RIVERSIDE PUBLIC UTILITIES

Board Memorandum

BOARD OF PUBLIC UTILITIES

DATE: OCTOBER 28, 2019

ITEM NO: 9

SUBJECT: INCREASE TO WORK ORDER NO. 1707248 BY $7,228,650 FOR A TOTAL AMOUNT OF $10,888,650 FOR FISCAL YEAR 2019-20 FOR SECOND PHASE OF IMPLEMENTATION OF ELECTRIC ADVANCED METER SYSTEM AND METER DATA MANAGEMENT SYSTEM AND STAFFING TRANSITION PLAN FOR ADVANCED METER PROGRAM

ISSUES:

Approve an increase to Work Order No. 1707248 by $7,228,650 for a total amount of $10,888,650 for fiscal year 2019-2020 for the second phase of implementation of an Electric Advanced Meter System and Meter Data Management System and recommend that the City Council approve changes to the Fiscal Year 2019/20 Master Personnel Detail and approve an interdepartmental budget transfer of $155,668 of personnel funds from Field Services Division 601000 to Electric Operations Division 610000.

RECOMMENDATIONS:

That the Board of Public Utilities:

1. Approve an increase to Work Order No. 1707248 by $7,228,650 for a total amount of $10,888,650 for fiscal year 2019-2020 for the second phase of implementation of an Electric Advanced Meter System and Meter Data Management System;

2. Recommend that the City Council approve changes to the Fiscal Year 2019/20 Master Personnel Detail as described herein; and

3. Recommend that the City Council approve an interdepartmental Budget Transfer of personnel funds totaling $155,668 from the Field Services Division 601000 to the Electric Operations Division 610000.

BACKGROUND:

On June 12, 2017, the Board of Public Utilities (Board) approved a Professional Services Agreement with Utiliworks Consulting, LLC (UWC), a professional consulting firm with over 13 years of experience successfully planning and implementing utility Advanced Meter Programs, to support the project from planning through execution.

On June 12, 2018, the City Council approved the Fiscal Year (FY) 2018-2020 Two-Year Budget (Budget).

On January 28, 2019, the Board approved the Electric Advanced Meter System and Meter Data Management System (MDMS), which included a Professional Services Agreement with Tantalus Systems, Inc. for a cloud-based Advance Meter Infrastructure (AMI) Head-End System (HES), and a Software as a

Service Agreement with SmartWorks for a cloud-based Meter Data Management System.

On April 22, 2019, the Board approved integration services with Systems and Software, Inc. to integrate the AMI HES and MDMS with RPU's existing enQuesta Customer Information System (CIS).

On June 18, 2019, the City Council approved the amended FY 2019/20 Budget.

DISCUSSION:

Advanced Metering Infrastructure is an integrated system of advanced electric meters, communications networks, and data management systems that enables automation and two-way communication between the utility and the meter provided to the customer. The system provides a number of important functions that were not previously possible or had to be performed manually, such as the ability to automatically and remotely measure electricity use, connect and disconnect service, detect tampering, identify and isolate outages, and monitor voltage. AMI provides RPU near real-time and actionable information about system performance, power quality, and outages, which increases reliability and efficiencies, and lowers overall operating costs.

Once fully implemented, AMI gives Riverside Public Utilities (RPU) customers expanded control, increased flexibility and additional choices in how they manage energy usage and energy efficiency. Customers will have access to energy usage through an online customer portal, which means the customer will not have to wait for a monthly bill to know how much energy they are using each month. They will be able to set up usage threshold alerts so that they can be notified if their bill is reaching their pre-determined budgeted amount. AMI will also open the door for other cost-saving programs, time-of-use rates, and customer pre-payment plans.

AMI is the current industry standard for electric meters. According to the U.S. Energy Information Administration, "in 2017 U.S. electric utilities had about 78.9 million advanced (smart) metering infrastructure (AMI) installations", which is over half of the 150 million electricity customers in the United States. According to the Wood Mackenzie Power & Renewables, AMI Global Forecast, 2019-2024 report, "global smart meter total will rise from 665.1 million in 2017 to more than 1.2 billion by the end of 2024".

A majority of California utilities have already implemented AMI. The California investor-owned utilities (IOUs), Pacific Gas and Electric, San Diego Gas and Electric, and Southern California Edison, began deploying AMI in 2007, with the approval of the California Public Utilities Commission (CPUC), and were largely completed by 2013. The CPUC also approved Southern California Gas Company's AMI project, to retrofit and replace approximately 6 million natural gas meters with a wireless communications device from 2010 through 2017. This project included Riverside residents. The following table, from the 2018 California Smart Grid Annual Report to the Governor and the Legislature, shows the total number of AMI meters that have been implemented by the IOUs as of October 2018, as well as customer opt-out rates, which are less than 1%.

Figure 1. California IOU Advanced Metering Infrastructure Rollout

Table 4 Advanced Metering Infrastructure (aka Smart Meters) Rollout[115] as of Oct. 2018[116]

IOU	Total Number of Electric Smart Meters (Millions)	Cumulative Electric Smart Meter Opt-outs[117] (No. of customers)	Percentage of Opt-outs	Annual Customer Complaints (escalated) [118]
PG&E	5.40	47,967	0.88%	12
SDG&E	1.45	4,217	0.29%	0
SCE	5.12	22,972	0.45%	442
Total	11.97	75,156	0.63%	454

Source: IOU 2018 Smart Grid Reports and Data Requests

On January 28, 2019, after several years of extensive industry research and gathering best practices from other successful electric AMI implementations, and in partnership with RPU's AMI consultant, UWC, staff presented and obtained approval from the Board to proceed with an Advanced Meter Program (Program). RPU's Program approach maximized the current investment in residential Encoder Receiver Transmitter (ERT) meters, while introducing new AMI functionality across the entire service territory. The plan is to replace all of the commercial and industrial (C&I) meters, many of which are obsolete mechanical meters that are beyond the expected service life. Staff, in partnership with UWC, composed a business case to determine the return-on-investment (ROI) for this approach. Staff is currently updating the business case with 2017/18 data and will post a summary on the AMI project webpage when completed.

Program Approach
In order to effectively manage the implementation of the new systems and significant business processes, policy and staffing changes must occur and be implemented using a phased approach. This phased approach began with a two-part proof-of-concept (POC), followed by full implementation. Phase 1, the Alpha POC, consists of installing approximately 100 new AMI meters and corresponding communications devices in strategic "clusters" throughout the City that correspond to each of Riverside's seven wards. Phase 2, the Beta POC, consists of installing 1,000 new AMI meters, the remaining communication devices, and integration of AMI with the Meter Data Management System and the existing Customer Information System, including a customer usage portal. The final phase, full implementation, consists of installing the remaining 24,000 AMI meters, which creates a full AMI network, capable of reading the remaining 87,000 legacy ERT meters. All of the meter replacements for all three phases are planned to be performed by in-house Electric Meter Shop Technicians.

The AMI solution that is being implemented is an "ERT overlay," which means that the new AMI devices (collectors and meters) will also collect and transmit data from the legacy meters. This means that RPU only needs to initially purchase 25,000 new AMI meters to collect data from the remaining 87,000 ERT meters. Once the full implementation phase is complete, there will be no manual electric meter reading activities conducted in the field, as all meter reads will be sent remotely through the communications network. This business change requires the existing electric meter reading positions to be repurposed into other areas. In addition, the existing Electric Meter Shop will assume additional responsibilities managing and overseeing the new AMI system and communications network, as well as conducting all AMI meter replacements. These additional responsibilities will require additional staff resources in the Electric Meter Shop.

Figure 2. High-Level System Diagram
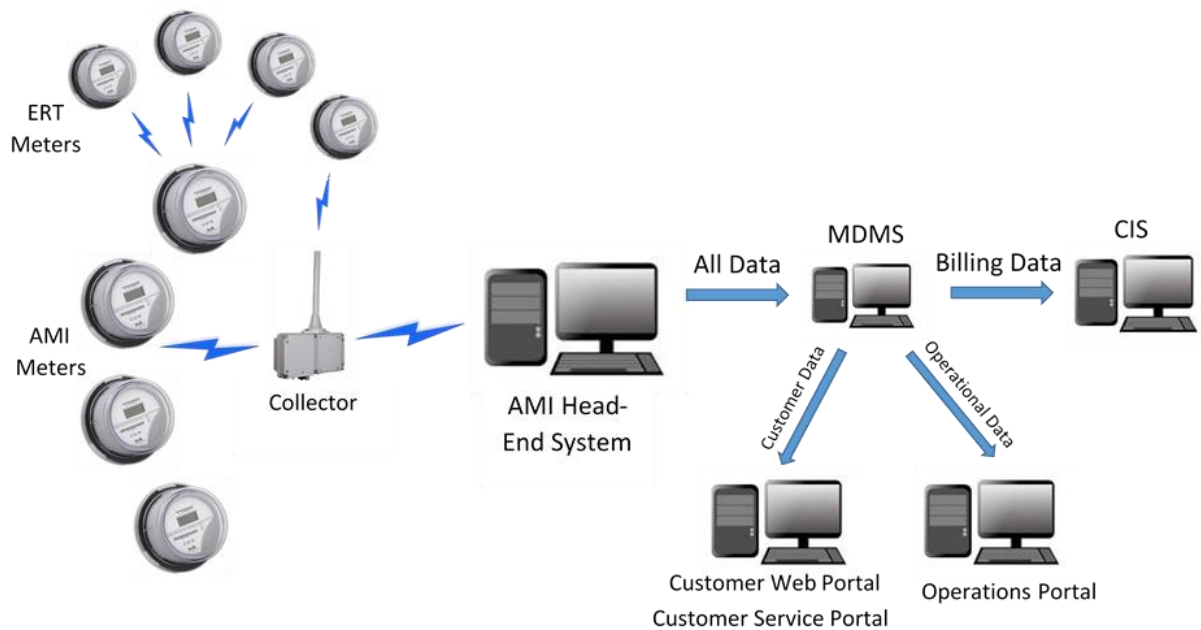
Program Update
Following the January 2019 approval from the Board, and a presentation to City Council, RPU proceeded with the first phase of the Program, the Alpha Proof-of-Concept (POC). The Alpha POC consisted of a test laboratory located in the Electric Meter Shop at the Utility Operations Center (UOC). Here, RPU installed communication devices and AMI meters, and set up the AMI head-end-system, to test and analyze meter and system functionality. The test lab allowed staff to obtain training and begin learning the new equipment and systems, and to become familiar with the new data that is being produced, prior to beginning installations in the field.

Extensive testing was conducted in the laboratory environment to analyze the system and successfully demonstrate the following use cases:

1. Automatic Meter Reading (AMR) via AMI
   a. Demonstrate the compatibility of the AMI system to communicate with the legacy AMR/ERT meters to retrieve register data and events
   b. Demonstrate accurate flow of data to the AMI head-end system
   c. Demonstrate that at least 1 ERT read is received per day
   d. Demonstrate legacy reading process remains intact for ERT meters
   e. Demonstrate that meter-to-cash process remains intact for all meter types
2. Remote Connect / Disconnect of AMI meters
   a. Demonstrate the remote disconnect/reconnect capability of the HES to the AMI meters
3. Over the Air AMI On-Demand Reads
   a. Demonstrate the ability for personnel to obtain real-time meter reads remotely through the AMI HES for customer or billing inquiries, or for troubleshooting the system
4. Electric Outage Detection
   a. Demonstrate the ability for the AMI system to create and process outage alarms and events from the AMI and AMR meters
   b. Identify power quality issues, sags and swells

Figure 3. AMI Test Laboratory

Following successful testing of the system in the laboratory environment, RPU proceeded with the field portion of the Alpha Proof-of-Concept beginning with installing seven (7) communication devices, or collectors, one (1) in each Council Ward. There were also seven (7) repeaters installed around the Auto Center in Ward 4. The collectors and repeaters were installed on utility poles and streetlights approximately 30 feet high. Then 88 AMI meters were installed in clusters around the collectors. Of the 88 meters, 48 are single-phase (residential) and 40 are poly-phase (commercial & industrial) meters. The poly-phase meters were installed at the Auto Center businesses in the Ward 4 test area. There was also extensive system design and configuration completed during Alpha to ensure that data continues to flow seamlessly and consistently through multiple systems for all AMI and ERT electric meters.

The 88 AMI meters are successfully transmitting AMI and ERT meter data through the collector devices back to the head-end system. RPU is remotely receiving hourly interval reads from residential AMI meters, fifteen-minute intervals from commercial and industrial AMI meters, and daily intervals from the authorized ERT meters. The data is then being transmitted, via flat files, to the Customer Information System (CIS) for billing. The process is working as expected for the entire meter-to-cash life-cycle and there have been no errors or impacts to billing. Staff has successfully completed the Alpha Proff-of-Concept phase of the project.

The following tasks were completed successfully in the Alpha Proof-of-Concept in both the laboratory and field environments:

1. Installed collectors
2. Activated data routers (4 per collector)
3. Installed AMI meters
4. Associated AMI and ERT meters to the HES
5. Retrieved on-request meter consumption and voltage readings
6. Retrieved outage data
7. Obtained electric ERT meter read data through AMI devices
8. Performed remote AMI meter connects and disconnects
9. Received alerts and alarms for pre-programed events (such as high and low voltage events)
10. Performed single and mass AMI meter uploads into the CIS
11. Validated communication device and meter coverage

12. Implemented new CIS work orders
13. Implemented new CIS electric meter install and exchange process
14. Implemented new meter data download/upload process
15. Implemented new reading process for existing Multi-Vendor Reading System (MVRS)
16. Successful results from extensive testing of all impacted systems – CIS, HES, MVRS, hand-held device

In addition, during the Alpha POC phase, RPU began a Community/Customer Engagement Campaign and developed the following:

1. AMI Program webpage
2. Postcard mailer to all Alpha POC customers
3. Letter mailed to all Alpha POC customers
4. AMI Program 1-page flyer, available at all customer service locations
5. Program information sessions for RPU staff, Council Members, and City Executive Management

RPU is in the process of developing a new electric rule for customers who elect to opt-out of AMI installations. This policy will be discussed, approved and adopted by both the Board of Public Utilities and the City Council in the coming months. RPU received two (2) calls from customers in response to the mailings, which were both related to scheduling meter installs. No calls were received from the Alpha customers expressing concerns or requesting to opt-out of the AMI program.

Next Steps
Following the successful implementation of the Alpha POC, and upon approval of the Board and support of the City Council, RPU will proceed with the second phase of the Program, the Beta POC. During the Beta POC, all of the remaining communication devices will be installed throughout RPU's service territory, as well as approximately 1,000 additional AMI meters. Staff will work with the vendors to integrate the MDMS with the CIS via a real-time interface for alerts, alarms and connect/disconnect functionality. The new customer usage portal, where customers can view detailed usage information and set usage threshold alerts, will be configured and integrated so that it is accessible through the existing customer web portal. During this phase, RPU may consider bringing the servers on premise, or adding additional functionality available in the AMI and MDMS systems, which may require additional development and configuration to be performed by the vendors. If this is determined to be beneficial and there are additional costs associated with these enhancements, staff will return to the Board for approval.

The purpose of the Beta POC is to:

1. Complete the integration between the AMI HES and the MDMS
2. Develop the real-time interface between the MDMS and the CIS
3. Verify design, security and capabilities of the AMI HES and the MDMS
4. Validate that data flows accurately from the meter all the way through to the billing system
5. Configure the customer usage web portal
6. Re-engineer impacted business processes
7. Recommend necessary policy changes
8. Design data streams and create operational reports and dashboards for new AMI data to appropriate stakeholders
9. Implement initial staffing changes

The third phase of the Program, full implementation of the "ERT overlay", will commence following successful completion of the Beta POC and upon approval from the Board and support of the City Council. RPU will create a full AMI network with the deployment of approximately 24,000 AMI meters to collect data from all of the remaining legacy ERT meters in the system. All commercial and industrial meters (approximately 12,500) will be replaced and the remaining 12,500 residential meters will be distributed at ends of feeders to capture distribution voltage data, in high turn-over areas for automated meter connects and disconnects, and other strategic locations that maximize the return on investment.

Staffing Plan

In support of the changing environment and needs of the electric utility, the Human Resources Department is proposing operational changes, as summarized below and outlined in the Master Personnel Detail (Attachment 1):

- **Field Services Division:** Eliminate 1.0 FTE Utilities Field Services Manager.
- **Electric Operations Division:** Add 2.0 FTEs Utilities Electric Meter Technician.

The net impact of the proposed staffing changes will increase RPU's total FTE count from 641.90 FTE to 642.90 FTE. The 2.0 FTE Utilities Electric Meter Technician positions will be underfilled at Apprentice or Apprentice Trainee level to allow professional growth into the journey level position. Following Beta Phase, additional positions will be required as the Program goes into full implementation. Those requested positions will be incorporated into the biennial budget for Fiscal Years 2020/21 – 2021/22. The Field Services Division has kept several positions vacant over the past year in anticipation of the AMI Program changing how RPU handles its meter reading process. Based on this plan, there is no plan for any employee layoffs.

FISCAL IMPACT:

There is no fiscal impact associated with the AMI staffing plan, as the proposed budget transfer will cover all anticipated salary/benefit costs for FY 2019/20.

The total Fiscal Year 2019/20 impact associated with this report is $7,228,650 as summarized in the following table:

Item	18/19	19/20	20/21	21/22	22/23	TOTAL
Tantalus AMI System	$140,000	$5,800,000	$1,327,644			$7,267,644
SmartWorks MDMS	$47,918	$595,732	$319,697	$395,665	$395,665	$1,754,677
EnQuesta Integration	$100,000	$275,000	$0	$0	$0	$375,000
Innovation & Technology Labor	$50,000	$230,000	$20,000	$0	$0	$300,000
Meter Test, IT and other Equipment	$150,000	$100,000	$0	$0	$0	$250,000
Customer Engagement Campaign	$150,000	$150,000	$0	$0	$0	$300,000
Contingency	$22,082	$77,918	$835,000	$0	$0	$935,000
TOTALS:	**$660,000**	**$7,228,650**	**$2,502,341**	**$395,665**	**$395,665**	**$11,182,321**

The only change from the presentation to the Board in January 2019 is a shift of $1,327,644 from FY 2019/20 to FY 2020/21 for Tantalus AMI System, as the Beta phase is not starting as early as initially expected. Sufficient funds are available for Fiscal Year 2019/20 in the Advanced Meter Infrastructure Account No. 6130200-470823. Staff will return to Board in the future to seek approval for the Fiscal Year 2020/21 funding of $2,502,341, which is part of the City Council approved five-year capital improvement program plan. Funding for subsequent years will be included in the next biennial budget process.

Prepared by: Daniel E. Garcia, Utilities Assistant General Manager/Resources
Approved by: Todd M. Corbin, Utilities General Manager
Approved by: Al Zelinka, FAICP, City Manager
Approved as to form: Gary G. Geuss, City Attorney

Certifies availability
of funds: Brian Seinturier, Utilities Fiscal Manager

Attachments:

1. Master Personnel Detail
2. Presentation