



Drinking Water Audit Report

County:	Dublin City Council	Date of Audit:	23/08/2017
Plant(s) visited:	Reservoir storage (treated water), Ballyboden Water Treatment Plant Scheme Code 0700PUB1002	Date of issue of Audit Report:	25/08/2017
		File Reference:	DW2010/127
		Auditors:	Ms Ruth Barrington Ms Aoife Loughnane
Audit Criteria:	<ul style="list-style-type: none"> • The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)</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 in a previous EPA audit report issued 09/11/2010. 		

MAIN FINDINGS

- i. **Low levels of an organic compound called geosmin have been detected above the human thresholds for taste/odour in treated water in Ballyboden open reservoir, at the reservoir outlet and at a location in the distribution network. These levels have decreased over the period 17/07/2017 to 09/08/2017.**
- ii. **An Irish Water/Dublin City Council investigation identified and eliminated a potential point of entry for surface water run-off into the reservoir from a newly constructed car park on site.**
- iii. **A new covered reservoir is being constructed at Ballyboden water treatment plant, as required by EPA Direction. Monitoring of dust from on-site construction works is ongoing at the site for the duration of the work. Vigilance is required to safeguard water quality in the open reservoir.**

1. INTRODUCTION

Under the *European Union (Drinking Water) Regulations 2014* 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 in response to the notification by Irish Water dated 17/08/2017 of the detection of a musty odour in a sample taken in the distribution network within South Dublin County Council Zone 1, which is supplied from Ballyboden. Irish Water had also informed the EPA of musty/earthy odours in operational sampling undertaken at the old uncovered Ballyboden reservoir and of complaints in relation to these odours from consumers.

The Ballyboden Water Treatment Plant treats raw water from Bohernabreena Reservoir. The treatment plant itself was not examined as part of this audit, as sampling undertaken by Dublin City Council (DCC) had ruled out the raw water and plant final water as being clear of taste/odour problems. Treated water from Ballyboden and from Ballymore Eustace is blended in the uncovered Ballyboden Reservoir. The water from Ballymore Eustace was also clear of taste/odour problems following sampling by DCC.

The Ballyboden Public Water Supply is on the EPA's Remedial Action List, and is the subject of an EPA Direction requiring Irish Water to install a covered reservoir to address the risk of

Cryptosporidium entering the treated water storage. The construction phase of the contract to achieve this started in June 2017 and is expected to be complete by March 2018.

The opening meeting commenced at 10.10 a.m. at Ballyboden 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 reservoir. The audit observations and recommendations are listed in Section 2 and 4 of this report. The following were in attendance during the audit.

Representing Irish Water:

Mr Andrew Boylan – Compliance Specialist

Mr Shane Tynan – SLA Water Lead

Mr Tomás Cawley – Compliance Analyst

Mr Trevor Hennessy – Water Engineer

Representing Dublin City Council:

Ms Imelda Averill – Senior Scientific Officer

Mr Pat Cronin – Executive Manager Water Services

Mr Larry Callaghan – Ballyboden Water Treatment Plant Caretaker

Mr Brian Ahearn - Engineer Water Services

Mr Eoin Walsh – Engineer DCC Operations

Mr Niall Armstrong – Senior Executive Engineer Water Services (Capital)

Ms Aileen O’Connell – Senior Executive Scientific Officer Central Laboratory

Mr Kevin Callanan – Senior Executive Scientific Officer (Microbiology) Central Laboratory

Mr Stephen Burke – Senior Executive Engineer

Representing RPS:

Mr Steven Fagan – Resident Engineer

Mr Daniel Wrafter – Resident Engineer

Representing the Commission for Energy Regulation (Observers):

Mr Liam Doherty – Analyst

Ms Ashley Shaheen - Analyst

Representing the Environmental Protection Agency:

Ms Ruth Barrington – Inspector

Ms Aoife Loughnane – 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.	Operational monitoring programme <ul style="list-style-type: none">a. An enhanced programme of operational monitoring was established to determine the source and extent of the taste and odour complaints first reported by consumers at the end of June 2017. The programme has focussed on taste, odour, microbiological parameters, geosmin, algal species and toxicity screening.b. Geosmin is a naturally occurring compound produced by bacterial activity in soil or algae. Its presence in drinking water leads to an unpleasant musty or earthy taste and smell. Levels of about 15 nanograms per litre (ng/l) are generally detectable to human taste/smell, although lower levels down to about 5 ng/l may be detected by some sensitive consumers.c. While undesirable from an aesthetic point of view, the World Health Organisation has not recommended a health protection guideline value for geosmin, nor has the Health Service Executive (HSE) recommended any precautions for public health protection in the affected supplies.d. The toxicity screening referred to above under point (a) related to potential blooms of algal species, and showed no toxic effects.e. Geosmin levels have decreased over the period of monitoring to date, from 18 ng/l on 17/07/2017 and 7 ng/l on 01/08/2017 to a low of 3 ng/l on 09/08/2017 in samples taken in the Ballyboden reservoir.
2.	Investigation and Remedial Actions <ul style="list-style-type: none">a. An Irish Water Process Optimisation team investigated the water treatment plant and the source catchment at Bohernabreena. No evidence of geosmin was found in the raw or treated water prior to entering the open reservoir.b. Once the results of monitoring pointed to the Ballyboden reservoir as being the source of the taste and odour problems, DCC and Irish Water investigated the potential routes of air, soil or water borne contaminants into the reservoir.c. As part of the upgrade works to build a new covered reservoir at the plant, the staff car park was re-located in late June 2017 to a new location to the left of the access road and across this road from the reservoir (Refer to Photo 1 at the end of this report). Initially the car park was surfaced with crushed stone and it is thought that heavy rain on 26th June led to surface water run-off down the slope towards the reservoir. In late July, remedial works based on the findings of the monitoring programme were undertaken; a tarmac surface was provided for the car park and an interceptor drain was installed to divert rainfall away from the reservoir. These measures should prevent the entry of soil/ muddy water into the reservoir.d. The audit team carried out a walkover of the open reservoir perimeter. The excavation works for the new reservoir were observed to be at a lower level than the open reservoir. Surface water run-off from these works is not considered to be a risk to the open reservoir.e. No evidence was seen by the audit team of any chemical spillage or pollution at the plant. As noted above, geosmin is naturally occurring and not linked to chemical pollution.f. In addition to the new reservoir construction at the plant, there is also a large private development construction site immediately adjacent to the plant. There is potential for dust generation from both these activities, which could potentially enter the open reservoir. Dust monitoring and temporary reservoir fencing has been in place at the Ballyboden water treatment plant since June 2017 when the construction phase of the contract started. Levels of dust at the reservoir side of the plant were much lower than any occupational health exposure limit.

3.	<p>Communications and Complaints</p> <ul style="list-style-type: none"> a. Significant numbers of complaints have been received by Irish Water relating to taste and odour in water supplies which are fed from Ballyboden in Dublin City Council, South Dublin County Council and Dun Laoghaire Rathdown County Council. A standard response to the complaints was developed and is available to those who specifically contact Irish Water with a complaint. b. No information on the investigation, its cause or impacts had been published on the Irish Water website as of the date of the audit.
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3. AUDITORS' COMMENTS

The audit team acknowledges the comprehensive investigation and corrective actions put in place by Dublin City Council and Irish Water in response to the taste and odour complaints and the detection of geosmin at Ballyboden reservoir through the expanded monitoring programme. The importance of the new covered reservoir for the protection of human health (by removing a route for *Cryptosporidium* to enter treated water) was emphasised by the audit team. In the meantime, every effort should be made during the construction phase to avoid adverse impacts on the environment including drinking water quality. The Environmental Management Plan in place for the contractors should be fully implemented at all stages.

It has been noted previously by the EPA that the new covered reservoir will not be completed by the Direction deadline of 31st December 2017. The completion date quoted by Irish Water is March 2018.

4. RECOMMENDATIONS

1. Irish Water should ensure that the monitoring of geosmin continues at Ballyboden reservoir. The frequency may be reviewed once the results show levels consistently below the sensitive human detection thresholds of 5 ng/l.
2. Irish Water should provide information on their website to proactively communicate to the public on the scale and nature of the musty/ earthy taste and odour detected in the Dublin water supplies fed from the Ballyboden reservoir and attributed to geosmin.
3. Irish Water should ensure that the contractors' Environmental Management Plan is fully implemented at all stages of the new reservoir construction phase to avoid adverse impacts on the environment including drinking water quality.
4. Irish Water should ensure there is follow up with the HSE personnel who visited the construction site adjacent to Ballyboden water treatment plant, to determine whether there are any additional precautions which are needed to safeguard the uncovered reservoir.

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 Ms Aoife Loughnane, Drinking Water Team Leader.

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:



Date:

25/08/2017

Ruth Barrington

Inspector

Photo 1. View of Ballyboden access road and open reservoir, showing the new car park and location of the interceptor drain

