



# RIVERSIDE PUBLIC UTILITIES

## Board Memorandum

**BOARD OF PUBLIC UTILITIES**

**DATE:** NOVEMBER 5, 2018

**ITEM NO:** 7

**SUBJECT:** **BID NO. SUB-806 FOR FURNISHING AND DELIVERY OF A COMBINED METAL-CAD SWITCHGEAR ENCLOSURE FROM CROWN TECHNICAL SYSTEMS IN THE AMOUNT OF \$1,343,878.13, BID NO. SUB-793 FOR FURNISHING AND DELIVERY OF PROTECTIVE RELAY PANELS FROM KEYSTONE MANUFACTURING COMPANY IN THE AMOUNT OF \$53,576.17 AND APPROVE WORK ORDER NO. 1810532 WITH FREEMAN SWITCHGEAR AND TRANSFORMER UPGRADE PROJECT IN THE TOTAL AMOUNT OF \$5,463,000**

**ISSUES:**

Award Bid No. SUB-806 for furnishing and delivery of a combined metal-clad switchgear enclosure to Crown Technical Systems of Fontana, California, in the amount of \$1,343,878.13, award Bid No. SUB-793 for furnishing and delivery of protective relay panels to Keystone Manufacturing Co. of Des Moines, Iowa, in the amount of \$53,576.17, and approve Work Order No. 1810532 in the total amount of \$5,463,000.

**RECOMMENDATIONS:**

That the Board of Public Utilities:

1. Award Bid No. SUB-806 for furnishing and delivery of a combined metal-clad switchgear enclosure to Crown Technical Systems of Fontana, California, in the amount of \$1,343,878.13;
2. Award Bid No. SUB-793 for furnishing and delivery of protective relay panels to Keystone Manufacturing Co. of Des Moines, Iowa, in the amount of \$53,576.17; and
3. Approve Work Order No. 1810532 in the total amount of \$5,463,000.

**BACKGROUND:**

Electrical substations are where the distribution and transmission systems meet. Substations house critical equipment and infrastructure such as substation power transformers, switchgear units, power circuit breakers, and protective relaying equipment. All this equipment within the substation boundaries is vital for the reliable, safe, and optimum operation of the electric grid.

Substation equipment, structures, and protective schemes must be upgraded periodically to meet increasing electric power demand, maintain safety, and improve system reliability. Several of the substation equipment in the Riverside Public Utilities (RPU) system have exceeded, or are reaching, the end of their design life. Replacement of failed equipment such as a power transformer or switchgear is a very expensive and lengthy endeavor due to their design requirements and the complexity of the manufacturing process. The failure of a single unit can result in a significant impact on the electric system's reliability and the safety of employees and the public.

Relays are also a critical component of electrical transmission and distribution systems. Electromechanical relays and control systems were the standard in the electrical industry until the 1980's. Since then, there has been a migration towards microprocessor-based relays and controls. RPU has standardized on the use of microprocessor-based relays for all new installations and upgrades. Electromechanical relays are prone to electrical and mechanical failures, require frequent maintenance, and have setting limitations compared to microprocessor-based relays, which perform the same protection operations, but with higher precision and reliability. Replacement of electromechanical relays with microprocessor-based relays is essential to increase safety and system dependability. See pictures below for substation equipment.



*Freeman Switchgear 1 & 2 and Substation Power Transformer*



*Electromechanical Relays at Freeman*



*Typical Microprocessor Relays*

Planned system improvements and equipment replacement are prudent and responsible measures to minimize the risk of prolonged power outages due to equipment failures and maximize system reliability.

**DISCUSSION:**

RPU is committed to providing safe and reliable energy service for all customers. As part of RPU’s effort to identify and replace aging infrastructure, RPU plans to replace switchgear nos. 1 and 2, and protective relaying equipment at Freeman Substation. Both switchgear units and protective relaying equipment are approximately 56 years old and have exceeded their design life. In addition to the replacement of this equipment, RPU plans to add substation transformer no. 2 which was removed from service over 20 years ago. Its load was transferred to an adjacent unit as a provisional solution. However, current and projected loading require transformer no. 2 to be added back in service in order to improve the reliability of the system.

Prior to the replacement and addition of the switchgears, transformers, and relaying equipment, RPU needs to modify and improve the current configuration of the interconnecting wiring for the supervisory, control, power, protective, and communication circuits within both switchgears. When the substation was built, many of the substation control, protection, and auxiliary power circuits were routed through switchgear no. 1 and no. 2. This has created several technical and reliability issues throughout the years especially during equipment upgrades. The existing circuitry configurations make switchgear no. 1 and no. 2 potential points of failure due to the numerous interconnections at a single location.

The scope of work includes procuring two switchgears, one transformer, relay panel, and developing plans and designs to relocate equipment, reroute power, communication, supervisory and control circuits. Additionally, some protective equipment will be relocated at the control building, which houses most of the substation protective, and communication equipment. RPU plans to replace two protective relay panels comprised of electromechanical relays with microprocessor-based relays in addition to the transformer and switchgear improvements. All of these improvements are required to make the replacement of the switchgear and power transformer more effective.

Staff will return to the Board of Public Utilities in February 2019 for the approval to purchase power transformers. This proposed work also includes the removal and installation of new foundations, segregated bus between the transformer and switchgear, and related electrical, above grade and underground work.

The engineering design contemplated for this project will be largely performed by a consultant firm from the consultant panel. The construction work, testing, and commissioning will be performed by RPU field forces.

On June 20, 2018, six switchgear vendors were invited to submit bids through an informal Request for Bids No. SUB-806 for the procurement of switchgears 1 & 2. Four vendors submitted Bids. Staff evaluated the Bids and deemed Crown Technical Systems of Fontana, California to be the lowest responsive and responsible bidder.

The bids are summarized in the table below:

<b>Vendors</b>	<b>City Location</b>	<b>Bid Amount</b>	<b>Rank</b>
<b>Crown Technical Systems</b>	<b>Fontana, CA</b>	<b>\$1,343,878.13</b>	<b>1</b>
Eaton	Omaha, NE	\$1,426,205.14	2
Powercon Corp	Severn, MD	\$1,453,313.25	3
Myers Power Products	Ontario, CA	\$1,469,874.79	4
➤ <i>Engineer's Estimate</i>		<i>\$1,450,000.00</i>	

On June 14, 2018, six relay panel vendors were invited to submit Bids through an informal Request for Bids SUB-793 for the procurement of relay panel. Four of the six vendors submitted Bids. Staff evaluated the Bids and deemed Keystone Manufacturing Co. of Des Moines, Iowa to be the lowest responsive and responsible bidder.

Vendors	City Location	Bid Amount	Rank
<b>Keystone Electrical Manufacturing Co.</b>	<b>Des Moines, Iowa</b>	<b>\$53,576.17</b>	<b>1</b>
Electrical Power Products, Inc.	Des Moines, Iowa	\$59,213.29	2
Crown Technical Systems	Fontana, CA	\$61,034.85	3
Control Panel USA, Inc.	Austin, Texas	\$73,159.39	4
➤ <i>Engineer's Estimate</i>		<i>\$60,000.00</i>	

RPU would like to purchase the equipment and material specified in this report in accordance with Section 404 of Purchasing Resolution No. 23256 which provides that informal procurement instead of competitive procurement may be utilized if the procurement is for specialized equipment that is particular to the needs of the City's Public Utilities Department and it appears to the Purchasing Manager to be in the best interest of the City.

The project breakdown is proposed as follows:

<b>Project Breakdown</b>	
Engineering Performed By:	RPU Engineering Staff and Consultant Panel
Civil Construction Performed By:	Contractor
Electrical Work Performed By:	RPU Field Forces and Contractor
Electrical Testing and Commissioning	RPU Field Forces
<b>Anticipated Construction Start Date:</b>	<b>July 2019</b>
<b>Anticipated Duration:</b>	<b>10 Months</b>

The breakdown for the total capital expenditure is as follows:

<b>Description</b>	<b>Amount (\$)</b>
Switchgear - Crown Technical Systems SUB-806	\$1,343,878.13
Relay Panel – Keystone SUB-793	\$53,576.17
Transformer (Estimated)	\$1,400,000.00
Misc. Parts and Material, and Equipment Rentals	\$240,000.00
Project Management and Engineering Design	\$600,813.00
Construction, Factory Testing, Field Testing and Commissioning	\$1,295,121.00
Contingency (10%)	\$529,611.70
<b>Work Order Total</b>	<b>\$5,463,000.00</b>

The Purchasing Manager concurs that the recommended actions are in compliance with Purchasing Resolution No. 23256.

**FISCAL IMPACT:**

The total fiscal impact is \$5,463,000. Sufficient funds are available in Public Utilities' Substation Transformer Addition Capital Account No. 6130100-470632.

Prepared by: George R. Hanson, Utilities Assistant General Manager/Energy Delivery  
Approved by: Todd L. Jorgenson, Interim Utilities General Manager  
Approved by: Al Zelinka, FAICP, City Manager  
Approved as to form: Gary G. Geuss, City Attorney

Certifies availability  
of funds: Aileen Ma, Interim Utilities Assistant General Manager/Finance & Administration

Attachments:

1. Project Site Map
2. Award Recommendation
3. Presentation

Attachment 1: Project Site Map

