



Drinking Water Audit Report

County:	Galway	Date of Audit:	31 st August 2016
Plant visited:	Glenamaddy Water Treatment Plant (scheme code 1200PUB1021)	Date of issue of Audit Report:	30 th September 2016
		File Reference:	DW2009/184
		Auditors:	Aoife Loughnane Emer Cooney
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 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. **Glenamaddy water treatment plant was operating satisfactorily on the day of the audit and Irish Water has provided 3 months plant performance SCADA data which demonstrates satisfactory turbidity and UVT levels. This demonstrates that the treatment plant is delivering wholesome and clean drinking water which meets the requirements of the Drinking Water Regulations.**
- ii. **A maintenance programme is needed at the plant to ensure that monitoring equipment is regularly maintained and serviced.**

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 to assess whether the measures carried out at Glenamaddy water treatment plant are sufficient to enable the supply to be removed from the Remedial Action List (RAL).

Glenamaddy public water supply is on the RAL since 2008 due to poor turbidity removal. Remedial works carried out by Galway County Council were not sufficient to ensure the safety and security of the water supply. Since Irish Water has taken responsibility for public supplies, operational improvements have been carried out to optimise plant performance. The long term plan is to decommission this supply and connect to Tuam Regional Water Supply Scheme in 2018.

The source of Glenamaddy PWS is Bushtown spring which discharges from a karstified limestone aquifer. Treatment at the plant consists of ozonation, granular activated carbon (GAC) filtration, UV disinfection and chlorination. The plant produces approximately 370 m³/day.

The opening meeting commenced at 11:00 am at Glenamaddy 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. Photographs taken by Aoife Loughnane 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:

Patrick O’Sullivan, Drinking Water Compliance Specialist, Irish Water

Shay Walshe, Operations Engineer, Irish Water

Peter Mitchell, Divisional Technician, Water Services, Galway County Council

Pat McDermott, General Services Supervisor, Galway County Council

Cathal Divilly, Caretaker, Galway County Council

Representing the Environmental Protection Agency:

Aoife Loughnane, Inspector

Emer Cooney, 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 spring source is covered with a concrete chamber and corrugated roof (see photo 1). The access hatch on top of the spring chamber was unlocked. b. Refurbishment works on the spring chamber to address health and safety concerns had commenced and are due to be completed soon, including a new lockable spring cover. c. Galway County Council representatives stated that the spring chamber was cleaned approximately 2 years ago. d. Raw water is monitored continuously for colour, turbidity and pH which were 27.4 Hazen, 0.06 NTU and 6.62 pH at the time of the audit.
2.	<p>Ozonation</p> <ul style="list-style-type: none"> a. The raw water is treated with ozone to assist in organics removal. There are 2 ozone generators working on a duty and assist basis with a target residual of 0.1 ppm ozone after the contactor. b. During the audit the ozone generator was operating at 35% capacity, with an ozone dose of 2.3 g/Nm³ providing a residual of 0.44 ppm before contact and 0.1 ppm after contact.
3.	<p>Filtration</p> <ul style="list-style-type: none"> a. The ozonated water passes into a granular activated carbon (GAC) filter for organics removal. b. The filter is backwashed every 24 hours, followed by a 15 minute settlement period before being brought back into use. There is no run-to-waste facility on the filter.
4.	<p>UV Disinfection</p> <ul style="list-style-type: none"> a. Primary disinfection is achieved by UV treatment in duty & standby Trojan Swift SC B08 units. b. The plant operators identified the validated operating range as $\leq 33 \text{ m}^3/\text{hr}$ and $> 83\% \text{ UVT}$ during the audit, however the UV certificate was not available to review on site. Following the audit, a review of the validation certificate submitted by Irish Water in April 2015 shows the UV system is validated to DVGW standards with minimum UVI for various flow rates specified in the operating characteristics table. The relevant operating criteria for flows up to $40 \text{ m}^3/\text{hr}$ is a minimum UVI of $19 \text{ W}/\text{m}^2$. c. During the audit, the plant was operating at $20 \text{ m}^3/\text{hr}$, 93.2% UVT and $43.53 \text{ W}/\text{m}^2$ which demonstrates that the UV system was operating within its validated range. d. There is no automatic switchover arrangement between the duty and standby UV units. However there is an automatic shutdown when the system drops below its validated range, to prevent inadequately disinfected water entering the distribution network.

5.	<p>Chlorination</p> <ol style="list-style-type: none"> Secondary disinfection by chlorination is carried out by dosing sodium hypochlorite in order to achieve residual disinfection in the distribution network. There is no automatic switchover between the duty and standby chlorine dosing pumps however there is automatic plant shutdown if chlorine levels drop below 0.7 mg/l leaving the plant. The chlorine dose is fixed rate with a target residual of 0.6 mg/l at the reservoir outlet. The chlorine monitor was displaying 1.77 mg/l leaving the plant. The calibration sticker on the dosing pumps indicated that they were overdue for calibration as it should have been carried out in February 2016. The caretaker carries out daily monitoring of residual chlorine at several network locations. The monitoring records were reviewed during the audit and showed adequate levels of disinfection in the network.
6.	<p>Monitoring of Treated Water Quality</p> <ol style="list-style-type: none"> There are 5 check samples and 1 audit sample taken on Glenamaddy PWS each year. There is no evidence of failures to meet the Drinking Water parametric values in this supply.
7.	<p>Management and Control</p> <ol style="list-style-type: none"> The final water is monitored continuously for colour, turbidity, pH and residual chlorine which were 6.15 Hazen, 0.04 NTU, 7.05 pH and 1.77 mg/l at the time of the audit. UV reactor control panel No. 1 was displaying a flow reading of 0.0 m³/hr during operation (see photo 2). However, the flow monitor in the plant control room displayed 20 m³/hr. The control set-points which activate an automatic plant shut-down are final water turbidity > 1 NTU, UVT < 83%, residual chlorine < 0.7 mg/l leaving the plant. The HMI screen shows an 'Alarm Debounce Time' of 49 minutes (see photo 3) which the caretaker believes to be the time delay before plant shutdown is activated. This significant delay before plant shutdown presents a risk to the final water quality. The current EDEN scheme data for Glenamaddy PWS identifies the population served as 1,206, volume supplied as 517 m³/d and level of treatment as "<i>ozonation, GAC filtration, UV, pH adjustment and chlorination</i>". During the audit, the operators identified that the population and volume figures are too high (they believe 370 m³/day is more accurate) and there is no pH adjustment carried out at the plant.

3. AUDITORS COMMENTS

Glenamaddy water treatment plant was operating satisfactorily on the day of the audit and subsequent to the audit, Irish Water has provided 3 months plant performance SCADA data from 1st July to 26th September 2016 which demonstrates satisfactory turbidity and UVT levels which ensures adequate treatment of the water supply. There are appropriate controls at the plant including alarms and automatic shutdown when water quality deteriorates outside the required operating criteria. There is no evidence of failures to meet the Drinking Water parametric values in this supply. Based on these findings, the EPA is satisfied that Glenamaddy PWS will be proposed for removal from the RAL as part of the Q3 2016 update.

4. RECOMMENDATIONS

Source Protection

- Irish Water should complete the refurbishment works on the spring chamber as soon as possible, to include ensuring the access hatch is locked.

Disinfection

- Irish Water should examine the feasibility of installing automatic switch over between the duty and standby chlorine dosing pumps.

Management and Control

3. Irish Water should review the plant control settings to ensure that:
 - (i) the alarm and automatic shutdown set-points on the UV disinfection system are appropriate to the validated operating criteria. The validated operating criteria should be clearly displayed and a copy of the UV certificate and validated operating characteristics should be kept at the plant.
 - (ii) there is minimum delay in automatic plant shutdown if the final water quality does not meet the required operating criteria.
4. Irish Water should investigate and rectify why the control panel on UV Reactor No. 1 was displaying no flow reading during operation.
5. Irish Water should ensure that the chlorine dosing pumps are serviced in accordance with the manufacturers' specifications.
6. Irish Water should ensure that all monitoring equipment at the plant is maintained and serviced/calibrated in accordance with the manufacturers' specifications. A maintenance programme should be put in place to manage this requirement.
7. Irish Water should update EDEN with accurate scheme data on population served (currently identified as 1,206), volume supplied (currently identified as 517 m³/day) and level of treatment (to reflect that no pH adjustment is carried out at the plant).

FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

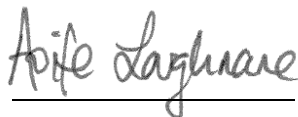
During the audit Irish Water representatives were advised of the audit findings and that action must be taken as a priority by Irish Water to address the issues raised. This report has been reviewed and approved by Mr Darragh Page, Senior Inspector, Drinking Water Team.

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:

30th September 2016

Aoife Loughnane

Inspector



Photo 1: Bushtown spring chamber - refurbishment works to be completed



Photo 2: UV Reactor No. 1 control panel showing 0.0 m³/hr flow during operation

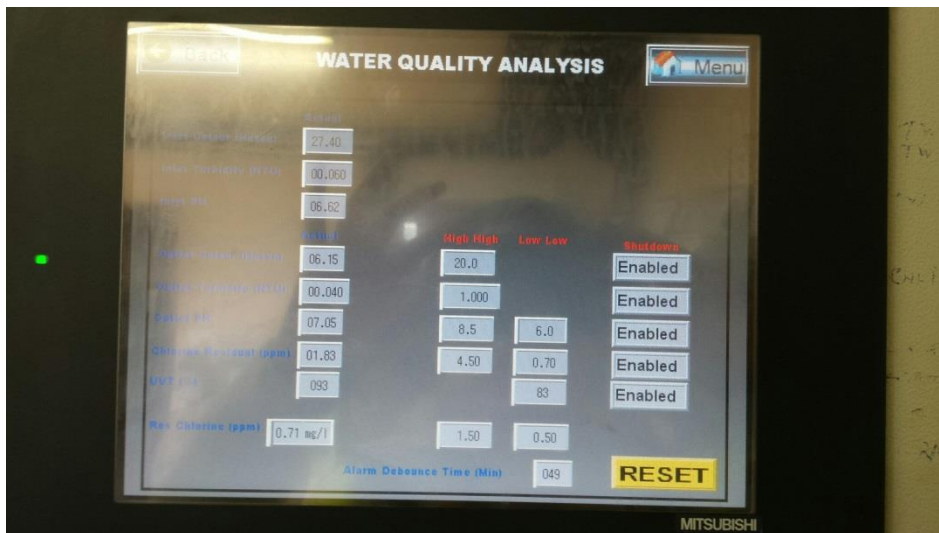


Photo 3: HMI plant control settings showing 'Alarm Debounce Time' of 49 minutes