

Churchill Monitoring Site Visit – 2012Sep26

CDH Energy reviewed the monitoring installation at the Churchill with Aegis Energy Systems on September 26, 2012. Locations for all sensors were identified, and several sensors are already installed.

Monitoring for the following major energy streams for the system were identified:

Generator Net Power Output: Gross power (**WG**) measured by a single power transducer located in the cogen disconnect, and parasitic power (**WPAR**) measured by a single power transducer located in the parasitic load panel. Inside the parasitic load panel are also two ejector pumps, not related to the CHP installation. CDH Energy will furnish a Veris H931 analog current transducer to monitor the current on these pumps, and their energy consumption will be subtracted from the CHP parasitic energy measurement. Net power (**WGnet**) from the CHP system will be calculated using the difference between the gross power and parasitic power (**WG - WPAR**).

Both power transducers were observed installed at the facility. Both meters need two sets of #20/2-conductor twisted shielded pair (or one set of #20/4-conductor twisted shielded pair) pulled between each meter and the data logger. All daisy chain connections shall be made at the data logger panel.

Net Useful Heat Recovery: Useful heat recovery is monitored using two BTU meters. The first BTU meter (**QT**) measures the total heat output from the plant, and the second BTU meter (**QD**) measures the heat rejected by the dump radiator. Net useful heat recovery (**QU**) will be calculated by the difference between the two meters (**QT - QD**). Heat transfer, flow, and temperatures will all be collected from the BTU meters.

Both meters were observed installed at the facility. The total heat output meter (**QT**) will be powered by the data logger unit (+/- 24 VDC), using a separate pair of #20/2 wires, which need to be pulled from the meter to the data logger. The dumped heat meter (**QD**) will be powered by the 24 VAC transformer located at the Cogen Control Panel on the 34th floor.

The total plant output meter (**QT**) needs two sets of #20/2-conductor twisted shielded pair (or one set of #20/4-conductor twisted shielded pair) pulled between the meter and the data logger. The dumped heat meter (**QD**) needs one set of #20/2-conductor twisted shielded pair pulled between the meter and the data logger, as this meter will be the last meter in the daisy chain connection.

Total Facility Power Import: The total facility power import (**WT**) will be measured using a single power transducer with flexible CTs located on the main bus for the building. The only load upstream of the CT location will be fire pumps which are not a regular building load and shall not be monitored.

The power transducer was observed installed at the facility, and Both meters need two sets of #20/2-conductor twisted shielded pair (or one set of #20/4-conductor twisted shielded pair) pulled between each meter and the data logger. All daisy chain connections shall be made at the data logger panel.

CHP Gas Consumption: The CHP system gas consumption (**FG**) will be measured using pulse output from the Con-Ed gas meter. The pulse output needs a single #20/2-conductor twisted shielded pair pulled from the meter back to the data logger panel.

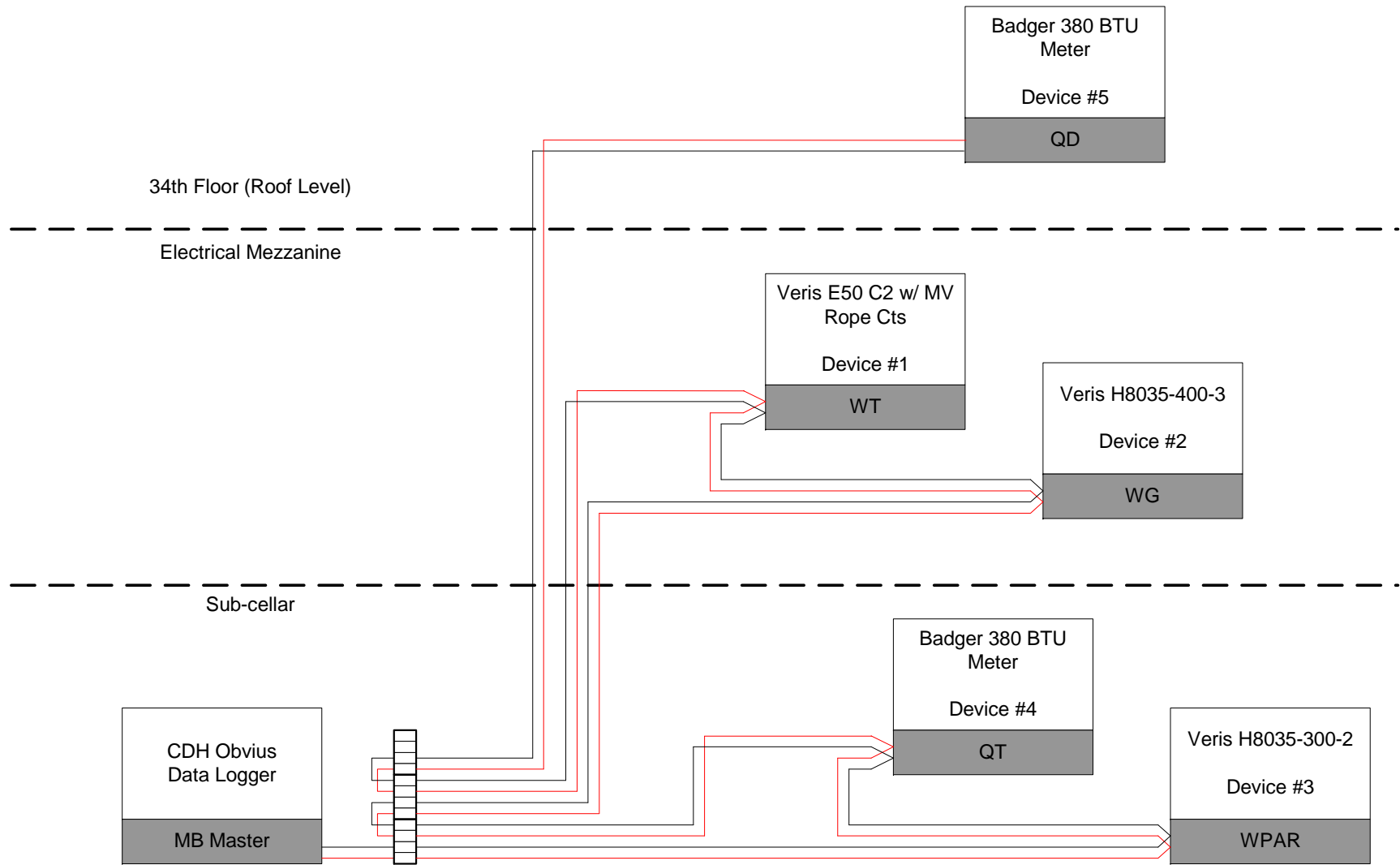


Figure 8. Modbus Communication Loop Configuration