WWS CCP PROCEDURE
Fluoridation – Marian WTP

Issue Date: 19 April 2016
To be Revised: 19 April 2017

1 Introduction

Mackay Regional Council (MRC) undertakes fluoride dosing at Marian WTP.

Fluoride dosing is used to add fluoride to the water at a concentration beneficial to consumers' dental health. The final fluoride concentration achieved is a critical parameter because overdosing can be detrimental to consumers' health and both overdosing and underdosing must be reported to Office of Water Supply Regulator (OWSR).

1.1 Purpose and Scope

The purpose of this procedure is to outline the management requirements for fluoride dosing at Marian WTP. It also includes the hazards and controls that must be considered and addressed when carrying out this work.

1.2 References

- Queensland Water Fluoridation Regulation 2008
- National Water Quality Management Strategy, Australian Drinking Water Guidelines, 2011, NHMRC/ NRMMC
- Water Fluoridation Code of Practice, Water Quality Unit Environmental Health Branch, QLD Health, September 2010
- Treatment Plant Operation Manual
- MRC Monitoring Program
- DWQ Incident Reporting Process

2 Definitions

- DEWS - Department of Energy and Water Supply (formerly DERM – Department of Environment and Resource Management)
- OWSR - Office of Water Supply Regulator (office within DEWS)
- CCP – Critical Control Point
- MRC – Mackay Regional Council
- HACCP – Hazard Analysis Critical Control Point
- WTP- Water Treatment Plant
- OWSR – Office of the Water Supply Regulator
- QLD Health - Queensland Health Public Health Unit

3 Responsibilities and Authorities

Position	Responsibilities and Authorities
Operator	• Monitor and optimise treatment processes • Respond to alert and critical limit alarms • Record and report information to Supervisor and Treatment Engineer
Supervisor	• Organise resources • Make decisions about treatment processes • Record and report information to Treatment Engineer
Treatment Engineer	• Assist Supervisor in analysis and decision making • Communicate issues to Manager Treatment and other MRC staff • Make decisions about treatment processes • Assist with follow-up sampling and further investigations
Senior Environmental Officer &/ Environmental Officer	• Communicate issues to external stakeholders e.g. DEWS, QLD Health • Complete Incident Reports
Manager Treatment	• Ensure correct procedures and protocols have been followed by operational staff • Assist with communication to external stakeholders • Communicate issues to Management Team

4 Monitoring

Monitoring of the MRC fluoride dosing process is carried out as detailed in the MRC Monitoring Program.

For CCP purposes, the performance of the fluoride dosing process is measured in terms of a fluoride analysis on a grab sample of treated water or from an online fluoride meter.

4.1 Performance Targets

CCP monitoring, performance targets and the alert and critical limits set for this CCP are shown in Table 4-1.

The validation (background) for the selection of these performance targets is as follows:

- **Target** – Treated water fluoride concentration of 0.7 mg/L as prescribed in the Queensland Water Fluoridation Regulation 2008;
- **Alert Limit** – Based on failure variance of from target level, as prescribed in the Queensland Water Fluoridation Regulation 2008 and QLD Water Fluoridation Code of Practice;
- **Critical Limit** – Maximum limit for any one sample based on Queensland Water Fluoridation Regulation 2008 level of 1.5 mg/L. Minimum and maximum limits for quarterly averages based on Queensland Water Fluoridation Regulation 2008 requirement to comply with 0.7 ±0.1 mg/L fluoride averaged over a quarter.

Table 4-1: Treated Water Fluoride Operational Targets

Location	Frequency	Target Limit	Alert Limit	Critical Limit
Treated water	Daily	0.7 mg/L	<0.6 mg/L >0.8 mg/L In any one sample 0.0 mg/L for 10 consecutive samples*	>1.5 mg/L In any one sample 0.0 mg/L for 14 consecutive samples* <0.6 mg/L >0.8 mg/L averaged over a quarter
	Continuous	0.7 mg/L	<0.6 mg/L >0.8 mg/L	>1.5 mg/L

** samples collected on a daily basis*

4.2 Corrective Actions

If operational monitoring shows the CCP parameters are in the alert or critical limit range, the corrective actions to be followed are as outlined below:

Table 4-2: Corrective Actions

Step	Actions	Responsibility
1. Confirm result	• Undertake a follow-up grab sample analysis to confirm the measured level. i. If follow-up grab sample analysis confirms the CCP limit range, investigate the cause of the incident (Step 2). If the Critical Limit is confirmed as being breached cease supply to the town and notify the Supervisor and Treatment Engineer immediately. ii. If discrepancy between readings, confirm correct sampling and analysis procedure and check settings and calibration of instrument then re-sample and repeat analysis. iii. If follow-up grab sample analysis shows fluoride is back within target range, continue to monitor process closely and record and report the incident (see below).	Operator
2. Investigate cause of incident	• Check settings and drop rate of fluoride dosing pumps. • Check dosing system control system is working correctly. • Check the WTP flow rate is appropriate for efficient process performance. • Check raw water and pre-filtration fluoride levels. • Check sample line and its connections. • Check chemical quality and level in storage/dosing tank. • Check settings and performance of dosing system. • Check for blockages and wear.	Operator
3. Address cause of incident	Take the appropriate steps to rectify any problems. If, after the actions are undertaken, the fluoride returns to the target level, continue to monitor process closely and record and report the incident (see below)	Operator
4. Assess need for shutdown/ Isolation	Shutdown of the fluoride facility, as it has no impact on the production of water	Operator, Supervisor, Treatment Engineer

Step	Actions	Responsibility
5. Report and record incident details	• Notify the WTP Supervisor and Treatment Engineer of the incident. • Record the details of the CCP limit incident in the WTP logbook.	Operator
	Communicate with other staff as required to organise follow-up sampling and further investigation and rectification of cause of incident.	Supervisor, Treatment Engineer, Manager Treatment
	If a critical limit incident, assess the need to communicate the incident to DEWS. If DEWS notification is required ensure notification occurs within 3 hours and complete an Incident Report Form that is to be submitted to DEWS within 24 hours. If DEWS notification is not required complete an internal incident record in the incident register. Follow the steps outlined in the DWQ Incident Reporting Process.	Treatment Engineer, Manager Treatment, Senior Environmental Officer &/ Environmental Officer

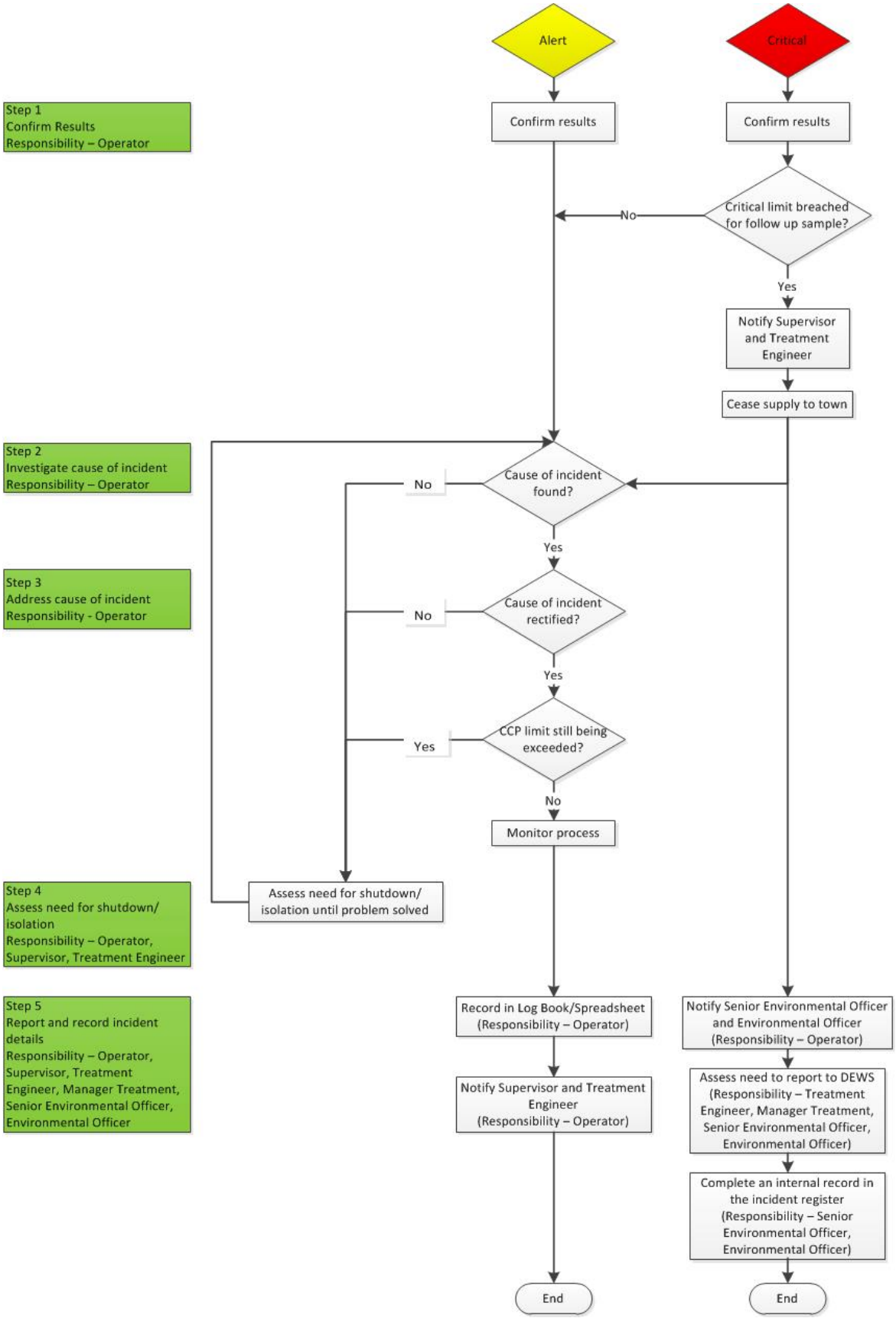
5 Records

General records required to be kept for CCP alert limit or critical limit incidents are:

- Written in the WTP logbook; and
- Written (email) notification to Supervisor and/or Treatment Engineer.

6 Process Map

A process map for corrective actions outlined in this procedure are included below. Note that each major step shown in a process map corresponds to a step in the corrective actions table shown above.


Alert
Critical
Step 1
Confirm Results
Responsibility – Operator
Confirm results
Confirm results
Critical limit breached for follow up sample?
No
Yes
Notify Supervisor and Treatment Engineer
Cease supply to town
Step 2
Investigate cause of incident
Responsibility – Operator
Cause of incident found?
No
Yes
Step 3
Address cause of incident
Responsibility - Operator
Cause of incident rectified?
No
Yes
CCP limit still being exceeded?
Yes
No
Monitor process
Step 4
Assess need for shutdown/ isolation
Responsibility – Operator, Supervisor, Treatment Engineer
Assess need for shutdown/ isolation until problem solved
Step 5
Report and record incident details
Responsibility – Operator, Supervisor, Treatment Engineer, Manager Treatment, Senior Environmental Officer, Environmental Officer
Record in Log Book/Spreadsheet (Responsibility – Operator)
Notify Supervisor and Treatment Engineer (Responsibility – Operator)
Notify Senior Environmental Officer and Environmental Officer (Responsibility – Operator)
Assess need to report to DEWS (Responsibility – Treatment Engineer, Manager Treatment, Senior Environmental Officer, Environmental Officer)
Complete an internal record in the incident register (Responsibility – Senior Environmental Officer, Environmental Officer)
End
End