by Component 5 following all Prime Contract modifications is provided in Table 3:

Table 3: Component 5 – Contract Deliverables Scheduled and Achieved Dates

Deliverable	Original Schedule	Achieved Date
Deliverable 1: Provide 30% design submittal	01 February 2012	02 February 2012
Deliverable 2: Provide equipment per section C.3.1.5 with notification of material delivery to COR.	16 months after Notice to Proceed (18 Jan 2012) 18 July 2013	23 September 2013
Deliverable 3: Assessment & Recommendations Report of electrical faults at the Kajaki powerhouse.	01 March 2011	07 October 2012
Deliverable 4: Emergency repairs and upgrades on 13.8 kV local distribution line at Kajaki Dam completed.	15 October 2013	18 October 2013
Deliverable 5: Training Report of DABS staff on medium voltage repairs.	01 January 2013	16 October 2013

Milestones taken from Schedule of Deliverables of Contract Modification 11 (Attachment m-03).

The current status of the deliverables are listed below:

Table 4: Component 5 – Contract Deliverables Status

ITEM NO.	DELIVERABLE	METHOD OF VERIFICATION	STATUS	ATTACHMENT
1	Provide 30% design submittal	Report & Design Submittals	Complete	d-01
2	Deliverable 2: Provide equipment per section C.3.1.5.	Notification of material delivery to COR	Complete	d-02
3	Deliverable 3: Assessment & Recommendations Report of electrical faults at the Kajaki powerhouse.	Government review of assessment report	Complete	d-03
4	Deliverable 4: Emergency repairs and upgrades on 13.8 kV local distribution line at Kajaki Dam completed.	Witness of completion according to government-approved plan	Complete	d-04
5	Deliverable 5: Training Report of DABS staff on medium voltage repairs.	Document Review	Complete	d-05

Deliverables as of Contract No. 306-C-00-11-00506-00 Modification 11.

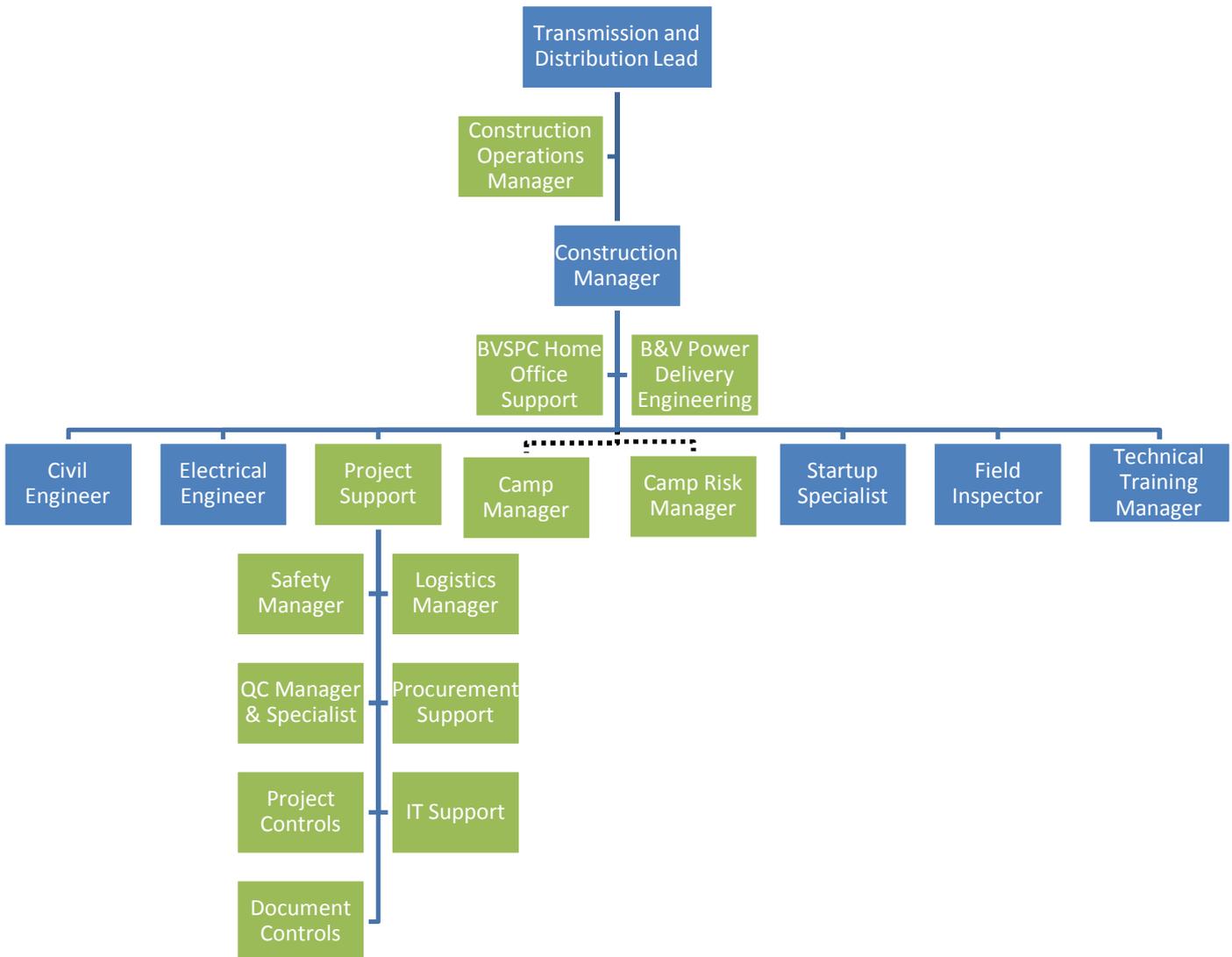
Electronic copies of these documents are included in CDs/DVDs submitted with this report.

3 PROJECT EXECUTION

3.1 Organizational Structure and Management Details

An organizational chart of KHPP Component 5 staff as of May 2013 is provided in Figure 3. Component 3 include the entire Chain of Command and project support organizations (noted in green below). The organization chart shows positions utilized for the original scope of work.

Figure 2: Component 5 – Final Organizational Chart



3.1.1 SECTOR LEAD – TRANSMISSION & DISTRIBUTION

The Sector Lead was based at the KHPP field office located in Kandahar, Afghanistan, with periodic visits to all KHPP transmission and distribution sites as needed. The Sector Lead assumed the overall authority for the Substation design and construction and the distribution line construction project Component implementation, and was responsible for all related contract management, client coordination, correspondence, invoicing, mobilization of personnel, and other project management activities in coordination with the Site Management and KHPP Program Management. The primary individual responsible for this position was Lynn Liikala-Seymore.

3.1.2 CONSTRUCTION OPERATIONS MANAGER

The Construction Operations Manager was responsible for coordination of the Substation safety, construction, testing, and commissioning on the project. This coordination includes compliance with the schedule, safety, cost, and quality decisions in conjunction with the Construction Manager and Sector Lead.

3.1.3 CAMP MANAGER

The Camp Manager reported to the KHPP Life Support and Air Operations Manager and was based at the KHPP Field Office located in Kajaki, Afghanistan. The Camp Manager was responsible for all life support functions at the project site.

3.1.4 IN-COUNTRY PROGRAM MANAGEMENT RESOURCES

In-country Program Management resources include Finance, Procurement, Logistics, Security, Health & Safety, Environmental, Reporting, Quality Control, Project Controls, Document Controls and Human Resources. The Program Management team is located in Kandahar, Afghanistan, with periodic visits to KHPP sites on an as-needed basis. The primary responsibilities of the Program Management are to provide functional support to all components in accordance with approved plans, policies and procedures.

3.1.5 HOME OFFICE PROGRAM MANAGEMENT RESOURCES

Home Office Engineering resources include civil, structural, electrical, and control and protection engineers, as well as drafters and technicians. The primary responsibilities of the Home Office Engineering Resources are to provide design and engineering for the electric distribution system analysis, the new Substation, the new transmission line for connecting to the existing line, and to specify the distribution materials needed for DABS to perform the system expansion and improvement work. This work also included writing the technical requirements to procure materials and construction services necessary to build the Substation and to procure materials for the distribution system expansion and improvements. This work is provided in accordance with approved plans, policies, and procedures.

3.1.6 HOME OFFICE ENGINEERING RESOURCES

Home Office resources were available to perform project support throughout the duration of the project. In addition, accounting functions and financial reviews for the Project were performed at the Black & Veatch Special Projects Corporation, Federal Services Division Headquarters in Overland Park, Kansas, USA. The Substation design work was also completed by the Home Office group. The primary individuals responsible for this position included Chris Martens, Samir Awad, Richard Ngotho, and Laurie Reese.

3.1.7 CONSTRUCTION MANAGER

The Construction Manager reported directly to the T&D Sector Lead and was to be based at the Kajaki Dam Camp. The Construction Manager was responsible for the execution of the Substation design and construction and the distribution line construction project scope of work within schedule. Additional responsibilities

included implementation of DABS training for and oversight and assistance in the operation and maintenance of the facility during construction. Further Construction Manager responsibilities included budget and cost control, ensuring daily activities were documented and reported in accordance with the Project Implementation Plan, and the coordination of the work effort with KHPP Program Management resources, Sector Lead, USAID COR, and DABS officials located in Kandahar and Kabul. When the Substation work was descoped, the Construction Manager was transferred to the Kandahar BK Substation Construction Manager position. The Subcomponent 1.2 Construction Manager then took on responsibility for the distribution system improvement work. The primary individual responsible for this position included Phillip Baker (Substation) and Kevin Armstrong (Distribution System Improvements).

3.1.8 FIELD ENGINEER CIVIL

The Field Engineer Civil reported directly to the Construction Manager and was to be based at the Kajaki Dam Camp. The Field Engineer was to be responsible for the execution of the civil works of the Substation design and construction and the distribution line construction project. Additional responsibilities included implementation of DABS training for and oversight and assistance in the operation and maintenance of the facility, civil design review to completion, ensuring daily activities were reported and in accordance with the schedule and the Project Execution Plan, and the coordination of the work effort with KHPP Program Management resources.

3.1.9 FIELD ENGINEER ELECTRICAL

The Field Engineer Electrical reported directly to the Construction Manager and was to be based at the Kajaki Dam Camp. The Field Engineer was to be responsible for the execution of the electrical works of the Substation design and construction and the distribution line construction project. Additional responsibilities included implementation of DABS training for and oversight and assistance in the operation and maintenance of the facility, electrical design review to completion, ensuring daily activities were reported and in accordance with the schedule and the Project Implementation Plan, and the coordination of the work effort with KHPP Program Management resources. The primary individual responsible for this position included Laurie Reese.

3.1.10 SAFETY MANAGER

The Safety Manager reported directly to the Construction Operations Manager and was based at the KHPP Regional Camp at Amtex in Kandahar, Afghanistan. The Safety Manager was to be responsible for the safe execution of the Substation construction and the distribution line construction project scope of work making periodic inspection visits to the Kajaki Dam Camp and works sites. Additional responsibilities included assistance with Job Hazard Analysis (JHA) as required. Training of DABS staff in Safety and Health as part of oversight and assistance in the operation and maintenance of the facility, Safety and Health Inspections of the Work Site, and ensuring daily activities were in accordance with the KHPP Safety Plan and the coordinating work effort with KHPP Program Management resources

also comprised Safety Manager responsibilities. Onsite Safety Management was by design to be undertaken daily by local Afghan Staff trained and overseen by the Safety Manager. The primary individual responsible for this position included Tom Franzoni.

3.1.11 QUALITY CONTROL (QC) MANAGER

The Quality Control (QC) Manager reported directly to the Construction Operations Manager and was based at the Kajaki Dam Camp. The QC Manager was to be responsible for the execution of the Substation design and construction and the distribution line construction project scope of work in accordance with the Three-phase Quality Assurance (QA) program of the US Army Corps of Engineers, per Prime Contract requirements. Additional responsibilities included oversight of materials and equipment testing and phased acceptance of completed work as meeting QA Plan requirements. The QC Manager was to maintain daily Inspections of the Work Site and ensure daily work activities were in accordance with the KHPP QC Plan while coordinating the work effort with KHPP Program Management as well as USAID onsite inspection resources.

3.1.12 QUALITY CONTROL (QC) MANAGER

One QC Manager was local national staff. The job description is equivalent to 5.11.

3.1.13 DOCUMENT CONTROL SPECIALIST

The Document Control Specialist reported directly to the KHPP Deputy Chief of Party and was to be based at the KHPP Regional Camp at Amtex in Kandahar, Afghanistan. The Document Control Specialist was to be responsible for the control and proper archiving of all documents and reports applicable to Subcomponent 5. The Document Control Specialist worked on multiple projects simultaneously and ensured all staff were following proper filing protocols.

3.1.14 STARTUP SPECIALIST

The Startup Specialist reported directly to the Construction Operations Manager and was to be based at the Kajaki Dam Camp. The Startup Specialist was responsible for oversight of the Substation startup. Additional responsibilities included implementation of DABS training for and oversight and assistance in the operation and maintenance of the facility, ensuring daily activities were reported and in accordance with the schedule and the Project Implementation Plan, and the coordination of the work effort with KHPP Program Management resources. The primary individual responsible for this position included Ratchasit Jitdarun.

3.1.15 FIELD INSPECTOR

The Field Inspector reported to the Construction Manager. The Field Inspector was responsible for inspecting the existing conditions to identify work to be performed, monitoring and coaching work to be performed by DABS, performing quality inspections after work was completed, and providing safety awareness and inspections. The primary individual responsible for this position included David McPherson.

3.1.16 FIELD INSPECTOR

One field Inspector was local national staff. The job description is equivalent to 5.15.

3.1.17 TECHNICAL TRAINING MANAGER

The Technical Training Manager reported to the Construction Manager. The Technical Training Manager was responsible for developing lessons and course content and training DABS staff for distribution system design and overhead line construction. Training topics also included job management, safety, and MEW standards. Recloser fundamentals, operation, and programming training was also provided for this Component.

3.1.18 TECHNICAL TRAINING MANAGER

One Technical Training Manager was local national staff. Job description is equivalent to 5.17.

3.2 Implementation of Work

In December 2010, USAID awarded BVSPC Contract No. 306-C-00-11-00506-00 to perform the Kandahar Power Initiative (later re-named Kandahar Helmand Power Project or KHPP), and began immediately executing activities under Component 5. At the inception of the KHPP, USAID coordinated the relationship with DABS Kabul to maintain communication and reporting of KHPP activity and progress. BVSPC maintained communication and reporting of KHPP field activity with the Kandahar DABS Director. BVSPC continued to coordinate and maintain liaison with Kandahar DABS, as well as Regional Command - South (RC-S) and Regional Command - Southwest (RC-SW) and the USAID Onsite Managers (OSM) working directly with DABS in Kandahar and Helmand Province. This communication and reporting continued throughout the implementation of KHPP. The OSM reported to the COR. The construction Manager worked directly with their counterparts in Kandahar DABS, and communicated mutual needs and concerns. The working relationships between KHPP staff and the Kandahar DABS Director, senior managers, and staff were consistently positive and productive.

Given multiple Modifications in Component 5, the following Tasks reflect the final work efforts executed under Component 5.

Engineering and design work, technical support, and training were performed by BVSPC staff.

Task i: *Contractor must complete and submit a 30% design package for Kajaki Substation per Modification 6.*

Status: **COMPLETED**

In coordination with USAID and DABS, BVSPC completed and submitted a 30% design package for Kajaki Substation, which was approved by USAID. (See **Attachment d-01.**)

Task ii: *Procure and provide secure storage for five (5) 20 kV field reclosers per Attachment 20; procure one (1) bypass switch for each field reclosers.*

Status: COMPLETED

In coordination with USAID and DABS, BVSPC procured and provided secure storage for five (5) 20 kV field reclosers and one (1) bypass switch for each field reclosers. DABS personnel installed one recloser and bypass switch set on the west side of the Kajaki Camp. The other four sets are recommended to be installed on the 20 kV system west of the Tangi Substation. This equipment was transferred to DABS for installation.

Task iii: *The Contractor must conduct emergency repairs on the existing 13.8kV line serving local distribution from the Kajaki HPP. The extent of repairs must be on the approximate 1 km segment of line from the Kajaki HPP to the Contractor's laydown yard. Repairs should focus on terminations and service connections, standardizing connections, and on eliminating unsafe conditions. Materials for repairs should be drawn from USACE inventory in Kandahar to the maximum extent possible (coordinate with DABS and USACE for the supply of materials). In coordination with DABS Helmand and DABS Kandahar, the Contractor must utilize DABS staff to reduce costs and to conduct on-the-job training to the maximum extent possible. Submit a report of training upon completion of repairs, along with recommendations for continued DABS training focusing on medium voltage repairs.*

Status: COMPLETED

In coordination with USAID and DABS, BVSPC conducted emergency repairs on the existing 13.8 kV line serving local distribution on the approximate 1 km segment of line from the Kajaki HPP to the Gate 2 entrance at the Kajaki Dam Camp. Executed repairs focused on terminations and service connections, standardizing connections, and eliminating unsafe conditions. Materials for repairs were drawn from KHPP Subcomponent 1.2 inventory. BVSPC also coordinated with DABS and USACE for the supply of materials. In coordination with DABS Helmand and DABS Kandahar, BVSPC oversaw these repairs being performed by DABS staff and conducted on-the-job training related to the repair work to the maximum extent possible. BVSPC submitted a training report upon completion of repairs to USAID, and provided recommendations for continued DABS training focusing on medium voltage repairs (see **Attachment d-05**). BVSPC also submitted a work execution report to USAID upon completion of the repairs and installation of the recloser. (**See Attachment d-04.**)

Significant design and engineering work was performed prior to the descoping of the Kajaki Substation by USAID. Documents and drawings were submitted for 10, 30, and 60% Design. (**See Attachment a-20.**) In addition, the following procurement packages were prepared:

1. KJKI.71.1001 - EPC Kajaki and Tangi Substations.
2. KJKI.71.0201 - Site Works.
3. KJKI.63.6001 - Kajaki and Tangi Structures and Equipment.
4. KJKI.64.0213 - Control Enclosure and Control System Panels and Equipment.
5. KJKI.73.0603 - Tangi and Musa Qa'la Distribution Improvements.
6. KJKI,63.7500 - Tangi - Musa Qa'la 20 kV Distribution Equipment.
7. KJKI.63.7502 - Kajaki - Tangi 20 kV Distribution Equipment.

The development of convoy plans was required prior to descoping. Regular plans were submitted to USAID as construction scope and/or execution strategies changed. The first convoy carrying camp construction materials and life support provisions successfully

traveled from Kandahar - AMTEX to Kajaki, arriving in late December 2011. Subsequent convoys were planned and executed based on this success.

3.3 Subcontracts and Major Procurements

The final scope of work for this project was completed with the procurement of two major components for the Kajaki Substation as identified in Task ii of the contract – (1) “Procure and provide secure storage for five (5) 20 kV field reclosers per Attachment 20, and (2) Procure one (1) bypass switch for each field reclosers.” The procurements for those items are identified below and again on the Subcontract/Purchase Order Matrix (**Attachment c-05**). Modification 10 transferred the actual procurement of these items from Component 5 to Subcomponent 2.2

1. KJKI.63.3609 - Procurement of five 20 kV reclosers including the control enclosure: [REDACTED].
2. KJKI.63.7042 - Procurement of five 20 kV bypass switches: [REDACTED].

Demining work was performed as part of the installation of these reclosers . Subcontract No. KJKI.12.8003 was issued to United Asia Demining Company for [REDACTED].

Any procurement associated with the original scope of work of Kajaki Camp Improvements will be covered under the closeout report associated with Subcomponent 6.3.

3.4 Budget and Expenditures

A summary of the Component 5 estimated cost (revised as of Contract Modification 13) and costs billed through 25 July 2014 (as reflected in Invoice 105), is provided in Table 5 below:

Table 5: Component 5 – Financial Summary

Cost Report	Estimated Cost (Modification 13)	Costs Billed thru 25 July 2014	Remaining Budget
TOTAL COST (Including Fee)	[REDACTED]	[REDACTED]	[REDACTED]

3.5 Government Property Summary

The summary of the property purchased under Component 2.2 and turned over to DABS per the contract instructions is outlined below:

1. KJKI.63.3609 - Procurement of five 20 kV reclosers, including the control enclosure. Transfer includes five reclosers and five bypass switches. Four reclosers were located in a DABS owned container at Kajaki. One recloser was installed adjacent to the GFE Warehouse.
2. KJKI.63.7042 - Procurement of five 20 kV bypass switches. Four switches were in a DABS owned container at Kajaki. One switch was installed adjacent to the GFE Warehouse.

3.6 Final Schedule

All work was completed 23 September 2013 (see **Attachment a-08**).

4 PHYSICAL COMPLETION OF THE WORK

4.1 Documentation of Completion

On 23 September 2013, DABS Kandahar Director Engineer Rasoul Baqi completed Material Inspection and Receiving Report for five reclosers and five bypass switches. Four sets of equipment were stored in a container at Kajaki under DABS control, and one set of equipment was installed adjacent to the Kajaki Hydro GFE Warehouse.

BVSPC submitted a Substantial Completion Inspection Request to the CO on 23 September 2013. The site work and materials were inspected over the period of 13 to 18 October 2013 by USAID's Quality Assurance Subcontractor. On the same day, 18 October 2013, USAID decided to forgo issuance of a Certificate of Substantial Completion, and directly issued the Certificate of Final Completion and Acceptance (FCA), stating the FCA date for Component 5 was effective 21 October 2013. The FCA was issued without exceptions.

4.2 Photo Album

A Photo Album indicating some of the typical conditions and work progress observed under Component 5 is provided as **Attachment a-09**.

5 SUSTAINABILITY

A key objective of this Component was to improve DABS lineman staff electrical system knowledge, construction skills, and safety awareness. Extensive classroom and on-the-job training was provided for up to 10 linemen. Each lineman was committed to attending the class and participating, as noted by the nearly 100 percent attendance rate and the number of questions that initiated each subsequent training session. The training generated outside-the-classroom dialogue, as was clearly demonstrated by the eagerness of the students to participate and by their subsequent improved work methods and material choices.

DABS personnel were trained in 20 kV electric system fundamentals, construction skills and work methods, and safety awareness. Specific objectives included:

- Acquire life and work skills to be successful in the workforce, including all safety procedures relative to the transmission and distribution system
- Understand the importance of the proper Personal Protective Equipment (PPE) required for the job, its effective use, as well as Occupational Safety and Health Administration (OSHA) regulations pertinent to Electric Power Generation, Transmission, and Distribution.
- Assist in the construction of electric transmission and distribution systems, relate electrical theory to electric power systems, work comfortably at heights while climbing poles and towers, operate power distribution equipment, and troubleshoot power distribution and transmission systems.
- Understand the principles and components associated with AC and DC electricity.
- Comprehend earth (or grounding) to make proper earth at precise locations during repairing and construction process of overhead lines.

- Obtain proper rigging skills and deploy the proper materials (cross arm, nut/bolts) used by a lineman.
- Understand how line conductors, distribution transformers, voltage regulators, fuses, and switches operate.
- Lay conduit and pull/splice electrical conductors.
- Understand angle pole installation and erection of correct poles at locations of different angles.
- Understand installation of correct stays and anchors, rods, and guy wires.
- Introduction to recloser function, operations, programming, and troubleshooting.

Training and training materials was provided in both Dari and English languages. The materials were presented in four general courses over the period of 22 days (**Attachment d-05**).

In addition to the lineman training, two local national staff participated in the training and implementation of the recloser installation. The Technical trainer provided all training materials and conducted all classroom training. The Field Inspector also participated in the training. Both the Technical Trainer and the Field Inspector provided translation services and technical clarifications during the on-the-job construction training. These roles were new to these individuals, and prepared them for further career development as trainers and electricity system specialists.

BVSPC, working with RC-Southwest, added focus on occupational training and local hiring prior to the descoping of the Substation. The civil work subcontract was modified to add training for (1) heavy equipment operator, (2) surveyors, and (3) civil work quality control inspector. The bid evaluation criteria added emphasis for hiring of local skilled and unskilled labor.

6 SECURITY PLAN AND INCIDENT REPORTS

BVSPC operated under a program-wide Security Plan (**Attachment a-02**) managed and coordinated by the BVSPC Security Managers. A specific site security plan was developed for the Kajaki Dam Camp and was updated as required with operations changes.

7 SAFETY AND HEALTH PROGRAMS AND PLAN

BVSPC operated under a program-wide Health and Safety Plan and Procedures (**Attachment a-04**) managed by the BVSPC Health and Safety Manager. No safety incidents were reported throughout the duration of this portion of the project. All personnel and key equipment transport was accomplished by rotary wing aircraft as part of the Security Plan.

8 QUALITY CONTROL PROGRAM AND PLAN

BVSPC operated under a project-wide Quality Control Plan (**Attachment a-05**). The implementation of a QC program at Component 5 was the responsibility of the KHPP professionals. Qualified KHPP Quality Management professionals provided oversight and guidance.

9 ENVIRONMENTAL PROGRAM

KHPP’s overall Environmental Plan (**Attachment a-14**) governed the activities executed under this contract component. All reasonable environmental protective measures were taken to design and procure items associated with the Kajaki Substation. The Final Kajaki Environmental Report for all Kajaki based work was implemented with overall site and site activity environmental issues addressed, and is attached here as **Attachment a-16**.

10 STATEMENT OF PATENTS, ROYALTIES, OR CLASSIFIED MATERIALS

No patents, royalties, or classified materials were obtained or generated under the activities of this task order.

11 VALUE ENGINEERING CHANGES (IF APPLICABLE)

No value engineering changes were identified or implemented during the execution of this Subcomponent.

12 ENHANCING BEST PRACTICES (LESSONS LEARNED)

Best practices were applied to the tender development, evaluation, selection of the proposed Subcontractor, and design, which were utilized throughout the implementation period of the KHPP. The major considerations gleaned during the course of implementing Component 5 are outlined in Table 6:

Table 6: Component 5 – Considerations from Implementation

Observation	Lesson	Recommendation
Backup of convoys at the gate and of other Subcontractors could be minimized.	As with all construction sites, congestion management is key to maintaining schedule.	Conduct 6 week and 3 week look-ahead schedule reviews for the site rather than by project to eliminate impact in congested areas. This recommendation was implemented.
Electric distribution system materials from various NGO and GO were not interchangeable.	Each NGO and GO designing and constructing electrical infrastructure in Helmand and Kandahar Provinces are using a unique set of standards and guidelines.	KHPP submitted a Design Basis document to USAID which was then used to establish technical requirements for electric transmission, distribution, and Substation of KHPP. This document used the MEW design standards as its base and then included additional detail based on local conditions and regionally available equipment. USAID may consider providing this document to MEW and DABS for use as other NGO and GO design and construct electric infrastructure in Kandahar and Helmand provinces.

13 WARRANTY

BVSPC has a project-wide Warranty Plan (**Attachment a-06**) as required by the Prime Contract. For Component 5, the warranty conditions reflect the Letter of Warranty (**Attachment m-01c**) provided to USAID applicable to this Component, and only cover the equipment procured under this Component.

14 OUTSTANDING ISSUES

No issues are outstanding related to the complete close of Component 5.

15 CONCLUSION: IMPACT ASSESSMENT

This Closeout Report is limited to activities associated with the execution of Component 5. All other Components and Subcomponents, including the overall PMO, will have their own closeout report.

This Component was successfully implemented from a sustainability perspective, as the DABS lineman staff has significantly improved in the areas listed below:

- Knowledge level of the hazards of electrical systems and how to avoid or eliminate the hazards.
- Breadth of knowledge of tools and equipment usage, particularly methods to reduce heavy lifting and working on structures.
- Knowledge of types of materials and equipment which enhance reliability of the electrical system.

From an electric system perspective, this Component successfully implemented a new type of technology to Helmand province and, by association, to Kandahar Province. The MEW standards utilized reclosers in Kabul; however, the technology was new to the southern part of the country. This technology adds electronically controlled fault detection and controlled closing to re-establish the circuit when an intermittent fault occurs. This technology reduces outage minutes and reduces labor requirements to manually reset a fault clearing device.

The Performance Monitoring Plan for KHPP provides the metrics indicating the impact of Component 5 training (**Attachment a-12**). Reliability metrics were not monitored for this Component, since the primary objectives were to enable additional system sectionalizing under fault conditions and to decrease the future cost of fuel at Kajaki Camp.

16 DEVELOPMENT EXPERIENCE CLEARINGHOUSE (DEC)

The Final Closeout Report with its appendices will be submitted to the DEC as required.