

Variable Frequency Drive Management Plan



Project Concept:

Variable Frequency Drives (VFDs) are motor control systems that attach to electric motors and control the frequency and voltage that is supplied to the motor. Once installed, they drive down the amount of energy used by the electric motor and reduce energy costs.

Our sewer ponds at the Wastewater Treatment Plant are regulated using an aeration system that distributes dissolved oxygen to the ponds. This aeration system is run using four 50 Horsepower motors (two of which were retrofitted with VFDs in 2009). At the Wastewater Treatment Plant, we are charged based on the spike in our energy consumption each month. The two new VFDs will be able to communicate with the motors and kick them off faster once the required dissolved oxygen levels are reached, thereby reducing the size of our monthly energy spike and saving the City a significant amount of money.

Location:

Blower Building at Red Lodge Wastewater Treatment Plant
40 Two Mile Bridge Road
Red Lodge, Montana

Installed Items:

2 Yaskawa A1000 VFD Drives
2 Door Mounted Programmable Keypads
Door Operated MCP Main Disconnect
2 VFD Isolation Disconnects
2 Speed Selectors
2 Hand Off Auto Switches
Fused control Power Transformer,
460V:120V AC

Filtered Forced Air Ventilated NEMA 12
Enclosure (72"H X 48"W X 18"D)
2 MTE Harmonic Filters
Floor Standing Mounting Feet for
Enclosure
2 Toshiba Model 50 F4EG841, 50 Hp,
1800 RPM, 326T frame, 460V 3 phase
TEFC Electric Motor

Installer Information:

Red Lodge Electric Company, Mark Brown
25 Shadow Drive
Red Lodge, MT 59068
(406) 446-1882, redlodgeelectric@gmail.com

Funding:

The City purchased and installed 2 Variable Frequency Drives for a total of \$49,614.15. A rebate from Northwestern Energy was received, which reduced the City's project costs by \$5,000.

Monitoring Usage:

NorthWestern Energy Account Number: 0969985-1

The Blower Building where the VFDs were installed is on the meter that is listed above. A monitoring spreadsheet has been developed that will allow the City to track the energy and cost savings accrued due to this investment.

The monitoring spreadsheet is available online via Google Sheets and can be found at the link below:

https://docs.google.com/spreadsheets/d/1gTng1eQ1LAoTUtiaXQywEEpukKWqbbFLkdcxnZIt_4g/edit?usp=sharing

Community Impact:

The City will see significant monetary savings from this project, as the VFDs will decrease the energy spike that our Wastewater Treatment Plant produces each month. The VFDs will also decrease the amount of energy used and lessen the amount of greenhouse gases that our plant emits. It will also more closely align motor and pump operation with the actual need for dissolved oxygen.

Maintenance Plan:

The Public Works Department will be in charge of maintaining the VFDs.. At present, we have a Wastewater Plant Manager who monitors the plant each day, and he will be able to track and address any maintenance needs.