Drinking Water Audit Report

County:	Wexford	**Date of Audit:**	20th May 2014
Plant visited:	Coolgreany WTP (DW2014/216)	**Date of issue of Audit Report:**	10th June 2014
		File Reference:	DW2014/216
		Auditors:	Nigel Hayes Yvonne Doris
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 Report on *The Provision and Quality of Drinking Water in Ireland*. • The recommendations in any previous audit reports.		

MAIN FINDINGS

i. **On 15th May 2014, Irish Water reported that, following a plant process malfunction, a consumer on the supply received injuries to his hands and face when water containing elevated levels of caustic soda entered the distribution network.**
ii. **The incident occurred on 15th May but wasn't reported to the Agency until 19th May.**
iii. **Record keeping and process control at the plant were poor.**

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 on 19th May 2014 of a plant process malfunction which caused water containing elevated levels of caustic soda to enter the distribution network and resulted in a consumer on the supply receiving injuries to his hands and face. Pending the implementation of remedial measures, caustic soda dosing has been suspended at the plant. Where the text refers to the Water Service Authority, this refers to Irish Water in accordance with Section 7 of the Water Services (No. 2) Act 2013.

Approximately 900 consumers are served by this supply and the plant is fed by two on-site boreholes which supply approximately 460 m³/day. The supply consists of an onsite reservoir (6m³ capacity) serving four premises and an offsite reservoir (450 m³ capacity) serving the remainder of the supply. Treatment at the plant consists of chlorination, fluoridation, and pH correction using caustic soda. Caustic soda dosing is achieved using a 30% Caustic Soda solution which is pumped from alternating dosing tanks (see Photograph 1). The caustic soda doing pumps are set to operate in unison with the borehole high lift pumps.

Photographs taken by Nigel Hayes during the audit are attached to this report and are referred to in the text where relevant.

The opening meeting commenced at 11.00am at the Coolgreany 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 Irish Water:
Name – Job Title
Cait Gleeson - Compliance Monitoring Liaison Specialist, Irish Water.
Kieran Cullinane – Above Ground Lead, Irish Water.
Liam Brett – Water Engineer, Irish Water.
Paul Delahunty – Water Quality Engineer, Irish Water.
James Whelan – Senior Executive Engineer, Wexford County Council.
Mark Collins – Area Engineer, Wexford County Council.
Eugene Doyle – Caretaker, Wexford County Council.
Denis Fitzgerald – GEO, Wexford County Council.
Representing the Environmental Protection Agency:
Name – Job Title
Nigel Hayes – Inspector
Yvonne Doris – Inspector
Kamal Tribak – Observer (JobBridge intern)

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 two on-site boreholes are enclosed in concrete casings. b. Both wellheads are sealed. c. All adjacent landowners have been written to with regard to their requirements under the European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2014 (SI No.31 of 2014).
4.	**Chlorination and Disinfection** a. Disinfection is achieved using 10/11% sodium hypochlorite with calgon. b. Sodium hypochlorite is dosed at the plant and measured by an online chlorine monitor as it leaves the reservoir. c. The high and low chlorine alarm limits are set at 0.7 mg/l and 0.3 mg/l respectively. d. Sodium hypochlorite is dosed at a fixed rate as the high lift borehole pumps are also set to dose at a fixed rate. e. The Effective CT to the first consumers served by the onsite reservoir and the offsite reservoir is 21 mg.min/l and 25 mg.min/l respectively. f. A duty and standby chlorine dosing pump is in place at the plant. However, the automatic changeover function between both pumps is currently not operational. g. The free chlorine residual is monitored every 7-10 days in the network. h. On the day of the audit, a sample taken in the network returned a free chlorine result of 0.14 mg/l and a total chlorine result of 0.20 mg/l.

8.	**Chemical storage and bunds** a. It is not clear if the caustic soda bund is capable of containing 110 % of the volume therein. b. Sodium hypochlorite containers were unbunded. c. Sodium hypochlorite containers did not contain details of expiry dates.
9.	**Hygiene and Housekeeping** a. In general, the plant was clean, tidy and well maintained.
10.	**Management and Control** a. Record keeping at the plant was poor and operational pH and chlorine residual results were not being recorded. b. Process control at the plant was poor as online pH and chlorine readings are only measured as the treated water leaves the offsite reservoir. c. The incident in the supply occurred on 15th May 2014. The Agency was notified of this on 19th May which is not in accordance with EPA guidance which requires notification by 11am the morning after a non-compliant result is received or incident occurs. d. The caustic soda dosing pumps are set to operate in unison with the borehole high lift pumps. However, the WSA confirmed that the caustic soda pump had been operating independently from the high lift pumps for an undisclosed period of time, allowing concentrated caustic soda to enter the distribution network. Following a site visit by external contractors CLS on 21st May, Irish Water confirmed that a milliamp setting on one of the caustic soda cause was manually changed, causing the plant process malfunction.

3. AUDITORS COMMENTS

The audit highlighted significant failures in the operation and management of this supply. Poor record keeping lack of process control meant that the plant failure was only brought to light when a consumer on the supply was injured. To ensure that drinking water consumers are protected and to prevent a reoccurrence of this incident, Irish Water should ensure that the appropriate process control measures and procedures are implemented without delay.

4. RECOMMENDATIONS

Disinfection

1. The Water Services Authority should install a duty and standby chlorine pump with automatic switch over in the event of the failure of one of the pumps.

Chemical Storage and Bunds

2. The Water Services Authority should review chemical storage arrangements at the treatment plant. Chemicals must be stored in bunded areas capable of containing at least 110% of the volume of chemicals stored therein. Fill points for storage tanks inside the bunds should be within the bunded area. Refer to EPA guidance document –"*IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities*".

3. The Water Services Authority should put a system in place so that stocks of reagents and chemicals kept on-site are regularly checked to see if they are in date.

Management and Control

4. The Water Services Authority should provide a report to the Agency outlining the procedures and controls it intends to implement to prevent a reoccurrence of this incident.

5. The Water Services Authority should that procedures are in place to ensure that the EPA is promptly notified of all incidents where a water supply constitutes a potential danger to human health.

6. The Water Services Authority should ensure that all operational monitoring results from the plant and distribution network are recorded and kept on site for inspection by the Agency. A procedure should also be put in place defining the actions to be taken in response to fluctuations in these results.

Monitoring and Sampling Programmes for Treated Water

7. The Water Services Authority should commence daily free chlorine and pH monitoring of the final treated water prior to entering the reservoir.

8. The Water Services Authority should revise the current frequency of chlorine residual monitoring in the network (7-10 days) and submit the revised monitoring frequency to the Agency for approval.

FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

During the audit the Water Services Authority representatives were advised of the audit findings and that action must be taken as a priority by the Water Services Authority to address the issues raised. This report has been reviewed and approved by Ms Yvonne Doris, Drinking Water Team Leader.

The Water Services Authority 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.

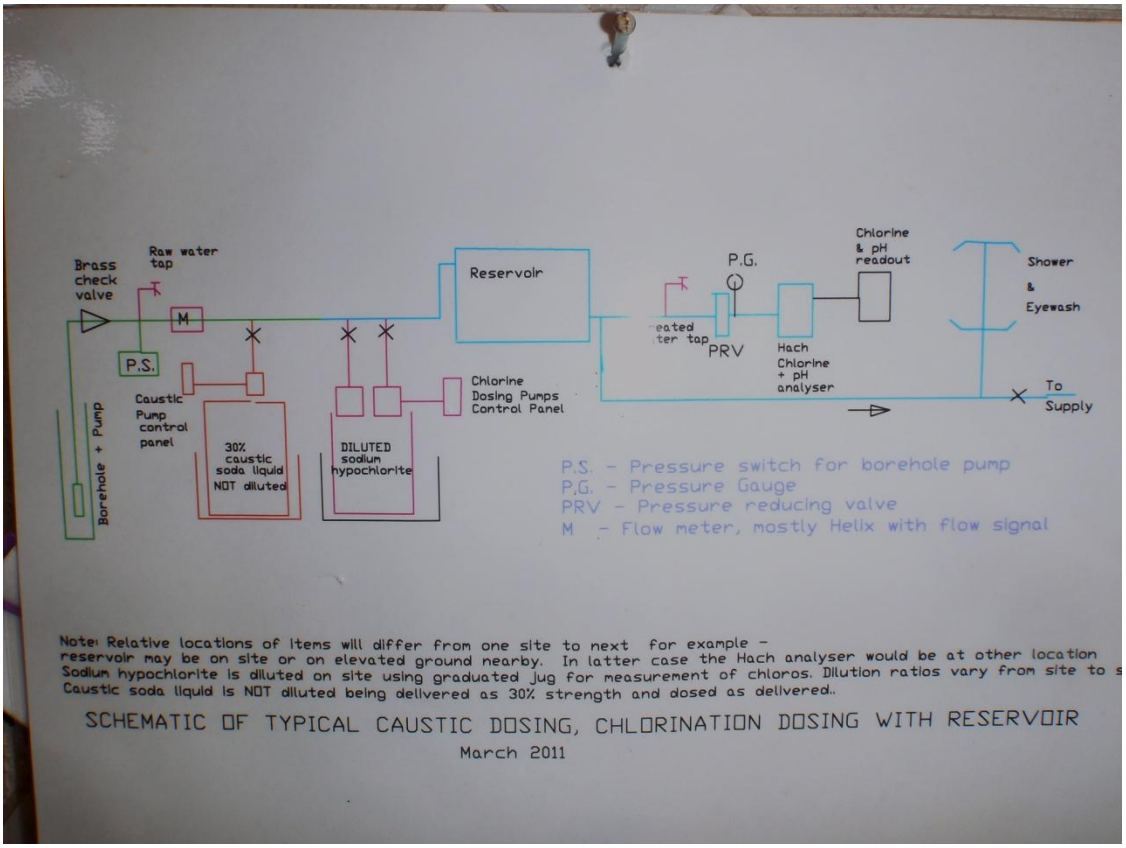
Please quote the File Reference Number in any future correspondence in relation to this Report.

Report prepared by: Nigel Hayes **Date:** 10th June 2014

Nigel Hayes

Inspector

Photograph 1: Caustic soda dosing tanks



Photograph 2: Plant schematic