STANDARD

OPERATING PROCEDURE

Plant Area: General

Procedure: General Procedures

Doc. Ref. STD-OP04 Rev 1

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1.0 REVISIONS

Revision	Date	Description	Reviewed	Approved
1	22/02/2023	Updated Formatting	AM	DB

2.0 EMERGENCY PROCEDURES

Before operating any sections of the plant, the operator must familiarise him or herself with the following emergency procedures to ensure that potentially hazardous situations can be stopped as soon as possible.

2.1. Shutdown of Drive(s)

In situations which require an emergency shutdown of any drive, carry out the following as appropriate:-

- Switch the local isolator to OFF.

  OR
- Set the drive to OFF at the SCADA.

  OR
- Push the **EMERGENCY STOP** button at the associated control panel.

THIS WILL STOP ALL DRIVES ASSOCIATED WITH THE CONTROL PANEL AND SHOULD ONLY BE USED IN DIRE EMERGENCY.

NOTE:

If a control panel emergency stop button has been used to stop a section of the plant, the emergency stop button should be released and the emergency circuit reset **as soon as it is safe to do so** to allow key plant items to re-start automatically. Manual re-starting of the remaining systems must then be carried out as appropriate. See Section 2.0.

2.2. Leakage - General

In situations where uncontrolled leakage is occurring from a fractured pipe or incomplete pipe fitting, carry out the following as appropriate:-

- Close all necessary valves feeding material to the fracture/incomplete pipeline.

  THEN
- Switch any relevant drives OFF at the operator interface or using the local isolator(s).

2.3. Leakage - Chemical

In situations where uncontrolled leakage is occurring from a chemical pipeline/tank, carry out the following as appropriate:-

- Prevent access into the affected area by any personnel unless the appropriate personnel protective equipment is worn.
- If safe to do so, switch the relevant dosing pump OFF at the SCADA or using the local isolator(s) to alleviate the pressure at the leakage.
- If safe to do so, close all necessary valves feeding material to the fracture/incomplete pipeline.
- If it is not safe to access the valves/pumps, wait until the contents of the pipe/tank are fully discharged. Where bunds are provided for IBCs, these safely hold greater than the maximum contents of one of the chemical IBCs. **Do not take any unnecessary risks to stop leakage if it is contained within a bund.**
- Ensure that suitable warning is given to prevent other personnel entering an area with a chemical spill.
- Refer to the chemical safety data sheet for the appropriate measures to contain and clear up the spillage.

2.4. Overflow

In situations where uncontrolled overflow is occurring from a tank or sump, carry out the following as appropriate:-

- If possible stop transfer of wastewater to the tank or sump by stopping any feeding pumps or systems or closing appropriate valves
- Investigate cause of overflow and rectify.

2.5. Foaming

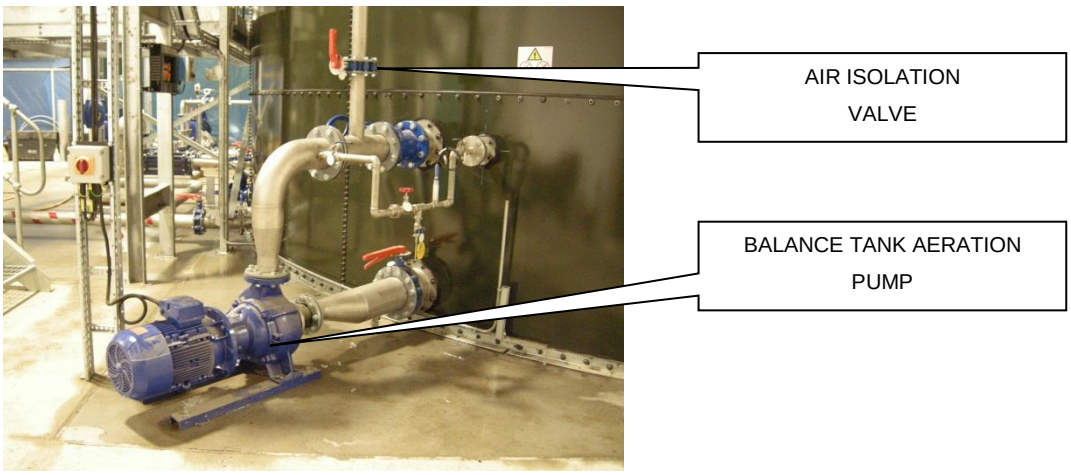
The main risk of foaming exists where the wastewater is being aerated. Hence there is risk of foaming with aerated balance tanks and bioreactor tanks.

Foaming at Aerated Balance Tank

If foam is overflowing from an aerated balance tank, carry out the following as appropriate:-

- Eliminate the addition of air to the tank by closing the air isolation valve at the balance tank aeration unit(s).
- This still allows the tank to be mixed but prevents air being entrained into the aeration manifold.
- Manually add the **approved non-silicone base antifoam** if required to alleviate the foaming.
- Hose down and clean up any foam residues.

- Once the foaming has been alleviated, re-instate the entrained air by opening the air isolation valve as required. Throttling of the air valve may be required to prevent excessive air entrainment.



Typical self-entraining aeration system for balance tanks

Foaming at Bioreactor Tank

If foam is overflowing from an aerated bioreactor tank, carry out the following as appropriate:-

- Reduce the addition of air to the tank by stopping any assist air blowers or if required both the assist and the duty air blowers.
- Manually add the **approved non-silicone base antifoam** if required to alleviate the foaming.
- Hose down and clean up any foam residues.
- Re-instate the air blowers as soon as possible to ensure continued aeration of the bioreactor contents.

CAUTION: USE NON-SILICONE BASED ANTIFOAM ONLY

The use of silicone based antifoam can cause irreparable damage to the UF Membrane Modules.

ONLY USE APPROVED NON-SILICONE BASED ANTIFOAM.

3.0 POWER FAILURE/EMERGENCY STOP

This section describes the features provided for the event of power failure and regaining of power.

3.1. Power Failure Features

A Phase Failure Device is installed within the mains section of each control panel. On failure of any or all phases, a signal is sent to the associated PLC indicating power failure has occurred.

In the event of loss of power to the panel either due to mains power failure or simply switching off the panel mains switch, remote indication of the power failure will be possible via the critical alarm relay function (if connected by the Client), i.e. the PLC will be holding this relay closed in the healthy condition and then on power failure the relay will be open thus raising the alarm remotely (if connected by the Client). In addition the power failure may be indicated via the Remote Mobile Phone Alarm System (if supplied).

On subsequent power up of the control panel, following mains power failure or simply switching off the panel mains switch, the following Power Recovery sequence will be carried out:-

- POWER RECOVERY text is flashed on/off on the bottom bar of all pages for the duration of the Power Recovery sequence.
- To prevent uncontrolled start-up, all systems are set to shutdown condition.
- The PLC generates an output signal to reset the emergency stop relay.
- After a delay, the associated inverters are reset.
- After a delay, the Alarm Mute, Accept and Reset functions are activated to clear any false alarm conditions generated due to power failure/start-up.
- The PLC records the power failure/start-up event at the Alarm Pages.
- The status of drives and valves is maintained through the power failure i.e. drives or valves set to AUTO prior to power failure will still be in AUTO on power up.
- Any drives or valves which are set to AUTO and are not controlled as part of a System are restarted automatically on power up.
- Any systems which were in operation prior to power failure are permitted to restart according to the start-up sequence.
- Any UF Membrane Banks which were active in Operation Mode prior to power failure undergo an Autoflush sequence and are then permitted to restart according to the start-up sequence.
- If a system was active in a mode other than normal operation, e.g. cleaning or flushing modes, the system is not restarted. Manual intervention is required.
- Any supporting systems e.g. UF Membrane Backflush Systems which were active prior to power failure are automatically restarted.

- Any tank filling functions are re-initiated if previously active.
- Once all stages are complete, the Power Recovery sequence is ended.

3.2. Procedure Following Power Failure

After a power failure, the following procedure must be carried out to ensure all necessary parts of the plant are operational:-

1. Ensure that power is back on at the associated control panel.

2. Providing it is safe to do so, release the Emergency Stop Button if it has been pressed. Then press the EMERGENCY STOP RESET button.

3. Ensure that the CONTROL CIRCUIT HEALTHY lamp is on. If not, try pressing the PANEL EMERGENCY STOP RESET button to reset the control circuit.

4. Ensure that the compressed air supply is available at the required pressure.

5. Following the regaining of power or the resetting of the Emergency Stop Circuit, allow the control system some time to carry out the above described Power Recovery Sequence.

6. Check that the Power Recovery Sequence is carried out correctly i.e.:-
   - Ensure that all drive/valves which are set to AUTO but are not controlled as part of a system are started-up/controlled automatically.
   - Ensure that any UF Membrane Banks (if operating prior to power failure) are Autoflushed and then re-started automatically.
   - Ensure that any other systems (if operating prior to power failure) are re-started automatically.
   - Ensure that supporting systems e.g. UF membrane Backflush Systems or tank filling functions are re-instated.

7. Once the Power Recovery Sequence is complete, if any of the systems are not re-started correctly then manual initiation of the start sequences will be required – see the relevant sections of the manual for the Start-Up Procedures.

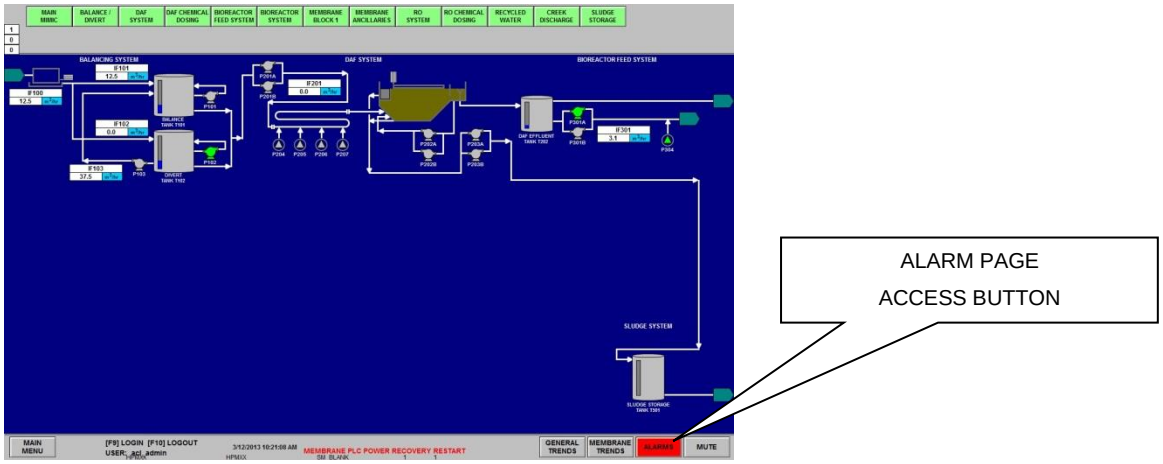
4.0 RESETTING OF DRIVE OVERLOADS

If a drive tripped alarm is raised at the SCADA it is necessary to reset the electrical overload within the control panel using the following procedure.

CAUTION: QUALIFIED ELECTRICIAN REQUIRED

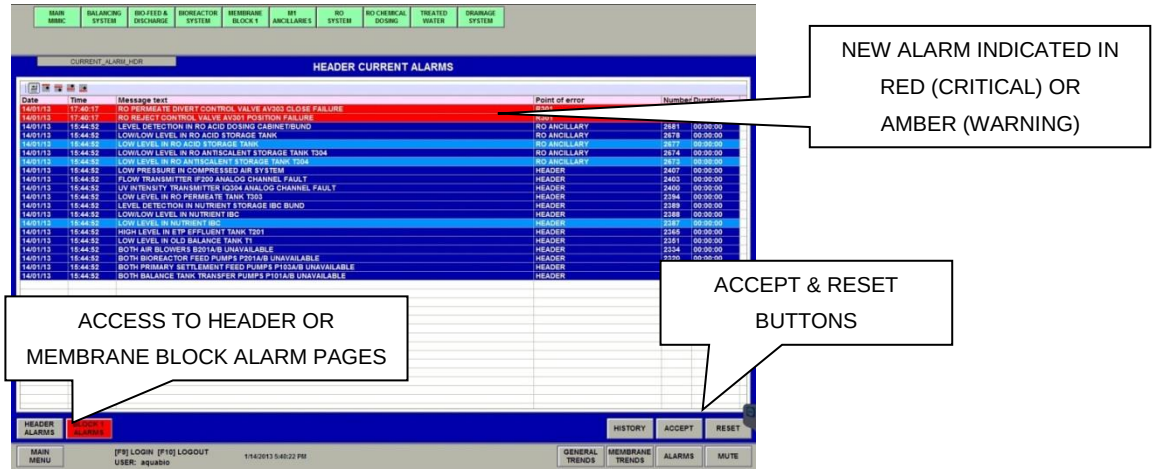
The resetting of overloads requires entry to the high voltage sections of the control panel. This should only be carried out by a qualified electrician (or other suitably experienced and authorised person).

1. At the SCADA, navigate to the Current Alarm Page by pressing the ALARM button at the bottom right of any page.

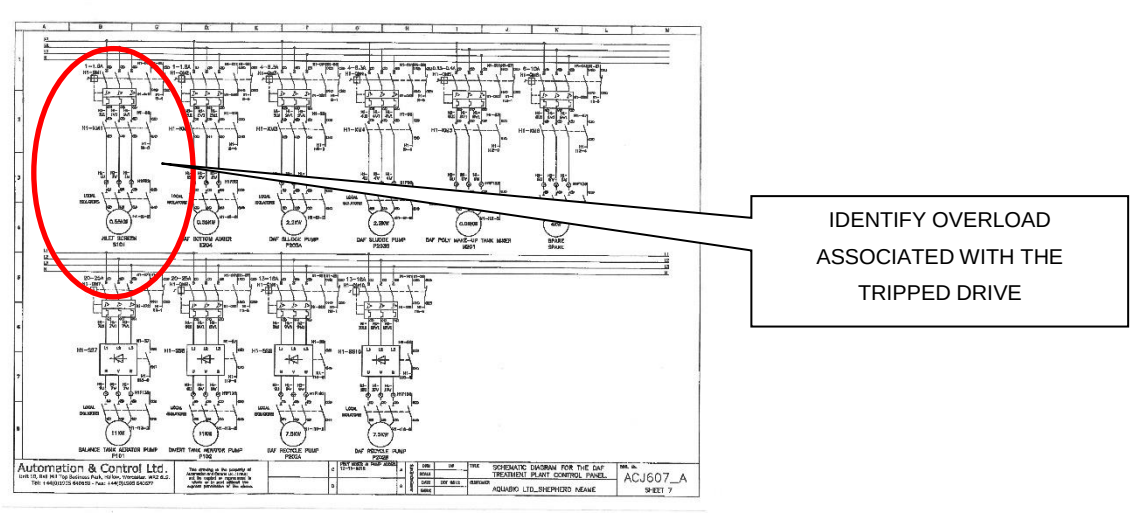


2. At the Current Alarm Page, check the description and tag number of the drive which has tripped.

Note: There are sometimes multiple Current Alarm Pages; one for each Header System (everything outside the UF membranes) and one for the UF Membrane Block (where included).



3. Use the Control Panel Schematic Drawings to identify the overload which will need to be reset.



4. Locate the required overload within the panel and reset.



5. At the Current Alarm Page, press the ACCEPT button – Red alarm indication will turn to Blue.

6. Then press the RESET button. If the overload has been correctly reset, the alarm will disappear from the Current Alarm List.