



Drinking Water Audit Report

County:	Waterford	Date of Audit:	12 June 2015
Plant(s) visited:	East Waterford Water Supply Scheme	Date of issue of Audit Report:	26 June 2015
		File Reference:	DW2015/67
		Auditors:	Ms Derval Devaney 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>. • <i>The 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>. • The recommendations in any previous audit reports. 		

MAIN FINDINGS

- i. The EPA was satisfied with the Drinking Water Safety Plan Team’s performance and scoring methodology in risk assessing the East Waterford Water Supply Scheme. Approximately 25% of the risk assessments have been uploaded to the Drinking Water Safety Plan (DWSP) online tool. The remaining risks within Excel are to be transferred to the online tool by the end of 2015.
- ii. It is unclear how Irish Water is to implement the DWSP approach for Public Water Supplies nationally e.g. Irish Water’s DWSP Implementation Plan remains in draft format. It is also unclear which DWSP tool is to be used and how Irish Water will sign-off and review DWSPs.
- iii. It is unclear how proposed mitigations arising from the DWSP receive funding approval.
- iv. In the current Service Level Agreements between Irish Water and the Local Authorities, DWSPs are not a Key Performance Indicator, resulting in the lack of assignment of adequate resources to the development of DWSPs.

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 the performance of Irish Water in providing clean and wholesome drinking water and in particular to assess the implementation of the Drinking Water Safety Plan (DWSP) for the East Waterford Water Supply Scheme (EWWSS).

Originally constructed in 1984, with a number of upgrades the EWWSS currently produces 28,000m³ per day and supplies approximately 65,000 people in East Waterford, including Waterford City. Water is sourced from a number of surface water sources (Mahon River, Clodiagh River, Ballyshonnock Lake and Knockaderry Lake). The treatment process consists of flocculation (assisted by dosing with Alum and polyelectrolyte) and settlement via one of 8 No. clarifiers. Following clarification the water passes to one of 8 No. rapid gravity sand filters. Post filtration water is disinfected (using chloros), fluoridated and is then dosed with calcium hydroxide to adjust the pH to an acceptable level. The plant feeds a total of 11 No. reservoirs, 2 No. on-site and 9 No. off-site. The plant is currently operating at 50% of its design capacity and is capable of producing up to 52,000m³ per day. The plant is manned on a shift basis 24 hours per day, 7 days a week.

The opening meeting commenced at 10.30 am at Adamstown drinking water treatment plant in Kilmeadan, Co Waterford. The scope and purpose of the audit were outlined at the opening meeting. Waterford City and County Council gave an introduction to the DWSP process, its team and a background to the operation and management of the water treatment plant and its current capabilities. The audit process consisted of interviews with staff and review of records relating to the DWSP for 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:

Deirdre O’Loughlin, Compliance Analyst; Catherine Rice, Compliance Analyst; Brian O’Leary, SLA Lead; Liam Brett, Water Engineer; Jim Fitzgerald, SLA Lead.

Representing Waterford City & County Council:

Colin Kehoe, Senior Executive Engineer; Michael Maher, Plant Supervisor; Thomas Rogers, Acting Senior Executive Engineer; Paul Carroll, Scientific Officer.

Representing the Environmental Protection Agency:

Derval Devaney, Inspector, 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.

<p>1.</p>	<p>DWSP Risk Assessment Implementation Process</p> <ol style="list-style-type: none"> a. Twenty-five percent of the DWSP Risk Assessment has been transferred from the old EPA excel spreadsheet to the more recently developed DWSP online tool on EDEN. b. The DWSP team includes Thomas Rogers, Paul Carroll, Michael Maher and Colin Kehoe of Waterford City & County Council (WC & CC). c. The DWSP team is focusing on transferring the rest of the data over to the online tool. Once fully transferred, additional detail is to be entered to the online tool such as text for the “Hazardous Event Scope” and more detailed descriptions for the Baseline, Current and Target Risk Scoring Mechanism used. WC & CC expect that the DWSP will be fully complete for this supply by the end of 2015. d. The Local Authorities (LA) Key Performance Indicators are not currently linked to DWSPs. Irish Water (IW) stated it is expected that this is to be addressed in the Service level Agreements between the LA and IW. e. It is also not clear which tool is to be used to risk assess public water supplies that are not a city supply. f. It is not clear how Irish Water is to sign-off on DWSPs / Hazardous Events (HEs) that have been risk assessed and completed. Nor is it understood how IW intends to verify and review completed DWSPs. g. The EPA met with IW on 23 March 2015 regarding its DWSP Implementation Plan (IW Ref: IW-AM-WT-DWSP IMPLEMENTATION PLAN 2014 – 2016 - Revision 1.2) to discuss EPA comments on the draft plan which were sent to IW on 20th February 2015. IW agreed during this meeting to submit a revised plan; however it has not been received by the EPA to date, despite the many requests for its submission. h. It is unclear how proposed mitigations arising from the DWSPs are linked to IW’s process for funding approval. i. The DWSP team mentioned the need for regional training on DWSPs which was to be carried out by IW following on from the EPA’s training on the DWSP online tool in March 2014.
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<p>2.</p>	<p>Element: Source (General Catchment)</p> <p>a. Hazard Code CO010 – Presence of <i>Cryptosporidium</i> in the Raw Water. The status of this HE is “in progress” on the online system (therefore yet to be completed). WC & CC stated that there needs to be clarity on sign-off of the HE’s and who is to click the “complete” button on the tool to change the status from “in progress” to “complete”. The DWSP Team stated that there is constant monitoring for <i>Cryptosporidium</i> at the plant (weekly samples taken on the final water and analysed by City Analysts) and this is in place for the last 4-5 years with every sample being clear of the parasite. It was suggested that a current mitigation could include the filters (and the turbidity monitors in place after each filter and on the combined filtered water as a validation method to verify the filters are operating optimally). Also the ammonia monitor on the source waters would act as an indicator of pollution (WC & CC stated that if ammonia levels increase significantly, they cease abstraction from that source (by switching to an alternative source) as they assume the water is polluted). The DWSP Team stated that the <i>Cryptosporidium</i> risk score is low (36) and this was scored based on a worst case scenario for the catchment (different surface water sources). The auditors highlighted the need to understand the difference between validation and verification which is explained in the EPA’s Advice Note No. 8 Developing DWSPs http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradviceadvicenotenote8.html#.VYrSC2BwZ9M</p> <p>b. Hazard Code CO120 - Algal blooms/eutrophication in source water causing contamination and/or loss/restriction of supply. The scope for the hazardous event (HE) could be more detailed e.g. outline the history of algal bloom events in the different source waters and the catchment land use. The reason behind the risk scores should also be detailed in the description of the scoring mechanism box e.g. an alternative source is an option, filters are managed so they don’t get blocked, etc. The titles for current mitigations could be more descriptive as some looked similar. Activated carbon was inserted as a proposed mitigation to be put in place at the plant by 31/12/15. WC & CC informed the audit team that this was to be pushed out to Q2, 2016 and the online tool would be updated to reflect this change in date.</p>
<p>3.</p>	<p>Element: Raw Water (Storage)</p> <p>a. Hazard Code RS010 – Algal blooms causing taste/odour issues. This was No. 59 on the excel sheet and had yet to be transferred to the online tool. The risk scoring methodology was assessed and a very high baseline and current risk was given for this HE. A likelihood of 5 (almost certain) and a severity score of 4 (major) was provided giving the HE a current risk rating of 20 (very high risk). The “Scope” and “Description of the Scoring Mechanism” boxes should include more detailed text documenting the reasons why this HE was applicable to this supply and how the likelihood and severity scores provided were determined (e.g. several algal blooms in the past on Ballyshonnock Lake and consumers have complained about taste and odour). Current mitigations were documented (e.g. farm surveys, ammonia monitor on source, switch to alternative less affected source, etc.) however the shallowness of the lake sources mean the problem isn’t eliminated entirely. Therefore activated carbon was listed as a proposed mitigation to be put in place by Q2, 2016. No person was assigned ownership of this mitigation and it was not clear how Irish Water is to sign-off on this HE risk assessment once complete. It was stated during the audit that all proposed mitigations need to be submitted to and approved by IW’s Assets Strategy Section as an Assets Needs Brief.</p>
<p>4.</p>	<p>Element: Treatment (Coagulation/Flocculation/Clarification)</p> <p>a. Hazard Code TC160 – Malfunction/failure of chemical dosing point. The DWSP Team need to be mindful that they include in the Scope, the dosing point they are referring to (in this case the Alum dosing point).The Current Mitigation given for this HE was “Maintenance” and is was suggested to be more descriptive on the mitigation titles so that the title is meaningful. The DWSP Team explained that there are 2 streams of coagulant but there was only one injection point in the past. Now there are 2 separate alum dosing points reducing the risk of blockage and failure of the dosing point and this is further backed up by duty and standby alum pumps per stream so each dosing point can work independently. This information needs to be captured in this HE risk assessment online. A target date of 10/06/15 was provided online to complete the proposed mitigation. As this work was now complete the current risk rating was altered/updated online during the audit reducing this HE to a lower risk. The Proposed Mitigation then automatically changed to a Current Mitigation online.</p>

	<p>b. It was noted during the above amendment to TC160 HE, that the DWSP Team could not update the information once the target date was passed (e.g. could not tick yes for validated) and hence the target date had to be changed to a date in the future in order to do update the proposed mitigation. This is a matter that needs to be addressed when further improvements are being made to the online tool (e.g. reporting requirements, print functionality, linking supplies that have common elements, sign-off arrangements between LA's and IW, submission of complete HE Risk Assessments to the EPA, etc.).</p> <p>Element: Treatment (Filtration)</p> <p>c. Hazard Code TF120 – Algal growth in filters causing insufficient particle removal or blockage of filters. The risk scoring methodology was assessed and a low baseline risk was given for this HE. Therefore the DWSP Team did not need to proceed to the next step in scoring a current risk. It was recommended that the DWSP Team include a more detailed description on the scope for this HE and the severity rating given e.g. they use another source if the algal bloom occurs in one of the raw water sources.</p> <p>Element: Treatment (Disinfection)</p> <p>d. Hazard Code TD030 - Failure to respond to a dial out alarm in the event of failure of key disinfection equipment causing inadequate disinfection. The DWSP Team stated while this HE is applicable its status on line is set to “not yet started”. It is recorded on the excel risk assessment sheet as Risk No. 145. The DWSP team explained that the plant is manned 24/7 on a shift basis and alarms are in place and critical alarms are recorded on SCADA system. Alarms are texted to the Plant Operator’s phone (which stays at the plant with the person on shift) and there is an escalation system in place depending on the alarm. There is also a roster in place for cover.</p>
<p>5.</p>	<p>Element: Distribution (Service Reservoir & Water Towers)</p> <p>a. Hazard Code DR050 – Lack of maintenance and cleaning of reservoirs causing contamination. There are 2 on-site reservoirs and 9 off-site which are all linked to SCADA. Seven of the 9 reservoirs have chlorine boosting and a chlorine analyser in place. This HE is risk assessed on the excel spreadsheet and not transferred yet to the online tool. The DWSP Team stated that all reservoirs are covered and access hatches have an upstanding rim so no ingress can occur. The security fencing at 3 reservoirs is being upgraded under Irish Water’s Minor Programmes. Mitigations include operational plan and reservoir inspection, walkover inspections and record keeping on-site and a reservoir cleaning programme. More detail could be included on the reservoirs in the Scope (number of reservoirs, year of construction, integrity, etc.), security (e.g. fencing in place), and cleaning programme and provide in the Descriptions field the reasons for score rating given.</p>
<p>6.</p>	<p>Questions Tab on the DWSP online tool</p> <p>a. Are there Turbidity Monitors in place? The DWSP Team answered “yes” to this question on the online tool as there are turbidity monitors in place post each filter. This answer prompts them to enter a current mitigation associated with this question (i.e. turbidity monitors). The DWSP Team stated that it has yet to complete this section of the Questions Tab.</p>

3. AUDITORS COMMENTS

This is the first DWSP Audit carried out by the EPA in relation to its assessment of the implementation of the DWSP Risk Assessment. The EPA was satisfied with the level of commitment, knowledge and the risk scoring methodology that was employed by the DWSP Team for the hazardous events that were assessed on the day of the audit. It was clear from the audit that the DWSP Team had an excellent understanding of how to perform the risk assessment, how to adequately consider the likelihood of a hazard occurring and how to weigh up the severity or impact that hazardous event would have on the water supply should it occur. It was apparent to the EPA auditors that the risk assessments for the hazardous events that were reviewed on the day of the audit were well thought-out and the scoring methodology used had consistency throughout the risk assessment process.

Commitment was given during the audit to transfer all the risk assessments (75% left on Excel) to the WSP online tool by the end of 2015. However, adequate resources to do such work was flagged during the audit as a

matter that required attention during the Service Level Agreement talks between Irish Water and the Local Authorities where such work requires linkage to Key Performance Indicators.

The EPA has yet to receive a revised version of Irish Water's DWSP Implementation Plan (IW Ref: IW-AM-WT-DWSP IMPLEMENTATION PLAN 2014 – 2016 - Revision 1.2) which the EPA reviewed and provided comments back to Irish water on 20th February 2015. It is important that this Plan is finalised as soon as possible as it addresses the DWSP Approach up until the end of 2016.

In addition to the above it is unclear as to how the risk assessment process will be completed for public water supplies that are not city supplies (i.e. those supplies that fall outside the DWSP Working Group). This DWSP Audit highlighted the difficulties in tracking progress with the implementation of a DWSP for a water supply when risk assessments are completed on the Excel tool rather than the online tool. The Excel spreadsheet does not provide the same query functionality as the online tool (e.g. to determine mitigations that are linked to a number of hazardous events, proposed mitigations that are due to be put in place within a month or have gone past their completion date, the number of proposed mitigations that relate to a stakeholder other than Irish Water or indeed the person responsible for following up on the proposed mitigations, hazardous events that relate to *Cryptosporidium* etc.) Other matters relating to the tool that require to be addressed include how Irish Water will sign-off on risk assessments that are completed by the DWSP Team prior to submission to the EPA, further improvements to the tool (e.g. improved reporting requirements that meet both Irish Water and the DWSP Team's business needs, printing, time-out matters, etc.).

4. RECOMMENDATIONS

DWSP Risk Assessment for the EWWSS

1. Irish Water should ensure that all the risk assessments (75% left on Excel) are fully transferred to the DWSP online tool by the end of 2015 as proposed.
2. More detail on the hazardous event and associated risk should be contained within the online tool (e.g. in the "Scope" and "Description of the Scoring Mechanism" boxes). Also more descriptive titles should be used for current and proposed mitigations and proposed mitigation dates should be kept up-to-date and reflective of the situation on the ground. In addition, the person / stakeholder who has been assigned ownership of the proposed mitigation should be recorded on the tool. The Questions tab section of the tool and its associated mitigations should also be completed.
3. Irish Water and the DWSP Team should ensure they understand the difference between validation and verification, as this is important when completing DWSPs and reviewing the plans to determine its effectiveness.

Implementation of the DWSP Approach

4. **Resources:** Irish Water should ensure that the Local Authorities (LA) Key Performance Indicators are linked to DWSPs and that adequate resources are assigned to this work.
5. **DWSP Implementation Plan:** Irish Water should submit an update to the EPA on the DWSP Implementation Plan (IW Ref: IW-AM-WT-DWSP IMPLEMENTATION PLAN 2014 – 2016 - Revision 1.2) for agreement.
6. **Minor Programmes/CIP:** Irish Water should outline to the EPA how proposed mitigations arising from the DWSPs are linked to Irish Water's process for funding approval.
7. **DWSP Training:** Irish Water should arrange for regional training on DWSPs to ensure consistency of approach and risk assessment scoring methodology.
8. **DWSP Tool:** Irish Water should discuss with the EPA its plan for rolling out DWSPs nationally in line with its DWSP Implementation Plan 2014-2016 and what tool it plans to use for the capture and reporting of this data. Further improvements to the online tool are warranted so that the business needs of the users are met (e.g. reporting requirements, print functionality, linking supplies that have common elements, sign-off arrangements between LA's and IW, submission of complete HE Risk Assessments to the EPA, etc.) In

addition the tool that is used by Irish Water to risk assess public water supplies should meet the World Health Organisations Guidelines (WSP Manual, 2009 “Step-by-step risk management for drinking-water supplies”) http://www.who.int/water_sanitation_health/publication_9789241562638/en/ and the requirements of the CSN EN Standard CSN 15975-2 Security of drinking water supply - Guidelines for risk and crisis management - Part 2: Risk management <http://www.en-standard.eu/csn-en-15975-2-security-of-drinking-water-supply-guidelines-for-risk-and-crisis-management-part-2-risk-management/> . Irish Water should also be mindful to the imminent amendments to the Drinking Water Directive which is to incorporate DWSP Risk Assessment of water supplies.

9. **Sign-off, review and verification of DWSPs:** Irish Water should devise a procedure for the sign-off on DWSPs / Hazardous Events (HE's) that have been risk assessed and completed by DWSP Teams. Irish Water should also set out in its procedures how it is to verify and review completed DWSPs.

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 Yvonne Doris, 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 DW2015/67 in any future correspondence in relation to this Report.

Report prepared by:



Date:

Derval Devaney
Inspector

26th June 2016