

## Batching the CIP Tank at Bendeela WTP

**DO NOT use this plant\* or complete this task unless you have been inducted in its safe use and operation by an Authorised Experienced Operator**

This SWI may not cover all possible hazards and risks and should be referred to as a control measure in the risk assessment process. Additional training may be required for high risk plant. Site and task may change required PPE.

### PERSONAL PROTECTIVE EQUIPMENT



Eye protection must be worn



Face protection must be worn



Hand protection must be worn (rubber gauntlets)



Foot protection must be worn (gumboots)



Protective body clothing must be worn



Long and loose hair must be contained or covered.

### POTENTIAL HAZARDS AND RISKS

- Manual Task Injury**  
Manual task injury from incorrect manual handling techniques
- Other**  
Exposure to hazardous chemicals  
Exposure to toxic fumes  
Burn injury  
Injury due to plant malfunction or misuse
- Slip, Trips, Falls**  
Slip, trip, fall due to uneven or slippery work surfaces

### PRE-OPERATIONAL SAFETY CHECKS

**WARNING:** These chemicals are considered hazardous substances. Before carrying out the following procedure worker is to familiarise themselves with relevant SDS's and follow all safety precautions listed on the data sheet prior to handling the chemical

- ✓ Complete site-specific risk assessment
- ✓ Complete the appropriate pre-operational plant checklist
- ✓ Ensure you are familiar with plant operations and controls
- ✓ Ensure that guards are fitted, secured and functional in accordance with manufacturers guidelines
- ✓ Before commencing the batching process for the HYPOCHLORITE or CITRIC ACID solution, worker must ensure the safety shower and eye wash facilities are in working order and be trained in their operation

### OPERATING PROCEDURES

- ✓ Change over to the off-line sludge lagoon and ensure that the duty lagoon valve is closed
- ✓ Check that the CIP tank is empty and that the drain valve is closed
- ✓ Flush out the CIP tank
  - Select the plant control switch to 'Recirculation' and press the 'CIP Tank Fill' push button
  - When the CIP tank is full, open the drain valve to drain the CIP tank to the lagoon
  - Close the drain valve
  - Repeat three times
- ✓ Open the ball valve on the discharge hose from the chemical pump

- ✓ Place the pump suction hose into the cleaning chemical and start the pump to add the cleaning chemical into the CIP tank
  - For a chlorine hypochlorite clean, rinse 1 x 50 litre bins to remove contaminants, decant 25 litres of hypochlorite into the bin and dilute with fresh water. Use potable water hose to fill bin with 50L of water then pump water through chemical pump into CIP tank to flush pump
  - For a citric acid clean, rinse 2 x 50 litre bins to remove contaminants, add 20L of boiling water from both hot water tap and kettle, stir water and slowly pour in half a 25kg bag of citric acid. Stir for 5 min or until dissolved then add another 20L of hot water and stir while slowly pouring in remaining contents of citric acid bag. Continue to stir until fully dissolved. Repeat for bin number 2 and second 25kg acid bag

**NOTE:** Cleaning chemical quantities may vary due to changing water quality, and in case of the hypochlorite, due to chemical quantity

- ✓ Once the cleaning chemical has been pumped into the CIP tank, use potable hose to fill bins and pump into CIP tank to ensure all chemical has been transferred and that the pump is adequately flushed out
- ✓ Turn off the chemical pump and close the ball valve
- ✓ Check that both CIP pump valves are open
- ✓ Select the plant control switch to 'Recirculation' (if not already selected)
- ✓ Press the 'CIP Fill' button
- ✓ When the CIP tank is full check the cleaning solution strength by taking a sample from the top of the tank

- For chlorine strength dip a HACH high-range chlorine test strip into the sample and read the free chlorine after waiting 30 seconds for the colour to develop. Should be between 200 and 400 mg/L (never exceed 700mg/L)
- For citric acid measure the solution pH using benchtop analyser. Should be between 2 and 2.3 pH, preferably about 2.1pH (never go below 2pH)
- ✓ After testing the solution add more chemical if necessary. However, if the citric acid solution is below 2pH or the hypo solution exceeds 700mg/L then waste the solution and start again (otherwise serious damage can occur to the membranes)
- ✓ Check 'soak timer' in control panel to ensure adequate soak time is selected
- ✓ Press the 'Cleaning Cycle' push button to initiate the CIP
- ✓ Once clean cycle starts then select plant control back to 'Filtration'
- ✓ Observe the clean sequences
  - Initial backwash and shell drain etc., about 8 minutes
  - First recirculation phase (AV11open) 30 min
  - Second recirculation (AV11 closed) 30 min
  - Soak 60 min (time value depends on inputted value as above)
  - Rinse cycles (2 of) about 23 min. Total time: 2hrs 31 min
- ✓ Check the cleaning solution strength towards the end of the first recirculation phase by taking a sample from the sample tape located above the CIP pump volute and measure as above. Add more chemical if necessary
- ✓ When the CIP is complete (as indicated by the 'Clean Cycle' indicator is green) take a sample from the CIP tank drain and carry out a final test to ensure that the chlorine strength remained above 200mg/L, if hypo concentration is below 200mg/L then another clean would have to be carried out (it is not necessary to check the pH following a citric acid clean as it is not likely to change significantly)
- ✓ Open the CIP tank drain valve and drain the cleaning solution into the off-line sludge lagoon
- ✓ Close the drain valve
- ✓ Flush CIP tank once as per pre-CIP flush procedure
- ✓ Change back to the duty lagoon, ensuring that the off-line lagoon valve is closed
- ✓ Press the 'Reset' button to restart the plant (hold for about 10 seconds if the clean fail alarm is active)
- ✓ Once the plant is running and the plant flow has stabilised, ie. About 3 to 5 minutes after the CIP, check the TMP and compare it with the pre-clean TMP to determine the efficiency of the clean. Also, another comparison of the TMP before and after the second backwash could be helpful to determine whether another clean is needed (that is a citric clean to follow after the initial hypochlorite clean)

**NOTE:** It is recommended not to leave the plant control switch in 'Recirculation' mode for any longer than 30 minutes. After 30 minutes in recirculation the process will halt and you will not be able to proceed in the 'Filtration mode'. It will then be necessary to turn the plant power off and back on again to reset this condition.

#### ENDING OPERATIONS

- ✓ Thoroughly hose down any spillage
- ✓ Thoroughly rinse empty drums and discard
- ✓ Immediately remove, clean and store all contaminated clothing
- ✓ Record litres of HYPOCHLORITE and/or kilograms of CITRIC ACID used in Bendeela's WTP site diary and Flows and Stocks Spreadsheet

#### DO NOT

- ✗ Do not use if plant is faulty. Attach an Out of Service tag and report fault to your supervisor
- ✗ Do not leave plant running unattended
- ✗ Do not breath gas/fumes/vapour/spray

\*Plant in this SWI refers to any machinery, equipment, appliance, container, implement and tool.