## 6.5.3.3 MLTR Pump Operation

The MLTR pumps recycle mixed liquor from the mixed liquor transfer return channel (MBR basin effluent channel) to Zone 3 of the MBR aeration basin. The system is designed for one pump operation with the second pump to provide redundancy. The control system automatically alternates the pumps to provide equal time on both pumps.

## **MLTR Pump Control Screen**

The MLTR pumps are controlled through SCADA from MLTR pump screen. The access to these screens is discussed in the following sections.

## **MLTR Pump Control Screen**

The automatic operation of the MLTR pumps is controlled through the SCADA system from the membrane main screen (*Figure 6.5.3.3-1*). The screen is accessed by clicking on the MBR button <1> on the top of the screen. The MLTR Pumps screen is accessed by selecting the MLTR Pumps icon <2>.



Figure 6.5.3.3-1 – Membrane System Control Panel

## **MLTR Pump Controls**

The MLTR pump screen (*Figure 6.5.3.3-2*) provides for status and control of the MLTR pumps. The pumps flow rate is paced off of the MBR plant flow. The MBR control system monitors the MLTR channel level <3> and varies the filtrate pump speed dependent on a number of the MLTR channel level. Two level indicators <4> measure the MLTR channel level. The level indicators can be enabled or disabled on this screen.

At least one of the level indicators must be enabled. Clicking on the level box will give a popup box that provides for entry of the alarm setpoints for MLTR channel level.



Figure 6.5.3.3-2 – MLTR Pump Screen

The valves can be opened and closed by clicking on the **valve icon <5>**. Clicking on the icon will give a popup box that will allow for opening and closing of the valve. The local control station for the valve must be set to REMOTE for this function to work from SCADA. The valves allow for sending the MLTR flow to either CAS AB#4 or to MBR AB#5.

Clicking on the **pump icon <6>** accesses the pump controls as shown in *Figure 6.5.3.3-2*. Clicking on the pump icon will give a popup box that provides pump control as discussed in the following section and shown in *Figure 6.5.3.3-3*.

#### **MLTR Pump Control**

The pumps must be in automatic in order for the pumps to run in automatic mode. When the system auto is on and the pumps are in AUTO mode, the pumps will turn on and run as needed to meet the flow setpoint. If the lead pump is not able to meet the flow setpoint, the lag pump will automatically start.

The pump mode of control is set with the AUTO, START and STOP buttons. This pump should be set in AUTO by clicking on the AUTO button <7>. The pumps can be started manually with the START/STOP buttons.



Figure 6.5.3.3-3 – MLTR Pump Control Screen

#### **MLTR Pump PID Loop Controller**

Clicking on the **PID button <8>** (*Figure 6.4.3.2-3*) will give a popup box with the PID controller for the filtrate pump as shown in *Figure 6.4.3.3-4*. This box provides a trend plot of the process variable for the pump as well as the PID control variables to tune the pump. These values have been set by the GE Technician and should not be changed without confirmation from GE.



Figure 6.5.3.3-4 – MLTR Pump PID Control Screen

## **MLTR Pump Flowrate Control**

The MLTR pump flowrate is controlled as a percent of the MBR flow. This flowrate is adjusted every 15-minutes by the MBR control system. The percent of MBR flow is set by the **Common Setpoints input box <1>** on the MBR screen shown in *Figure 6.5.3.3-5*.

| Phase 1 Expansion Pg.1  |  |  |   |  |
|---|--|--|---|--|
| Plant<br>Overview Treatment   | Phase 1<br>Page 2<br>Page 2<br>P | MBR AER<br>BASIN                               | Centrate<br>EQ Basins   | Trending Reports   |
| EVER EVER EVER EVER EVER EVER EVER EVER   | MBR Plant O  | verview  | Tue   | 06 Nov, 2012<br>09:47:12   |
| FII-38-015B   |  |  |   |  |
| Z000/ golf<br>Totalized MIBR Flow<br>Totay 416485.00 gal<br>Yesterday 3221014.00 gal<br>MBR<br>Influent<br>0 0 0 0 0 0 0                          | IT-39-028 AIT-39-048   0.08 N10   BR Basin 1A MBR Basin 1B   Koouction M. clean   TL: 5:31   | MLTR<br>Channel<br>11039-421<br>Pump 1A        | Totalized Plant Production<br>Today 416416.00 gal<br>Yesterday 3567408.00 gal | 110.39.602 No. 1<br>110.39.612 No. 2<br>110.39.612 No. 2<br>MLTR Filtrate To<br>Disinfection |
| Common Equipmen   | nt Setpoints   | 110 39 041<br>Pump 1B                          |   | ТП.39.029  |
| KS-110-39-502D - STBY MLTR Pump 0<br>FFY-39-505 - MLTR Pumps Recirc. Fa<br>KQS-110-63-011 - BP Pumps Lead Sw<br>KQS-210-32-012 - Mam Agr. Blowers | Dp. Iterations 2<br>stor 59 9<br>ritch Time 10 m   | 110.39-061<br>Pump 2A<br>110.39-081<br>Pump 2B | iodium Hypo. Citric Acid  | 66.6 deg.F<br>Backpulse<br>Pumps   |
| KOS 110 20 502 MI TE Burner Swite   | a Time 24.0 br   | Filtrate<br>Pumps                              |   | "(o)—  |
|   | Exit   |  | 1   | 0.63.011 No. 1   |
| Quit Go To Plant Comm<br>Project Granbics Setto ints Setto  | non Membrane Pe  | ermeate contr                                  | actor Horn Alarm  | Alarm Ack. All<br>Histopr Alarms   |
| Alarms Date Time State Group Name   | Comment  |  |   | Operator   |
|   | Tri-City Me  | mbrane   | Communication Statu   | <u>s</u>   |
| TC contractor   | LOGOUT DIALER ALAR<br>SUMMA  | ALARM ALARM STATUS                             | TC4A TC3A TC1<br>Main BK<br>Pro Pro 3   | 11/6/2012  |

Figure 6.5.3.3-5 – MBR Common Setpoints Popup Box

#### Mixed Liquor Transfer Return Channel Level Alarms

The alarm setpoints for the MLTR channel are located on the MLTR pump screen. They are accessed by clicking on one of the MLTR channel level indicators. This will give a popup box with the alarm setpoints as shown in *Figure 6.5.3.3-6*.

## **Mixed Liquor Transfer Return Channel Level Alarms**

The alarm setpoints for the MLTR pump recirculaton flow are located on the MLTR pump screen. They are accessed by clicking on the MLTR Flow to AB#5 flow indicator. This will give a popup box with the alarm setpoints as shown in *Figure 6.5.3.3-7*.



Figure 6.5.3.3-6 – MLTR Channel Alarm Setpoints Popup Box



Figure 6.5.3.3-7 – Recirculation Flow Transmitter Setpoint Popup Box

# **MLTR Pump Startup Sequence**

To start up the MLTR pumps in Automatic Mode, follow the following sequence. This sequence is for a cold startup of the pumps. If the system is operating, confirmation that the equipment is off may not be necessary.

| Step | Action   | Location  |
|------|--|---|
|      | Confirm Equipment is in Off  |   |
| 1    | Confirm MLTR Pumps are OFF   | SCADA Main Screen                               |
| 2    | Confirm MLTR Pumps are in Off Position in SCADA  | SCADA Main Screen                               |
| 3    | Confirm MLTR Pumps are in OFF Position at Local VFD Panel  | MBR Electrical Room                             |
| 4    | Confirm MLTR Pumps Breaker is OPEN at the MCC Panel  | MBR Electrical Room                             |
|      | Ready Equipment  |   |
| 1    | Confirm MLTR valve to the aeration basin (540-<br>35-507) is open (For AB#5)                         | AB#5  |
| 2    | Confirm MLTR Pump suction and discharge valves are Open  | MBR Building Lower Level                        |
| 3    | Close Breaker in MCC for MLTR pumps at MCC   | MBR Electrical Room MCC                         |
| 4    | Close Breaker on MLTR pump VFD for both MLTR pumps   | MBR Electrical Room VFD                         |
| 5    | Place MLTR pumps in REMOTE at MLTR pump<br>VFD Panel   | MBR Electrical Room VFD                         |
| 6    | Confirm MLTR pumping rate setpoint on the MBR<br>Common Setpoint screen. Design setpoint is<br>400%. | SCADA Membrane System<br>Common Setpoint Screen |
| 7    | Place MLTR pumps in AUTO on MLTR pump<br>SCADA Screen  | SCADA MLTR Pump Screen                          |
| 8    | Pumps will now operate when called by the MBR control system   |   |