
Meeting Date: June 17, 2015

Staff Contact: Anthony Montoya, Chief Engineer, Water Resources Division

TITLE: C-15-18 – Approving and Agreement with Eaton Corporation for Arc Flash Analysis and Safety Training at Water Authority Facilities

ACTION: Recommend Approval

SUMMARY:

This item is for approval to enter into an agreement with Eaton Corporation to conduct Arc Flash analysis of Water Authority facilities, create One-Line electrical diagrams of those facilities, and provide training to operations staff related to Arc Flash hazards.

As part of the ongoing effort to improve workplace safety, the Water Authority has established a goal for FY15 to conduct Arc Flash Hazard Evaluations at its facilities. The evaluations are intended to identify electrical hazards so that operators can have a heightened awareness and hopefully a better understanding of the electrical dangers at each site in the attempt to minimize the occurrence of workplace injury.

This item includes application of arc flash labels generated from the previous arc flash study (C-14-7) conducted by Eaton for each potable and non-potable pump station.

A training component is also part of the Arc Flash Evaluation. The training is for Water Authority operators to be able to identify arc flash hazards and understand the warning labels around the hazard. The combination of the arc flash evaluation work and the training will hopefully minimize any future exposure to arc flash by the operators.

FISCAL IMPACT:

The agreement with Eaton Corporation to perform the analysis for the Water Authority facilities is \$283,057.80. Funding to support this agreement is in the FY15 budget.

**THIRD SUPPLEMENTAL AGREEMENT
ALBUQUERQUE BERNALILLO COUNTY
WATER UTILITY AUTHORITY
AND
EATON CORPORATION**

This **THIRD SUPPLEMENTAL AGREEMENT** is made and entered into on the date of the last signature entered below by and between the Albuquerque Bernalillo County Water Utility Authority, a New Mexico political subdivision, P.O. Box 568, Albuquerque, NM 87103-0568 (hereinafter referred to as the “Water Authority”), and Eaton Corporation, an Ohio corporation, 560 N. 54th St., Ste 3, Chandler, AZ 85226 (hereinafter referred to as the “Contractor”).

RECITALS

WHEREAS, the Water Authority and the Contractor entered into an Agreement, dated March 27, 2014, a First Supplemental Agreement dated June 3, 2014 and a Second Supplemental Agreement dated November 24, 2014, referred to as the “Original Agreement”, whereby the Contractor agreed to render certain professional services to the Water Authority under GSA contract no. GS-07F-9460G, which is attached to the Original Agreement; and

WHEREAS, the Water Authority wishes to add to the Scope of Services to include additional electrical one-line diagram and arc flash analysis services at additional well sites and plant locations; and

WHEREAS, the Water Authority wishes to increase the total compensation of the Original Agreement by \$283,057.80 for payment of the additional services; and

WHEREAS, the Water Authority wishes to extend the Original Agreement; and

WHEREAS, the Contractor is agreeable to adding to the Scope of Services, the increase in total compensation and extension of the term.

NOW THEREFORE, in consideration of the premises and mutual obligations herein, the parties hereto do mutually agree as follows:

1. Section 1, **Scope of Services**, of the Original Agreement is hereby amended to add Subsections E through I to read as follows:

- E. Updated electrical one-line diagram and arc flash analysis, ratings and verification of the relay/fusing coordination for the twenty seven (27) well sites in accordance with Exhibit E, which is attached hereto and incorporated herein as part of this Agreement.
- F. Updated electrical one-line diagram and arc flash analysis, ratings and verification of the relay/fusing coordination for the San Juan Chama Surface Water Treatment Plant (SWTP) in accordance with Exhibit F, which is attached hereto and incorporated herein as part of this Agreement.
- G. Application of all arc flash labels generated from a previous arc flash study conducted by the same contractor for each potable and non-potable pump station in accordance with Exhibit G, which is attached hereto and incorporated herein as part of this Agreement.

- H. Application of all arc flash labels (as required under NFPA 70E and mandated by OSHA) and adjustment of breaker setting according to the previous arc flash study conducted by the same contractor for each sewer lift, storm and vacuum stations in accordance with Exhibit H, which is attached hereto and incorporated herein as part of this Agreement.
- I. Complete short-circuit/coordination study, arc flash hazard analysis, and development of updated electrical one-line diagrams for the six (6) major odor control sites (as required under NFPA 70E and mandated by OSHA). Followed up by a full report, system review and recommendations, production and application of arc flash labels as well as any needed adjustable circuit breaker setting changes, in accordance with Exhibit I, which is attached hereto and incorporated herein as part of this Agreement.

2. Section 2, **Time of Performance**, of the Original Agreement is hereby amended to read as follows:

Time of Performance: Services of the Contractor shall commence upon execution of this Agreement and shall be undertaken and completed in such sequence as to assure their expeditious completion in light of the purposes of this Agreement; provided, however, that in any event, all of the Services required hereunder shall be completed by February 28, 2017. This Agreement may be extended in accordance with the term of the above-referenced GSA contract upon written agreement of the parties

3. Section 3.A., **Compensation**, of the Original Agreement is hereby amended to read as follows:

A. **Compensation.** For performing the Services specified in Section 1 hereof, the Water Authority agrees to pay the Contractor up to the amount of **Six Hundred Sixty-Seven Thousand Forty-Eight and 70/100 Dollars (\$667,048.70)**, which amount includes any applicable gross receipts taxes and which amount shall constitute full and complete compensation for the Contractor's Services under this Agreement, including all expenditures made and expenses incurred by the Contractor in performing such Services.

4. Section 3.B., **Method of Payment**, of the Original Agreement is hereby amended to add the following subsection:

2) Payment for Services as set forth in Sections 1.E., 1.F., 1.G., 1.H. and 1.I., above, shall be paid in the following amounts, which exclude any applicable New Mexico gross receipts taxes:

E)	Well Sites	\$118,797
F)	SJC Surface Water Treatment Plant	\$ 82,853
G)	Potable & Non-Potable Pump Stations	\$ 7,440
H)	Sewer Lift, Storm & Vacuum Stations	\$ 28,350
I)	Odor Stations	\$ 27,100

Gross receipts tax shall be billed as a separate item on the invoice to be paid.

Payments shall be made upon completion of the Services upon receipt by the Water Authority of properly documented requisitions for payment as determined by the budgetary and fiscal guidelines of the Water Authority and on the condition that the Contractor has accomplished the Services to the satisfaction of the Water Authority.

5. Except as herein expressly amended, the terms and conditions of the Original Agreement shall remain unchanged and shall continue in full force and effect unless there is a conflict between the terms and conditions of the Original Agreement and this Third Supplemental Agreement, in which event, the terms and conditions of this Third Supplemental Agreement shall control.

6. This Third Supplemental Agreement shall not become effective or binding until approved by the Water Authority's Executive Director.

IN WITNESS WHEREOF, the Water Authority and the Contractor have executed this Third Supplemental Agreement as of the date of the last signature entered below.

**ALBUQUERQUE BERNALILLO COUNTY
WATER UTILITY AUTHORITY**

**CONTRACTOR:
EATON CORPORATION**

Approved By:

Mark S. Sanchez, Executive Director

Date: _____

John M. Stomp III, P.E.
Chief Operating Officer

Date: _____

Reviewed by:

Charles W. Kolberg, General Counsel

Date: _____

By: _____

Title: _____

Date: _____

State Taxation and Revenue Tax
Identification No.: **01721442004**

Federal Taxpayer Identification No.:
34-0196300

EXHIBIT E
Arc Flash Study Scope of Services
Well Sites

1. General Description of Scope of Services: Work to be performed by the contractor under this agreement includes development of an updated electrical one-line diagram and arc flash analysis, ratings and verification of the relay/fusing coordination for the twenty seven (27) well sites. Contractor work includes:

- Development of a system model using the SKM Systems Analysis software for purposes of providing a complete arc flash analysis. This model will represent the system from the utility service entrance down to and including all major equipment locations such as panelboards, motor control centers (MCCs), switchboards and switchgear as understood by the supplied spreadsheets. The model will include the impedance model (cables, transformers, etc.), sources of short circuit contribution (utility, source, large motors, etc.) and the tripping characteristics of the overcurrent protection devices.
- Performing the arc flash analysis in accordance with IEEE 1584 equations that are presented in NFPA70E-2012, Informative Annex D. The short circuit calculations and the clearing times of the devices will be retrieved from the system model.
- Performing calculations for maximum and minimum contributions of fault current magnitude. The minimum calculation will assume that the utility contribution is at a minimum and will assume a minimum motor load. Conversely, the maximum calculation will assume a maximum contribution from the utility and will assume all motors to be operating. Up to 5 scenarios may be considered upon request and for no additional charge.
- Conducting data collection, short-circuit study, coordination study, arc flash hazard analysis, one-line diagram study, system review and formalization of recommendations, report presentation, arc flash training and arc flash label preparation and application.
- Onsite data gathering to consist of one contractor power system (or field service) engineer onsite for up to three (3) weeks at 8 hours per day during normal working hours.
- For the remaining data not gathered during the contractor's onsite visit, providing forms and direction to the Water Authority to allow data to be gathered in an efficient manner.
- Based on the arc flash analysis, providing and installing arc flash labels which include the arc flash level, personal protective equipment (PPE) requirements and safety clearance range measurements for all electrical equipment to include, but not be limited to, panel boards, individual MCC cubicles, switchboards and medium voltage switches, disconnect switches, control panels, VFDs, Soft Starters, etc.
- Providing a minimum of four (4) hours training and label interpretation in two (2) 4-hour class room training sessions.
- Installing arc flash labels at the seventy nine (79) well sites.

2. Responsibilities of the Water Authority: Responsibilities of the Water Authority under this agreement include:

- Supplying a complete set of any available electrical plans in electronic PDF format for the wells, including single-line diagrams and specifications.
- Providing a qualified escort(s) (Water Authority electrician(s) and operator(s)) to accompany the contractor to the sites, provide access to electrical equipment and to assist with the removal of equipment covers. At least one escort shall be CPR-certified.
- Shutting down the well if conditions prevail to allow this if it is necessary to gather the required information.
- When access to energized electrical equipment over 5 kVolts is required, providing an On-Call Electrician rated to access and test equipment over 5 kVolts.
- Verification that equipment can be opened without shutting down the equipment if required.
- Maintaining power to necessary plant equipment and processes.
- Coordinating all outages (if necessary) and performing all switching to de-energize or isolate equipment for data collection.
- Providing a man-lift and operator, if required, to access cable or bus/duct for data collection.
- Providing the utility contact name and phone number so that contractor can gather necessary utility data required to complete the analysis. Assisting the contractor in obtaining the maximum and minimum available three-phase and line-to-ground fault current with associated X/R ratios.

3. Delivery of Services: The scheduling of work will be mutually agreed upon between the Water Authority’s Groundwater Plant Operators/Electricians and contractor. Delivery time for submitting the completed one-line diagrams will be 4 to 6 weeks after all necessary data are collected/obtained and analyzed, and findings and recommendations documented in the report. Following the report presentation and acceptance of results by the Water Authority, contractor shall install all of the required labels on all respective equipment at each well site within 4 weeks.

4. Prices and Payments: Prices include the equipment data gathering, on-line drawing generation, short-circuit, coordination and arc flash hazard studies, printing and application of labels, training, travel time and related expenses, excluding NMGRT.

DELIVERABLES:

Short-circuit/coordination/arc flash analysis:	\$ 44,626
Onsite data collection:	\$ 52,608
Arc flash training:	\$ 9,181
Arc flash label application:	<u>\$ 12,382</u>
Total:	\$118,797

EXHIBIT F
Arc Flash Study Scope of Services
SJC Surface Water Treatment Plant

1. General Description of Scope of Services: Work to be performed by the contractor under this agreement includes development of an updated electrical one-line diagram and arc flash analysis, ratings and verification of the relay/fusing coordination for the SJC Surface Water Treatment Plant (SWTP) work includes:

- Development of a system model using the SKM Systems Analysis software for purposes of providing a complete arc flash analysis. This model will represent the system from the utility service entrance down to and including all major equipment locations such as panelboards, motor control centers (MCCs), switchboards and switchgear as understood by the supplied spreadsheets. The model will include the impedance model (cables, transformers, etc.), sources of short circuit contribution (utility, source, large motors, etc.) and the tripping characteristics of the overcurrent protection devices.
- Performing the arc flash analysis in accordance with IEEE 1584 equations that are presented in NFPA70E-2012, Informative Annex D. The short circuit calculations and the clearing times of the devices will be retrieved from the system model.
- Performing calculations for maximum and minimum contributions of fault current magnitude. The minimum calculation will assume that the utility contribution is at a minimum and will assume a minimum motor load. Conversely, the maximum calculation will assume a maximum contribution from the utility and will assume all motors to be operating. Up to 5 scenarios may be considered upon request and for no additional charge.
- Conducting data collection, short-circuit study, coordination study, arc flash hazard analysis, one-line diagram study, system review and formalization of recommendations, report presentation, arc flash training and arc flash label preparation and application.
- Onsite data gathering to consist of one contractor power system (or field service) engineer onsite for up to ten (10) days at 8 hours per day during normal working hours.
- Providing an on-site presentation and discussion of study results and recommendations. Addressing all questions and concerns regarding the study results. If it is determined that system changes, upgrades or modifications are necessary in order to reduce the incident energy at any location in the power system, the resulting study revision will be quoted and performed under a separate agreement.
- For the remaining data not gathered during the contractor's onsite visit, providing forms and direction to the Water Authority to allow data to be gathered in an efficient manner.
- Based on the arc flash analysis, providing and installing arc flash labels which include the arc flash level, personal protective equipment (PPE) requirements and safety clearance range measurements for all electrical equipment to include, but not be limited to, panel boards, individual MCC cubicles, switchboards and medium voltage switches, disconnect switches, control panels, VFDs, Soft Starters, etc.
- Providing a minimum of four (4) hours arc flash training and materials for ten (10) Water Authority attendees.
- Installing arc flash labels on all equipment.

2. Responsibilities of the Water Authority: Responsibilities of the Water Authority under this agreement include:

- Supplying a complete set of any available electrical plans in electronic PDF format for the wells, including single-line diagrams and specifications.
- Providing a qualified escort(s) (Water Authority electrician(s) and operator(s)) to accompany the contractor to the sites, provide access to electrical equipment and to assist with the removal of equipment covers. At least one escort shall be CPR-certified.
- Shutting down the well if conditions prevail to allow this if it is necessary to gather the required information.
- When access to energized electrical equipment over 5 kVolts is required, providing an On-Call Electrician rated to access and test equipment over 5 kVolts.
- Verification that equipment can be opened without shutting down the equipment if required.
- Maintaining power to necessary plant equipment and processes.
- Coordinating all outages (if necessary) and performing all switching to de-energize or isolate equipment for data collection.
- Providing a man-lift and operator, if required, to access cable or bus/duct for data collection.
- Providing the utility contact name and phone number so that contractor can gather necessary utility data required to complete the analysis. Assisting the contractor in obtaining the maximum and minimum available three-phase and line-to-ground fault current with associated X/R ratios.

3. Delivery of Services: The scheduling of work will be mutually agreed upon between the Water Authority's Surface Water Treatment Plant Operators/Electricians and contractor. Delivery time for submitting the completed one-line diagrams will be 4 to 6 weeks after all necessary data are collected/obtained and analyzed, and findings and recommendations documented in the report. Following the report presentation and acceptance of results by the Water Authority, contractor shall install all of the required labels on all respective equipment at each well site within 4 weeks.

4. Prices and Payments: Prices include the equipment data gathering, on-line drawing generation, short-circuit, coordination and arc flash hazard studies, printing and application of labels, training, travel time and related expenses, excluding NMGRT.

DELIVERABLES:

Short-circuit/coordination/arc flash analysis:	\$45,665
Onsite data collection:	\$25,086
Report presentation and arc flash training:	\$ 4,979
Arc flash label application:	\$ 4,123
10 additional locations:	<u>\$ 3,000</u>
Total:	\$82,853

EXHIBIT G
Label Applications Scope of Services
Potable and Non-Potable Pump Stations

- 1. General Description of Scope of Services:** Work to be performed by the contractor under this agreement includes application of all arc flash labels generated from a previous arc flash study conducted by the same contractor for each potable and non-potable pump station.
 - Installing arc flash labels on all equipment. Arc flash labels include the arc flash level, personal protective equipment (PPE) requirements and safety clearance range measurements for all electrical equipment to include, but not be limited to, panel boards, individual MCC cubicles, switchboards and medium voltage switches, disconnect switches, control panels, VFDs, Soft Starters, etc.
 - Based on short-circuit and coordination analyses included in the previous arc flash study, changing settings on electrical equipment per the study recommendations.
- 2. Responsibilities of the Water Authority:** Responsibilities of the Water Authority under this agreement include:
 - Providing a qualified escort(s) (Water Authority electrician(s) and operator(s)) to accompany the contractor to the sites, provide access to electrical equipment and to assist with the removal of equipment covers. At least one escort shall be CPR-certified.
- 3. Delivery of Services:** The scheduling of work will be mutually agreed upon between the Water Authority's Groundwater Plant Operators/Electricians and contractor.
- 4. Prices and Payments:** Prices include arc flash label application and circuit breaker settings changes, excluding NMGRT.

COST FOR SERVICES:

- Arc flash label application and circuit breaker settings changes: Total: \$7,440

EXHIBIT H
Label Applications Scope of Services
Sewer Lift, Storm and Vacuum Stations

1. General Description of Scope of Services: Work to be performed by the contractor under this agreement includes application of all arc flash labels (as required under NFPA 70E and mandated by OSHA) and adjustment of breaker setting according to the previous arc flash study conducted by the same contractor for each sewer lift, storm and vacuum stations.

- Installing arc flash labels on all qualifying electrical equipment at the 34 Sanitary Lift, 10 Vacuum, and 14 Storm Stations. Arc flash labels include the arc flash level, personal protective equipment (PPE) requirements and safety clearance range measurements for all electrical equipment to include, but not be limited to, panel boards, individual MCC cubicles, switchboards and medium voltage switches, disconnect switches, control panels, VFDs, Soft Starters, etc.
- Adjustable circuit breaker setting will be changed based on short-circuit and coordination analyses included in the previous arc flash study recommendations at the following stations:
 - Lift Station 20
 - Lift Station 24
 - Lift Station 80
 - Storm Station 44
 - Vacuum Station 62
 - Vacuum Station 63
 - Vacuum Station 65
 - Vacuum Station 68
 - Vacuum Station 69

2. Responsibilities of the Water Authority: Responsibilities of the Water Authority under this agreement include:

- Providing a qualified escort(s) (Water Authority electrician(s) and operator(s)) to accompany the contractor to the sites, provide access to electrical equipment and to assist with the removal of equipment covers. At least one escort shall be CPR-certified.

3. Delivery of Services: The scheduling of work will be mutually agreed upon between the Water Authority's Sewer Lift, Storm and Vacuum Station Operators/Electricians and contractor.

4. Prices and Payments: Prices include arc flash label application and circuit breaker settings changes, excluding NMGRT.

COST FOR SERVICES:

- Arc flash label application and circuit breaker settings changes: Total: \$28,350

EXHIBIT I
Arc Flash Study Scope of Services
Odor Stations

1. General Description of Scope of Services: Work to be performed by the contractor under this agreement includes complete short-circuit/coordination study, arc flash hazard analysis, and development of updated electrical one-line diagrams for the six (6) major* odor control sites (as required under NFPA 70E and mandated by OSHA). Followed up by a full report, system review and recommendations, production and application of arc flash labels as well as any needed adjustable circuit breaker setting changes.

The scope of work includes the following:

- Onsite Data Collection
- Short-Circuit Study / Coordination Study
- Arc Flash Hazard Analysis
- Study One-line Diagrams
- System Review and Recommendations
- Arc Flash (4) hour Training Session
- Arc Flash Labels
- Arc Flash Label Application
- Updating Adjustable Circuit Breaker Settings

*Proposal only includes stations: H₂O₂ Station 1, FeCl₂ Station 50, FeCl₂ Station 51, H₂O₂ Station 64, FeCl₂ Station 70 and Station 75. These are the “major” odor control stations that have a large electrical load. “Note: Based on IEEE Std 1584-2002, equipment below 240 V need not be considered in arc flash calculation unless it involves at least one 125kVA or larger low-impedance transformer in its immediate power supply.”

Contractor work in detail includes:

- Development of a system model using the SKM Systems Analysis software for purposes of providing a complete arc flash analysis. This model will represent the system from the utility service entrance down to and including all major equipment locations such as panelboards, motor control centers (MCCs), switchboards and switchgear as understood by the supplied spreadsheets. The model will include the impedance model (cables, transformers, etc.), sources of short circuit contribution (utility, source, large motors, etc.) and the tripping characteristics of the overcurrent protection devices.
- Performing the arc flash analysis in accordance with IEEE 1584 equations that are presented in NFPA70E-2012, Informative Annex D. The short circuit calculations and the clearing times of the devices will be retrieved from the system model.
- Performing calculations for maximum and minimum contributions of fault current magnitude. The minimum calculation will assume that the utility contribution is at a minimum and will assume a minimum motor load. Conversely, the maximum calculation will assume a maximum contribution from the utility and will assume all motors to be operating. Up to 5 scenarios may be considered upon request and for no additional charge.

- Conducting data collection, short-circuit study, coordination study, arc flash hazard analysis, one-line diagram study, system review and formalization of recommendations, report presentation, arc flash training and arc flash label preparation and application.
- Onsite data gathering to consist of one contractor power system (or field service) engineer onsite. These data collection costs are based on the time estimated to travel to each location and gather the necessary data and include extra time to develop one-lines for use in the study when updated one-lines are unavailable.
- Based on the arc flash analysis, providing and installing arc flash labels which include the arc flash level, personal protective equipment (PPE) requirements and safety clearance range measurements for all electrical equipment to include, but not be limited to, panel boards, individual MCC cubicles, switchboards and medium voltage switches, disconnect switches, control panels, VFDs, Soft Starters, etc.
- The four (4) hour Arc Flash training session will accommodate up to (20) individuals. Each member will receive a training binder as well as a hard copy of the NFPA 70E 2015.
- Making changes to adjustable circuit breaker settings to improve overcurrent system coordination.

2. Responsibilities of the Water Authority: Responsibilities of the Water Authority under this agreement include:

- Supplying a complete set of any available electrical plans in electronic PDF format for the wells, including single-line diagrams and specifications.
- Providing a qualified escort(s) (Water Authority electrician(s) and operator(s)) to accompany the contractor to the sites, provide access to electrical equipment and to assist with the removal of equipment covers. At least one escort shall be CPR-certified.
- Shutting down the well if conditions prevail to allow this if it is necessary to gather the required information.
- Verification that equipment can be opened without shutting down the equipment if required.
- Maintaining power to necessary plant equipment and processes.
- Coordinating all outages (if necessary) and performing all switching to de-energize or isolate equipment for data collection.
- Providing a man-lift and operator, if required, to access cable or bus/duct for data collection.
- Providing the utility contact name and phone number so that contractor can gather necessary utility data required to complete the analysis. Assisting the contractor in obtaining the maximum and minimum available three-phase and line-to-ground fault current with associated X/R ratios.

3. Delivery of Services: The scheduling of work will be mutually agreed upon between the Water Authority's Odor Control Operators/SWRP Electricians and contractor. Delivery time for submitting the completed report will be 4 to 6 weeks after all necessary data are collected/obtained and analyzed, and findings and recommendations documented in the report.

Following the report presentation and acceptance of results by the Water Authority, contractor shall install all of the required labels and make needed breaker setting adjustments on all respective equipment at each Odor site within 4 weeks. Changes to these deadlines can be made with the approval of the Water Authority's Project Manager.

4. Prices and Payments: Prices include the equipment data gathering, one-line drawing generation, short-circuit, coordination and arc flash hazard studies, system review and recommendations, printing and application of labels, updating adjustable circuit breaker settings, travel time and related expenses, excluding NMGRT.

COST FOR SERVICES:

- Short-Circuit / Coordination Study / Arc Flash Analysis / Arc Flash Training / Label Application / Breaker Settings Adjustment. Total: \$27,100