



RIVERSIDE PUBLIC UTILITIES

Board Memorandum

BOARD OF PUBLIC UTILITIES

DATE: SEPTEMBER 13, 2021

SUBJECT: ROHR SUBSTATION PROTECTION SYSTEM UPGRADE PROJECT WORK ORDER 2123497 IN THE AMOUNT OF \$485,000

ISSUE:

Consider approval of the capital expenditure for Work Order No. 2123497 in the amount of \$485,000 for the Rohr Substation Protection Upgrade Project.

RECOMMENDATION:

That the Board of Public Utilities approve the capital expenditure for Work Order No. 2123497 in the amount of \$485,000 which includes all design, construction, procurement, testing and commissioning and construction support for upgrading the protection and automation systems at Rohr Substation.

BACKGROUND:

Riverside Public Utilities (RPU) has an ongoing protective relay replacement program that identifies and proactively replaces substation protective relays, automation, and control equipment. The program is driven by number of factors including the age of the relay, relay obsolescence, level of effort to maintain a complex and unique relay model and system criticality.

RPU's Substation Engineering and Test Group identified the relays at Rohr Substation for replacement. The Rohr substation is located in the western area of the City, just north of Cypress Avenue at the end of Picker Street. The relays the substation have reached the end of their useful life while some are obsolete and are no longer cost effective to maintain because of their uniqueness and complexity.

Protective relays are critical components of the electrical transmission and distribution systems. The function of a protective relay is to detect and locate an electrical fault and issue a command to the associated circuit breaker to isolate the faulty section of the system.

Protective relays come in two forms: electromechanical and microprocessor-based relays. Electromechanical relays and control systems were the standards in the electrical industry until the 1990s. Since then, there has been a migration towards microprocessor-based relays and controls. Electromechanical relays are more prone to electrical and mechanical failures, require frequent maintenance, and have setting limitations when compared to microprocessor-based relays. Microprocessor relays perform the same protection operations, but with higher precision

and reliability. Also, microprocessor relays have added protection capabilities, event recording, and alarming for failure that can assist with system performance, and they provide telemetry data that can increase critical asset longevity. RPU has standardized the use of microprocessor-based relays for all new installations and upgrades. Replacement of electromechanical relays with microprocessor-based relays is essential to increase safety and system dependability and support smart grid infrastructure.



Typical Electromechanical Relays



Typical Microprocessor Relays

DISCUSSION:

The project scope of work includes the following:

1. Replacing thirty-four (34) 15kV distribution electromechanical relays with six (6) microprocessor relays at the Rohr Substation to improve the reliability and simplify the protection and control systems.
2. Replacing existing analog multifunction meters with digital power quality meters.
3. Installing a digital substation automation system for communication with the new relays.
4. Installing new auto-transfer schemes for potential transformers and control power transformers.
5. Replacing transformer winding and oil temperature gauges.

The engineering design for this project will be performed by RPU staff. The construction work, testing, and commissioning will be performed by RPU field forces. There is no civil construction work associated with this scope of work and not contract services are required. There are no planned outages or associated service disruptions to customers in the area.

The proposed project and fiscal breakdown:

Work Type	Performed By:	Amount (\$)
Project Management and Engineering	RPU Engineering Staff	\$110,000
Electrical Construction	RPU Substation Electricians	\$165,000
Testing and Commissioning	RPU Test and SCADA Techs	\$50,000

Equipment and Material	\$120,000
Contingency	\$40,000
Work Order Total:	\$485,000
Anticipated Start Date:	September 2021
Anticipated Duration:	8 months

STRATEGIC PLAN ALIGNMENT:

This item contributes to Strategic Priority No. 6 Infrastructure, Mobility and Connectivity and the following goals:

1. **Goal 6.2** – Maintain, protect, and improve assets and infrastructure within the City’s built environment to ensure and enhance reliability, resiliency, sustainability, and facilitate connectivity.

This item aligns with EACH of the five Cross-Cutting Threads as follows:

1. **Community Trust** – The replacement of aged protective relays will improve the safety and reliability of the electric system, which help build community trust and results in the greater public good.
2. **Equity** – The protective relay replacement program targets replacing all aged protective relays and control systems in the entire system based on well-defined engineering and operational criteria that support an equitable distribution of services to ensure every member of the community has access to share in the benefits of community progress.
3. **Fiscal Responsibility** – This item represents fiscal responsibility through the evaluation of the best method and approach to execute the project efficiently, on budget, and schedule. Small relay replacement projects are routine projects and are executed by internal staff more efficiently and effectively due to the integrated understanding of the internal design standards, system configurations and operational practices.
4. **Innovation** – RPU is committed to identifying creative solutions to meet the needs of our community members, effectively and efficiently by providing innovative infrastructure improvements. Upgrading electromechanical relays with microprocessor relays (digital) is part of the effort to modernize the grid to make it smarter and more resilient through the use of cutting-edge technologies, equipment and automation systems that communicate together to deliver reliable and efficient electric power.
5. **Sustainability & Resiliency** – RPU is meeting the community’s changing needs and preparing for the goals set by the City to achieve carbon neutrality by 2040 and to ensure that new system upgrades provide grid operators the ability to monitor and respond to system disturbances quicker and safer during outages.

FISCAL IMPACT:

The total fiscal impact is \$485,000. Sufficient funds are available in Public Utilities Substation Bus Upgrade Account No. 6130100-470616.

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Approved by: Al Zelinka, FAICP, City Manager
Approved as to form: Phaedra A. Norton, City Attorney

Certifies availability
of funds: Edward Enriquez, Chief Financial Officer/City Treasurer

Attachments:

1. Project Site Map
2. Presentation