



Drinking Water Audit Report

County:	Co. Clare	Date of Audit:	28/05/19
Plant(s) visited:	Corofin Drinking Water Treatment Plan	Date of issue of Audit Report:	13/06/19
		File Reference:	DW2012/17
		Auditor:	Regina Campbell
Audit Criteria:	<ul style="list-style-type: none"> • The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014, as amended)</i>. • The <i>EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)</i> • The recommendations specified in the <i>EPA Drinking Water Report</i>. • EPA Drinking Water Advice Notes No.s 1 to 15. • The recommendations in any previous audit reports. 		

MAIN FINDINGS

- i. **Corofin Public Water Supply is on the EPA's Remedial Action List since January 2016 under the heading of EPA Audit Observation – Treatment and Management Issues. Irish Water intend to upgrade the plant and have advised that the projected date of completion of works is June 2020. Irish Water should begin to progress works without delay in order to meet this date.**
- ii. **A number of operational improvements have taken place at the plant including upgrades to the disinfection system and construction of housing around the treatment plant.**

1. INTRODUCTION

Under the *European Union (Drinking Water) Regulations 2014, as amended*, the Environmental Protection Agency is the supervisory authority in relation to Irish Water and its role in the provision of public water supplies. This audit was carried out to assess the performance of Irish Water in providing clean and wholesome drinking water and in response to three notifications by Irish Water of the failure to meet the aluminium parametric value in samples taken on 08/01/2019, 06/02/2019 and 27/02/2019. The Corofin PWS (Public Water Supply) has been on the EPA's Remedial Action list since January 2016 due to treatment and management issues.

The Corofin Drinking Water Treatment Plan serves a population of 1,276 and supplies a volume of 329 m³/day according to the EPA's EDEN system. The source of the supply is the adjacent Inchiquin Lough. Treatment at the plant consists of coagulation, clarification by an integrated dissolved air flotation combined with filtration (DAFF) unit followed by GAC (granular activated carbon) filtration and chlorination. Irish Water originally proposed to abandon the Corofin treatment plant and connect to the Ennis supply with an estimated timeframe for completion of December 2017. This proposal was reviewed and it is now intended to upgrade the Corofin treatment plant with a revised estimated completion date of June 2020. At the time of the audit, Irish Water were unable to confirm if a contractor had been appointed to undertake the upgrade works.

The opening meeting commenced at 11.30am at the Corofin Water Treatment Plant. The scope and purpose of the audit were outlined at the opening meeting. The audit process consisted of interviews with staff, review of records and observations made during an inspection of the treatment plant. The audits observations and recommendations are listed in Section 2 and 4 of this report. The following were in attendance during the audit.

Representing Clare County Council

Patrick McNamara – Plant Operator

Conor Marrinan – Engineer

Roisin Breheny – Executive Technician

Cathal Brodie – Executive Scientist

Representing Irish Water:

Deirdre O’ Loughlin – Drinking Water Compliance Specialist

Oliver Harney – Water Engineer

Representing the Environmental Protection Agency:

Regina Campbell – Inspector

2. AUDIT OBSERVATIONS

The audit process is a random sample on a particular day of a facility's operation. Where an observation or recommendation against a particular issue has not been reported, this should not be construed to mean that this issue is fully addressed.

1.	<p>Source Protection</p> <ul style="list-style-type: none"> a. The source of the supply is the adjacent Inchiquin Lough. b. Clare County Council said that the intake point is approximately 120m from the edge of the lake. The abstraction pipe was raised in November 2018 by divers and this has improved the turbidity of the raw water. c. There are continuous turbidity, pH and temperature monitors on the raw water. The lake pH is around 7.6 - 7.8. Clare County Council advised that generally the quality of the raw water is consistent with some seasonality evident. Heavy rain may raise turbidity occasionally. During the audit, the raw water turbidity was observed to be 0.458 NTU. d. The EPA Eden system provides a Cryptosporidium Risk Score of 65 (Moderate Risk). e. Relevant land-owners have been informed of their obligations under the European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No. 31 of 2014).
2.	<p>Coagulation, Flocculation, Clarification and Filtration</p> <ul style="list-style-type: none"> a. Treatment at the plant consists of dissolved air flotation with integrated rapid gravity filtration (DAFF). b. There is no pH correction. c. Aluminium sulphate is used as the coagulant. d. Clare County Council advised that the required alum dose is between 100 mg/l and 120 mg/l and manual adjustments take place if required. Alum dose-charts and a Procedure for the Alum Day Tank Make Up are in place at the plant. e. Alum is stored in two day tanks, a duty and standby tank. There is manual switchover between the two tanks about every three days and the pumps are not alarmed. f. The alum is injected in front of a static mixer to aid contact time. There is seven minutes contact time before the water reaches the DAFF.

	<ul style="list-style-type: none"> g. There is a maintenance contract in place for servicing the pumps (last serviced February 2019). The aluminium exceedances in January and February 2019 were linked to a failure of one of the dosing pumps. The pump was serviced in February. The entire network was flushed on 18th and 19th February and the DAFF tank was cleaned out on 1st March. There have been no further aluminium exceedances notified to the EPA since these actions were undertaken. h. I was informed that a solenoid valve for the DAFF had developed a fault the previous evening. This had the potential to impede the saturation vessel and floc formation. During the audit the solenoid came back into operation following a backwash of the DAFF. Irish Water subsequently confirmed by email on 05/06/19 that the faulty solenoid had been replaced on the 29/05/19 and no further issues had arisen since. i. The DAFF is cleaned out and checked every six months. A record is kept of when the DAFF was cleaned out but the record would benefit from more detail being recorded of issues noted and actions taken. j. The sand filter is 200m in depth and is comprised of a 16:30 silica sand mix. k. The DAFF unit was noted to be very rusty. l. The DAFF is backwashed on a timed basis every 3.5 hours and each backwash takes twenty minutes. m. There is no turbidity monitoring of the water after the DAFF unit.
3.	<p>GAC Filtration</p> <ul style="list-style-type: none"> a. The filtered water is then passed through a GAC (granular activated carbon) filter. Clare County Council said that the GAC filter removes any taste or odour issues from the water. b. The carbon is sampled every year to test its effectiveness and every three years the carbon is replaced. c. The GAC filter is backwashed every day d. There is a continuous turbidity monitor after the GAC unit and this was reading 0.108 NTU at the time of the audit. The turbidity monitor is alarmed.
4.	<p>Disinfection</p> <ul style="list-style-type: none"> a. The water is disinfected using sodium hypochlorite 5% with softener. Drums (25L) were stored in a bunded area. A sticker with a use by date was on each drum and a biocide PCS number was also displayed. b. Dosing is linked to the residual chlorine monitor. The target residual chlorine level is 0.5mg/l. The residual chlorine monitor was reading 0.45mg/l at the time of the audit. c. There are duty and standby pumps in place with automatic switchover on a 40 minutes frequency. d. I was informed that there is a low chlorine alarm (0.15mg/l) and a high chlorine alarm (2.5mg/l) on the outlet from the reservoir. e. There is approximately 2.5 days storage in the reservoir and there no connections prior to the reservoir. f. The chlorine monitors were last calibrated in February 2019 with calibration dates displayed on the monitors. g. While reviewing chlorine trends on the SCADA the target residual chlorine level was displaying 0.8mg/l rather than 0.5mg/l. It could not be ascertained during the audit why this had happened.
5.	<p>Treated Water Storage and Distribution Network</p> <ul style="list-style-type: none"> a. There are two reservoirs on the supply (referred to as the 'old' and 'new' reservoirs). They were not visited on the day of the audit. b. Both reservoirs were cleaned out three years ago. c. I was informed by Clare County Council that mesh is to be put on the vents on the old reservoir and that the manholes on both reservoirs are to be replaced.
6.	<p>Monitoring and Sampling Programme for treated water</p> <ul style="list-style-type: none"> a. Daily monitoring records are kept for a number of parameters for the final water including residual aluminium and turbidity. Records reviewed for April and May indicated stable results.

	b. Audit and check monitoring is undertaken on the supply.
7.	Exceedances of the Parametric Values <ol style="list-style-type: none"> No exceedances have been notified to the Agency since 2014 except for three exceedances of the aluminium parametric value in January and February 2019. The cause of the exceedances was a faulty alum dosing pump which has been rectified.
8.	Hygiene and Housekeeping <ol style="list-style-type: none"> The plant was clean and tidy and has benefitted by having the treatment unit housed. A number of improvements are planned for the plant as part of an Access to Height and Edge Protection Programme. The plant operator provides cover for two wastewater treatment plants as well as the drinking water plant and duties may involve work on both sites on the same day.
9.	Management and Control <ol style="list-style-type: none"> The plant operator checks the site seven days a week. He was knowledgeable and helpful in relation to the day to day running of the plant. All relevant staff should attend the Water Treatment Plant Operations course provided by the LASNTG. At present there are only two people on the cascade system for responding to alarms; the plant operator and the engineer.
10.	Sludge Management <ol style="list-style-type: none"> Sludge from the DAFF is sent to a sludge holding tank and removed from site to a wastewater treatment plant approximately once per month. There is no recycling of backwash or disposal of sludge supernatant at the plant.

3. AUDITORS COMMENTS

Corofin Public Water Supply (PWS) is on the EPA's Remedial Action List since January 2016 under the heading of EPA Audit Observation – Treatment and Management Issues. Irish Water intend to upgrade the plant and have advised that the projected date of completion of works is June 2020. Irish Water should begin to progress works without delay in order to meet this date.

The plant was found to be well managed on the day of the audit. Corrective actions were taken following aluminium exceedances in January and February 2019.

4. RECOMMENDATIONS

General

- Corofin Public Water Supply (PWS) is on the EPA's Remedial Action List since January 2016 under the heading of EPA Audit Observation – Treatment and Management Issues. Irish Water intend to upgrade the plant and have advised that the projected date of completion of works is June 2020. Irish Water should begin to progress works without delay in order to meet this date. Irish Water should confirm that a contractor has been appointed and a detailed programme of works should be submitted.

Coagulation, Flocculation and Clarification

- Irish Water should install automatic changeover of the alum dosing pumps in the event of failure of the duty pump and install an alarm to warn of pump failure.

Filtration (General)

- Irish Water should investigate the feasibility of installing a continuous turbidity monitor after the DAFF. The monitor should be linked to a recording device and generate an alarm in the event of a deviation from the acceptable operating range of the filter.
- Irish Water should ensure that a logbook is kept ("the filter logbook") for the filter containing

the following:

- i. A record of all maintenance work and inspections carried out on the filter;
- ii. Details of the media depth and the condition of the filter when it is drained down;
- iii. Where appropriate, details of the operation of the backwashing / air scouring systems and underdrains;
- iv. Details of any changes or required changes to filters, the backwashing /air scoring systems or underdrains; and
- v. Details of any trial work carried out on the filters.

Disinfection

5. Irish Water should investigate the reason why, on the day of the audit, the SCADA was showing the target residual chlorine to be 0.8mg/l rather than the actual target of 0.5mg/l and confirm the high and low level chlorine alarms for the water leaving the plant.
6. Irish Water should review the low level chlorine alarm of 0.15 mg/l on the outlet from the reservoir. Setting a higher alarm would provide additional time to react to the detection of a low chlorine residual leaving the water reservoir.

Treated Water Storage

7. Irish Water should confirm that vents and manholes on the new and old reservoirs are secured against ingress of animals or deliberate introduction of any contaminant or acts of vandalism.

Hygiene and Housekeeping

8. Irish Water should ensure that procedures are in place to minimise the risk of cross contamination from staff working on both water and wastewater treatment systems.

Management and Control

9. Irish Water should investigate adding an additional person to the cascade system for responding to alarms.
10. All relevant staff should attend the Water Treatment Plant Operations course provided by the LASNTG.

FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

During the audit Irish Water representatives were advised of the audit findings and that action must be taken as a priority by Irish Water to address the issues raised. This report has been reviewed and approved by Dr. Michelle Minihan, Senior Inspector.

Irish Water should submit a report to the Agency within one month of the date of this audit report detailing how it has dealt with the issues of concern identified during this audit. The report should include details on the action taken and planned to address the various recommendations, including timeframe for commencement and completion of any planned work.

The EPA also advises that the findings and recommendations from this audit report should, where relevant, be addressed at all other treatment plants operated and managed by Irish Water.

Please quote the File Reference Number in any future correspondence in relation to this Report.

Report prepared by:

Regina Campbell

Date:

13/06/19

Inspector