Drinking Water Audit Report

County:	Limerick	**Date of Audit:**	20/02/2017
Plant(s) visited:	Newcastlewest PWS	**Date of issue of Audit Report:**	30/03/2017
		File Reference:	DW2014/283
		Auditors:	Ms. Cliona Ní Eidhin Ms. Criona Doyle
Audit Criteria:	• The *European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014).* • *The EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)* • The recommendations specified in the EPA *Drinking Water Report*. • EPA Drinking Water Advice Notes No.s 1 to 15. • The recommendations in any previous audit reports.		

MAIN FINDINGS

i. **The Newcastle west water treatment plant was found to be well run with comprehensive monitoring instrumentation in place, particularly at the raw water intake, which enhances the security of the supply.**
ii. **Irish Water's investigation into the PAH contamination issue in Ardagh village is on-going and the EPA wishes to be kept informed of developments on this matter.**

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 notifications by Irish Water dated 08/07/2014 and 07/06/2016 of the failure to meet the PAH parametric value (as specified in Table B of Part 1 of the Schedule of the Regulations) in the Newcastle West Public Water Supply, Co. Limerick.

The opening meeting commenced at 10.30am at the 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. Photographs taken by Cliona Ní Eidhin during the audit are attached to this report and are referred to in the text where relevant.

The following were in attendance during the audit.

Representing Irish Water (IW):
Deirdre O'Loughlin – Compliance Specialist (IW)
Tom Tarpey – Senior Engineer, Limerick City and County Council (LCCC)
Peter McEvoy – Assistant Scientist, LCCC
Caoimhin Curran - Compliance Analyst, IW

Mark Collins - Area Engineer, LCCC John Kelly - Water Caretaker, LCCC Sinéad Kennedy – A/Senior Executive Engineer, LCCC Eddie Sheehan – Area Foreman, LCCC
Representing the Environmental Protection Agency:
Cliona Ní Eidhin, Inspector Criona Doyle - Inspector

The Newcastle West Drinking Water Treatment Plant is located just outside the village of Castlemahon, Co. Limerick. It produces 3024 m^3/day and is operating below its design capacity. The supply serves a population of approximately 9,320 in the town of Newcastlewest and dispersed throughout its mainly rural hinterland. The farthest extremity of the network is in the Coolcappagh area, north of Newcastle West. The treatment plant abstracts water from a single source; the River Deel, via a riverbed infiltration gallery. Treatment comprises the following:

- coagulation, flocculation with alum as the primary coagulant and polyelectrolyte coagulant aid
- clarification
- rapid gravity sand filtration (including GAC layer for pesticide removal)
- chlorination
- fluoridation

The Deel catchment has been subjected to considerable catchment inspection work by LCCC over the past 10 years. The treatment plant operates 24 hours / day and a caretaker is present at the treatment plant for 39 hours a week spread across 7 days.

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.	**Source Protection** a. The area of the intake was examined during the audit and found to be clear of accumulated debris. Notable was the presence of online monitoring for turbidity, ammonia, nitrate (wasn't operational on the day of the audit), UVT, hydrocarbons and pH. Alarm-based shut-down is in place on turbidity, ammonia and hydrocarbon monitors. b. Irish Water outlined the catchment inspection measures taken in the preceding years.
2.	**Coagulation, Flocculation and Clarification** a. The auditors noted that, whilst there were two alum daytanks, there was only a single alum dosing line. (See Photographs 1a and 1b) b. Clarifiers were largely covered by engineered removable shuttering and were only partially accessible for inspection. (see Photograph 2.) The section of clarifier examined was clear of any algal growth or sludge accumulation on clarifier furniture. There was no floc carryover into the decanting channels visible on inspection.
3.	**Filtration**

	a. The auditors examined the three filters, visually, and observed a full backwash cycle in filter No. 3. Backwash water is run to waste. b. IW advised that the filters had been refurbished in January 2015. Refurbishment included the painting of the internal filter walls with turquoise-coloured paint. (See Photograph No. 3.) A Safety Data Sheet for the paint product was later reviewed by the auditors but it did not provide a clear conclusion as to its safety for use in contact with potable water. (See Photograph No. 4) c. Depth measuring gauges were not in place in all of the filters. d. Turbidity monitors were in place on all 3 filters, as well as on raw, settled and final water, and read as follows at the time of inspection: Filter No. 1: 0.1 NTU Filter No. 2: 0.02 NTU Filter No. 3: 0.04 NTU e. On examination of the SCADA in the plant office later in the audit, it was noted by the auditors that during the backwash of one filter, the entire plant volume is directed via to the other two filters resulting in events of elevated turbidity in settled water.
4.	**Disinfection** a. The auditors confirmed that the minimum disinfection criteria were met at the Newcastle West drinking water treatment plant. b. The portable Hach monitor used for taking chlorine residual readings in the network was noted to not be captured by a routine calibration programme.
5.	**Treated Water Storage and Distribution Network** a. The final/treated water holding tank was examined at ground level by the auditors. The inspection hatch to the treated water tank was observed to not have a rubber seal in place (See Photograph No. 5) and was only slightly above ground level. The potential vulnerability to ingress should a spillage occur in the vicinity was pointed out by the auditors. b. Irish Water informed the auditors that there are 4 reservoirs in the distribution network, located at Newcastle West, Ardagh, Coolcappagh and Strand. Each one has chlorine boosting capabilities but boosting is only operational at Strand. The reservoirs were not examined as part of the audit.
6.	**Exceedances of the Parametric Values** a. Irish Water and Limerick County Council provided a detailed account of the investigation that has taken place into PAH exceedances in the Ardagh section of the network. The first odour issue arose in 2014 with a subsequent reoccurrence and PAH exceedance in 2016. b. The investigation into the cause of the exceedance is on-going with the installation of a valve in O'Connor Park, Ardagh imminent. Irish Water advised that results of analysis of internal pipe-scrapings would soon be available, also. c. Following conclusion of the closing meeting the auditors drove to the village of Ardagh and viewed the housing estate affected by the PAH exceedances. It was noted that a number of dismantled cars were present on green areas and waste ground in the estate. (See Photograph 6) d. The pesticide exceedances on this supply are subject to Irish Water's action plan for supplies affected by pesticides. At the time of the audit, Irish Water had held the workshop in the Southern Region but had yet to launch a co-ordinated programme of action on the affected supplies.
7.	**Chemical storage and bunds** a. All bulk and day-tank storage of chemicals examined was found to be adequate and well maintained.
8.	**Hygiene and Housekeeping** a. The treatment plant was generally tidy and adequately maintained.

9.	**Management and Control** Good monitoring and control of treatment processes throughout the plant was noted by the auditors. Time spent examining the SCADA indicated a good level of central control over its operation, reinforced with documented procedures and routine responsiveness to changing raw water conditions.

3. AUDITORS COMMENTS

The audit found that Newcastle West Drinking Water Treatment Plant is generally well run. It was apparent during the audit that that the plant had received on-going investment over the past number of years, particularly in the area of monitoring instruments at the raw water intake and at various stages of the treatment process. The security of the supply benefits considerably from comprehensive on-line monitoring equipment at the intake, in particular. The audit did not identify any significant concerns with the treatment plant itself. Regarding the on-going PAH contamination issue in the network at Ardagh, the EPA advises Irish Water and Limerick County Council to continue the investigation into the cause of the contamination and to notify the EPA of the investigation's findings as it progresses. Details of any remedial actions should be provided to the EPA, when identified, followed by results of sampling to verify that the contamination issue has been resolved.

4. RECOMMENDATIONS

Source Protection

1. Irish Water should formulate and enact the co-ordinated action on pesticides exceedances in relation to the Newcastle West Public Water Supply and report to the EPA on its implementation under file reference DW2013/96.

Coagulation, Flocculation and Clarification

2. Irish Water should ensure that duty and standby dosing lines are in place for the dosing of the primary coagulant, aluminium sulphate, to raw water.

Filtration

3. Irish Water should ensure that the minimum depth of filter media (excluding the gravel layer) is no less than 800 mm and that filter media depth markers are in place on all filters to verify this.

4. Irish Water should ensure that any future refurbishment of filters excludes the painting of internal filter walls, as this is not regarded by the EPA as best practice. All products used in contact with drinking water should be used in an approved manner. For example, the paint used during the filter refurbishment at Newcastle West should have been afforded 21 days (at 7$_{o}$C.) curing time.

5. Irish Water should develop a procedure to prevent the overloading of the operational filter unit(s) when one of the filters is being backwashed and ensure that this is enacted as routine optimal control of the treatment process.

Treated Water Storage

6. Irish Water should ensure all inspection hatches accessing the treated water storage tank reservoirs are fully sealed when shut.

Exceedances of the Parametric Values

7. Irish Water should continue the investigation into the cause of PAH contamination in the Ardagh area of the distribution network and inform the EPA of the investigation's findings as it progresses. Details of any remedial actions should be provided to the EPA, when identified, followed by results of sampling to verify that the contamination issue has been resolved. Clarification should be provided as to whether the abandoned cars have been examined as part of the investigation.

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.

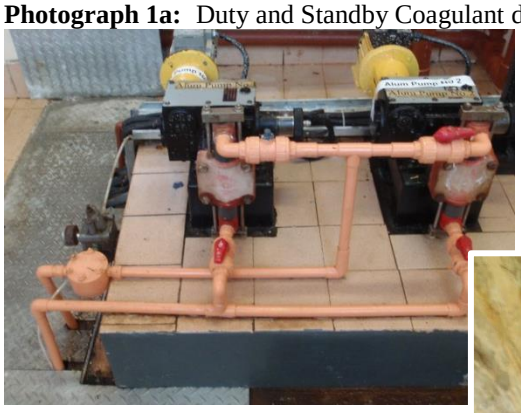
The EPA also advises that the findings and recommendations from this audit report should, where relevant, be addressed at all other treatment plants operated and managed by Irish Water.

Please quote the File Reference DW2014/283 in any future correspondence in relation to this Report.

Report prepared by: Cliona Ní Eidhin **Date:** 30/03/2017

Inspector

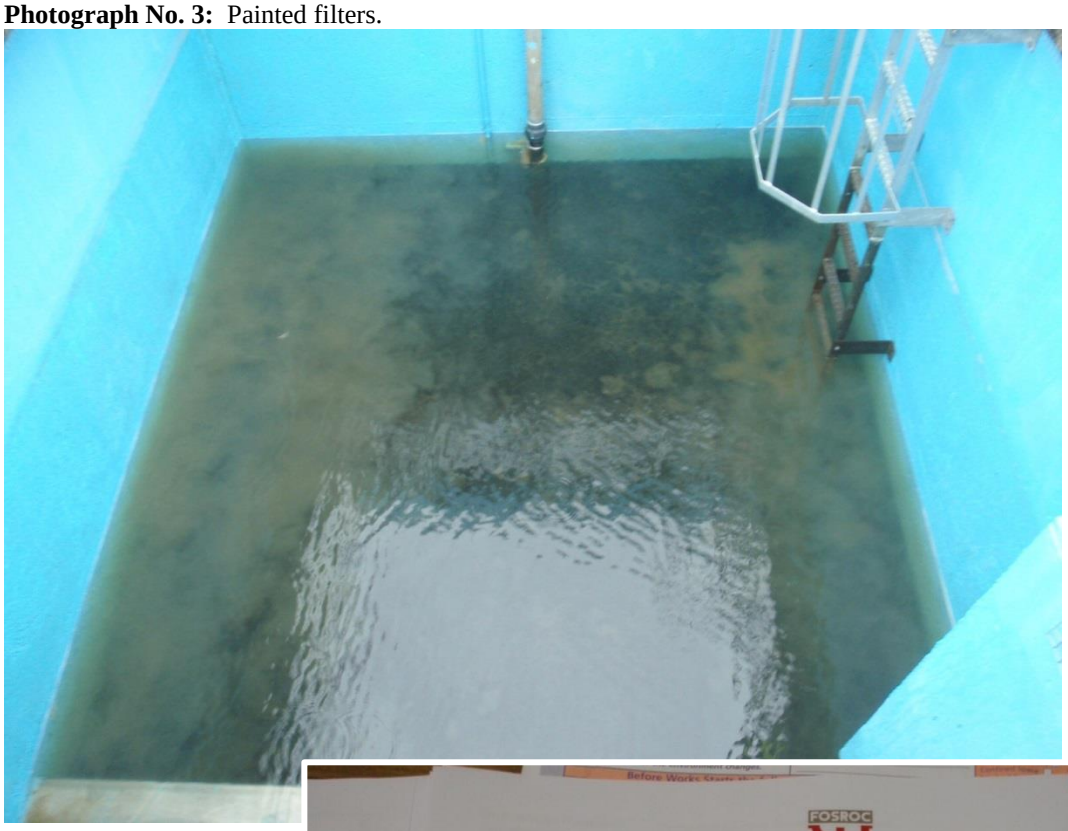
Photograph 1a: Duty and Standby Coagulant dosing pumps

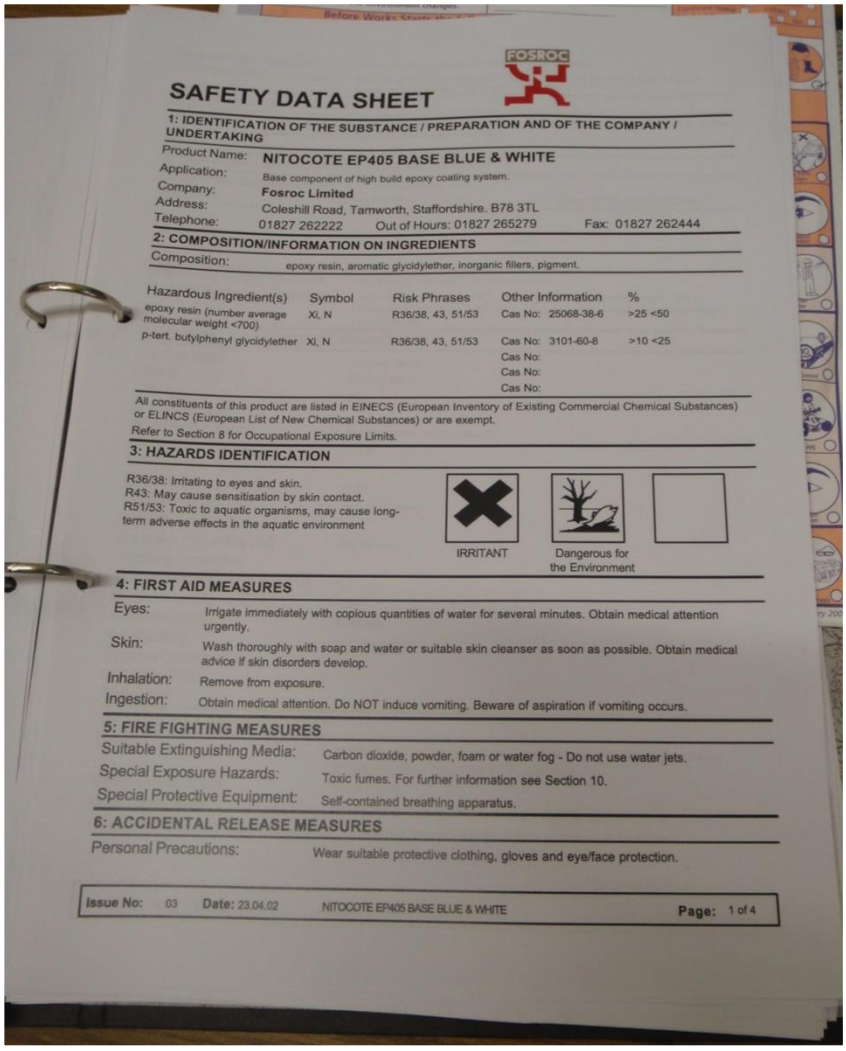


Photograph 1b: Single coagulant dosing line.

Photograph 2: Covered clarifiers.

Photograph No. 3: Painted filters.





SAFETY DATA SHEET

FOSROC

1: IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY / UNDERTAKING

Product Name: NITOCOTE EP405 BASE BLUE & WHITE
Application: Base component of high build epoxy coating system.
Company: Fosroc Limited
Address: Coleshill Road, Tamworth, Staffordshire. B78 3TL
Telephone: 01827 262222 Out of Hours: 01827 265279 Fax: 01827 262444

2: COMPOSITION/INFORMATION ON INGREDIENTS

Composition: epoxy resin, aromatic glycidylether, inorganic fillers, pigment.

Hazardous Ingredient(s)	Symbol	Risk Phrases	Other Information	%
epoxy resin (number average molecular weight <700)	Xi, N	R36/38, 43, 51/53	Cas No: 25068-38-6	>25 <50
p-tert. butylphenyl glycidylether	Xi, N	R36/38, 43, 51/53	Cas No: 3101-60-8	>10 <25
			Cas No:	
			Cas No:	
			Cas No:	

All constituents of this product are listed in EINECS (European Inventory of Existing Commercial Chemical Substances) or ELINCS (European List of New Chemical Substances) or are exempt.
Refer to Section 8 for Occupational Exposure Limits.

3: HAZARDS IDENTIFICATION

R36/38: Irritating to eyes and skin.
R43: May cause sensitisation by skin contact.
R51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

IRRITANT | Dangerous for the Environment

4: FIRST AID MEASURES

Eyes: Irrigate immediately with copious quantities of water for several minutes. Obtain medical attention urgently.
Skin: Wash thoroughly with soap and water or suitable skin cleanser as soon as possible. Obtain medical advice if skin disorders develop.
Inhalation: Remove from exposure.
Ingestion: Obtain medical attention. Do NOT induce vomiting. Beware of aspiration if vomiting occurs.

5: FIRE FIGHTING MEASURES

Suitable Extinguishing Media: Carbon dioxide, powder, foam or water fog - Do not use water jets.
Special Exposure Hazards: Toxic fumes. For further information see Section 10.
Special Protective Equipment: Self-contained breathing apparatus.

6: ACCIDENTAL RELEASE MEASURES

Personal Precautions: Wear suitable protective clothing, gloves and eye/face protection.

Photograph No. 4: Safety Data Sheet for paint product used on filter walls.

Photograph No. 5 Unsealed inspection hatch to treated water storage tank.

Photograph 6: Dismantled cars.