

COMMISSION FILE NO: 21-134-10 **DATE INTRODUCED:** October 11, 2021

INTRODUCED BY: Executive Director (Signature on File in the Office of the Commission)

REFERRED BY COMMISSION CHAIRPERSON TO: Operations Committee

RELATING TO: Award of Contract S03004C01, Effluent Pump Motor Control Center and Variable Frequency Drive Upgrades at South Shore Water Reclamation Facility

SUMMARY:

The Commission is requested to award and to direct the Executive Director to execute on behalf of the District Contract S03004C01, Effluent Pump Motor Control Center (MCC) and Variable Frequency Drive (VFD) Upgrade at South Shore Water Reclamation Facility (SSWRF), to NEXT Electric, LLC, in the amount of \$611,900. NEXT Electric, LLC, was the lowest responsible, responsive bidder among three bids received.

SSWRF uses both self-generated electrical power and purchased power from We Energies. This power is distributed and managed throughout SSWRF using load center unit substations (LCUS), and motor control centers. Each LCUS distributes power to several MCC's throughout the facility. An MCC is an electric device that allows for safe distribution of power and control of individual pieces of equipment. Each MCC consists of circuit breakers, motor starters, and controllers, all located in cubicles surrounded by a steel enclosure.

A VFD controls the speed of an electric motor by adjusting the frequency and voltage of the motor's power supply. VFD's are primarily used to save energy and improve system efficiency. During startup, a VFD gradually increases motor voltage, providing a controlled ramp-up to full speed; this lowers inrush current and controls starting torque, reducing electrical load and mechanical wear during each startup.

Like a VFD, a soft starter gradually increases voltage to a motor during startup, providing a controlled ramp-up to full speed; however, unlike a VFD, a soft starter cannot control the motor speed after startup.

ATTACHMENTS: **BACKGROUND** ☐ **KEY ISSUES** ☐ **RESOLUTION** ☒
FISCAL NOTE ☒ **S/W/MBE** ☒ **OTHER** ☐ _____

OP_Award_S03004C01_Effluent_Pump_VFD_MCC_legislative_file.docx
09-22-21

COMMITTEE ACTION: _____ **DATE:** _____

COMMISSION ACTION: _____ **DATE:** _____

SUMMARY (Cont'd)

Award of Contract S03004C01, Effluent Pump Motor Control Center and Variable Frequency Drive Upgrades at South Shore Water Reclamation Facility

At SSWRF, five effluent pumps are used to pump fully treated wastewater into the plant effluent conduit and Lake Michigan. The need to use the pumps changes with varying levels of Lake Michigan along with changes in plant flow. Effluent pumping is continuously required when plant flow is high. When lake levels are low, effluent can bypass the pumping system and exit the plant by gravity. Between high and low lake levels and plant flows, the need for pumping varies.

Each of the five effluent pumps is driven by a 200 horsepower electric motor, providing each pump with the capability to pump 75 million gallons per day. Two MCC's provide power to two VFD's for two of the effluent pump motors and three soft starters for the other three effluent pump motors.

The purpose of this project is to improve the reliability of the effluent pumping system. The two MCC's are over 30 years old and have exceeded their expected useful service lives. The soft starters are over 12 years old and have exceeded their useful service lives. There is limited ability to obtain spare parts for this equipment. The condition of the two existing VFD's is acceptable.

Staff recommends both replacing the MCC's and installing VFD's in place of the soft starters. Replacing these soft starters with VFD's will allow all effluent pumps to run at variable speeds, which will:

- Save energy costs.
- Provide operational flexibility to balance run hours.
- Reduce the number of pump starts and stops, which will extend effluent pump and motor service life.

There is other ancillary electrical equipment in this area that has experienced corrosion and staff recommends replacement.

In addition, the rooms in which this electrical equipment is located is classified by the National Fire Protection Association as "flammable gases/vapors may be present during abnormal conditions". By separating the main room and electrical room from a utility tunnel, the District can change room classification to "flammable gases/vapors are not present during normal or abnormal conditions". This represents reduced safety risks.

SUMMARY (Cont'd)

Award of Contract S03004C01, Effluent Pump Motor Control Center and Variable Frequency Drive Upgrades at South Shore Water Reclamation Facility

Staff recommends improvements summarized below to address these issues. Under Contract S03004C01, the contractor will:

- Remove and replace:
 - Two MCC's.
 - Three soft starters with VFD's.
 - One power panel and one lighting panel corroded.
 - Low voltage disconnects, transformers and automatic transfer switch.
- Physically separate the Effluent Pump Station main floor and electrical room from the SSWRF utility tunnel system.

The contract duration is 380 days.

RESOLUTION

Award of Contract S03004C01, Effluent Pump Motor Control Center and Variable Frequency Drive Upgrades at South Shore Water Reclamation Facility

RESOLVED, by the Milwaukee Metropolitan Sewerage Commission, that Contract S03004C01, Effluent Pump Motor Control Center and Variable Frequency Drive Upgrades at South Shore Water Reclamation Facility, is awarded to NEXT Electric, LLC, in the amount of \$611,900, and that the Executive Director is directed to execute a contract on behalf of the District.