

INTERNAL AUDIT

REPORT

Commitment and Endorsement

Risk Assessment

Personnel Coverage

Sampling, Testing, and Monitoring

Emergency Management

Internal Audits

Niagara Region Drinking Water Quality Management System Internal Audit

Rosehill WTP (Area 1)
Port Colborne WTP (Area 2)
DeCew Falls WTP (Area 3)

1.1 AUDIT PLANNING OVERVIEW

1.2 Purpose

The 2021 internal audit was undertaken:

- To verify the continued conformance of the Water-Wastewater (W-WW) Division's Water QMS (Quality Management System) with the requirements of the DWQMS (Drinking Water Quality Management Standard) and the Water QMS Operational Plan; and
- To verify the effective implementation and maintenance of the Water QMS for all five of Niagara Region's drinking water systems.

Audits were completed between March 1st and 31st, 2021, covering activities at Rosehill WTP (Area 1), Port Colborne WTP (Area 2), and DeCew Falls WTP (Area 3). Internal audit interviews were also conducted with members of Top Management and with various support staff in other sections of the division.

1.3 Scope

The scope of the 2021 Water QMS internal audit was modified in consideration of the ongoing COVID-19 pandemic and associated impacts to W-WW work processes. Auditors placed a focus on elements/processes of the QMS that could be audited remotely, and efforts were made to minimize additional workload for front-line management and staff.

The 2021 internal audit was conducted via a mix of element-based and process-based auditing.

In a **process-based audit**, auditors review a QMS process and examine the main process as well as any adjacent QMS processes/elements; for example, a process audit of Sampling, Testing, and Monitoring may also examine Competencies (e.g., "is this person suitably trained to conduct sampling?") and Measurement and Recording Equipment Calibration and Maintenance (e.g., "is instrumentation appropriately calibrated to ensure accurate monitoring results?").

In an **element-based audit**, auditors examine a specific element to ensure that requirements of the DWQMS and the associated procedure are met. Element-based audits do not typically examine adjacent processes.

The following elements were examined during the 2021 internal audit:

- Element 3 – Commitment and Endorsement
- Element 7 – Risk Assessment
- Element 11 – Personnel Coverage
- Element 16 – Sampling, Testing and Monitoring
- Element 18 – Emergency Management (*process audit*)
- Element 19 – Internal Audits

Elements that were not audited during the 2021 internal audit will be included in future internal audits such that frequency requirements specified in ***Internal Auditing*** (QMS-WT-ALL-P-190, rev9, effective 3Feb2020) are satisfied.

1.4 Selection of Internal Audit Team

Rachel Whyte acted as Lead Auditor for this internal audit.

Auditors were assigned as follows:

- Element 3 – Commitment and Endorsement: **Dawn MacArthur**
- Element 7 – Risk Assessment: **Michelle Max**
- Element 11 – Personnel Coverage: **Rachel Whyte**
- Element 16 – Sampling, Testing, and Monitoring: **Jen Croswell/Josh MacArthur**
- Element 18 – Emergency Management: **Jason Oatley/Dana Knegt**
- Element 19 – Internal Audit: **Janet Rose**

All internal auditors have completed Internal Auditor Training as required by ***Internal Auditing*** (QMS-WT-ALL-P-190, rev9, effective 3Feb2020).

1.5 Criteria and Methodology

Audit criteria included the following:

- **Internal Auditing** (QMS-WT-ALL-P-190, rev9, effective 3Feb2020);
- **Niagara Region Water Operational Plan** (QMS-WT-ALL-MAN-010, rev11, effective 7Dec2020) and supporting procedures; and
- Internal audit training materials (various auditor training courses).

Remote work arrangements remain in place due to the ongoing COVID-19 pandemic; as such, formal opening and closing meetings were not held with auditors or auditees. The Lead Auditor assembled the audit team and assigned auditors to audits via email. Initiation of the audit was communicated to Top Management and Divisional staff via email.

Audits were conducted by assigned auditors as noted in Section 1.3 of this report. Where required, auditors completed interviews with various members of Divisional staff to support audit findings. These checklists were submitted to the Lead Auditor and used as input to this report.

The audit findings will be communicated via e-mail circulation of this Internal Audit Report and assignment of associated corrective actions, preventive actions, and best management practices.

Internal audit checklists, along with copies of communication emails, are retained as per **Document & Records Control** (QMS-WT-ALL-P-050, rev8, effective 6Jan2020). These can be found in the "Records Control" module of EtQ.

1.6 INTERNAL AUDIT RESULTS

1.7 Review of Previous Internal Audit Findings

Previous internal audit findings were not reviewed during this internal audit, as much work was done in advance of the internal audits to address and close open corrective actions from the previous internal audit in 2019. These efforts were summarized in a memo to Public Works Committee ([PWC-C 8-2020, 10March2020](#)).

1.8 Review of Previous External Audit Findings

No non-conformances were identified in the 2020 external reaccreditation audits.

Eight best practices were identified in the 2020 external reaccreditation audits. Three of these best practices have been addressed; these include role clarifications in the Operational Plan, definition of operating areas in the Operational Plan, and addition of a MetroLinx contact to the Emergency Contact List. The Lead Auditor confirmed that these continual improvement suggestions were effectively implemented.

The remaining five best practices are being evaluated and will be addressed appropriately. It is important to note that best practices are issued more as “suggestions for improvement” and do not have to be implemented if they do not meet business needs.

1.9 Summary of New Internal Audit Findings

Findings are categorized as follows and are summarized in Table 1 below.

- **Non-conformance:** A requirement of the Drinking Water Quality Management Standard or a documented Standard Operating Procedure is not being met. These findings require **corrective action**.
- **Potential non-conformance:** A non-conformance has not yet occurred, but a trend or pattern indicates that occurrence of a non-conformance is likely. These findings require **preventive action**.
- **Best practice for evaluation:** A best practice behaviour or opportunity for improvement is identified. These findings are brought forward to the appropriate level of management for review and consideration, and those requiring Top Management direction or input are reviewed at the annual Management Review.

Table 1: Summary of Internal Audit Findings – Number and Type

Element	NC	PNC	BP	Total
3 – Commitment and Endorsement	-	-	2	2
7 – Risk Assessment	-	1	3	4
11 – Personnel Coverage	2	-	-	2
16 – Sampling, Testing, and Monitoring	1	3	3	7
18 – Emergency Management	2	2	9	13
19 – Internal Audits	3	-	4	7
Total	8	6	21	35

Table 2 provides a summary of findings from the QMS Internal Audit. In reviewing Table 2, the following acronyms should be noted:

Acronym	Definition
C	Conformance
NC	Non-Conformance
PNC	Potential Non-Conformance
BP	Best Practice for Evaluation

Table 2 is provided below.

Table 2: Summary of Findings – 2020 Internal Audit

Element #	Finding	DWQMS Standard Element
3 – Commitment and Endorsement	BP	The Operational Plan states "Continued endorsement of the Operational Plan is demonstrated through the enactment of a confirmatory by-law preceding each Council meeting." In practice, continued endorsement is demonstrated through Public Works Committee's receipt of annual QMS information updates and through re-endorsement of the Operational Plan as required. Consider rewording the Operational Plan to more clearly reflect this process.
3 – Commitment and Endorsement	BP	All members of top management have taken Standard of Care training, with the exception of the Acting Commissioner of Public Works. Consider adding Standard of Care training to the Competencies Table (QMS-ALL-ALL-T-100) if this is a required or preferred training requirement for top management. Consider also adding a timing from hire date to complete the training to allow for potential scheduling conflicts.
7 – Risk Assessment	PNC	Drinking-Water Risk Assessment (QMS-WT-ALL-P-070, Rev 9, 5-Feb-2020) does not mention the requirement to connect risk assessment results to capital activities. Consider explicitly mentioning this requirement in the procedure in order to ensure that linkages to capital validation continue to be identified during risk assessment processes.
7 – Risk Assessment	BP	It may be beneficial to add a column in the Drinking Water Risk Assessment Outcomes Table to correlate EtQ risk action item numbers with risk IDs in the table.

Element #	Finding	DWQMS Standard Element
7 – Risk Assessment	BP	Consider evaluating risks at each individual remote station rather than grouping them under generic line items covering multiple stations.
7 – Risk Assessment	BP	<p>The following procedure improvements are recommended:</p> <ul style="list-style-type: none"> Section 5.5.1 of <i>Drinking-Water System Risk Assessment (QMS-WT-ALL-P-070, rev 9, 5Feb2020)</i> procedure states that "the Process Engineer or delegate develops action plans related to high scoring risks (greater than 15)". There is not Process Engineer – Water; in practice, the QMS Representative completes this task. Section 5.2.7 of <i>Drinking Water System Risk Assessment (QMS-WT-ALL-P-070, rev9, 5Feb2020)</i> states that "the [risk assessment] team identifies critical control points (CCPs) within the drinking-water system". CCPs have already been established for the Region's Drinking Water Systems and are generally just confirmed during annual exercises. Consider modifying this language to clarify. The <i>Niagara Region Water QMS Operational Plan (QMS-WT-ALL-MAN-010, rev11, 7Dec2020)</i> identifies a risk assessment frequency of once every 3 years; this is less stringent than the 36-month frequency specified in the DWQMS, Element 7. This should be corrected. Consider identifying the Wastewater QMS Rep as backup for the Water QMS Rep.

Element #	Finding	DWQMS Standard Element
11 – Personnel Coverage	NC	Section 5.1.3 of Personnel Coverage (QMS-WT-ALL-P-110, rev8, 1Aug2018) specifies that "during regular business hours, Area Operations Managers who are not designated as "on-call" are designated as Operators-in-Charge (OICs) for the WTPs and remote locations in their areas." In a sample of 11 logsheets selected between April 2020 and February 2021, Operations Managers were never identified as OICs in Areas 2 and 3. They were identified as OICs in Area 1 approximately 65% of the time.
11 – Personnel Coverage	NC	Section 5.3.2 of Water Treatment Plant Logbook Entries and Review (OP-WT-ALL-P-032, rev8, 6Mar2018) includes an excerpt from O. Reg. 128/04, s.27(4): "A person who makes an entry in a log or other record-keeping mechanism shall do so in a manner that permits the person to be unambiguously identified as the maker of the entry." A review of a sample of 15-20 Area 2 logsheets between Apr 2020 and Feb 2021 included 12 instances where an OIC entered the same initials for more than one person on shift (23Feb2021, 12Feb2021, 4Feb2021, 18Jan2021, 13Jan2021, 9Sep2020, 19Aug2020, 18Aug2020, 11Aug2020, 16Jun2020, 21May2020, 8Apr2020).

Element #	Finding	DWQMS Standard Element
16 – Sampling, Testing, and Monitoring	NC	<p>Sampling, testing, and monitoring tables for all WTPs identify a quality target of 0CFU/100mL for microbiological testing and specify that chlorine dosage should be increased as a corrective action. The auditor identified two total coliform exceedances within the distribution system:</p> <ul style="list-style-type: none"> Rosehill DWS – Ridgeway Standpipe (31Mar2020) Grimsby DWS – Smithville Reservoir Outlet (10Jun2020) <p>There is no evidence that chlorine dosing was increased for either event. <i>(NOTE: Public Health was satisfied with the response actions.)</i></p>
16 – Sampling, Testing, and Monitoring	PNC	<p>Section 5.2.7 of <i>Initial Response to the Interruption of SCADA, SCADA Components, and/or Flatline Alarms (rev5, 30Aug2019)</i> notes that SCADA staff typically respond to communication failures and complete associated chlorine residual testing. During a communication failure at the NOTL 400mm and 450mm mains on 17Sep2020, secondary disinfection free chlorine residuals were missing. Free chlorine residuals were collected at 04:00 by a member of Maintenance staff (certified WT1, 68598), with results of 0.81mg/L for the 400mm and 0.84mg/L for the 450mm sampling location. A WaterTrax report for the corresponding timeframe does not include the results from this sampling event.</p>

Element #	Finding	DWQMS Standard Element
16 – Sampling, Testing, and Monitoring	PNC	<p>MECP inspection reports generated by the SCADA should include complete datasets for provision to the Ministry at inspection.</p> <p>Continuous monitoring data captured on MECP inspection reports in Jan2020, Apr2020, and Sep2020 were reviewed for each plant. The distribution free chlorine MECP inspection report for the Rosehill Water Treatment Plant report does not include recent changes made to sampling at the Erie Road remote station where a redundant chlorine analyzer was repurposed and installed at the sampling station inlet. Sampling points were previously labeled as primary and secondary (both on the outlet) and changed to pre (inlet) and post (outlet). SCADA trending review shows that data is present and recorded as required.</p>
16 – Sampling, Testing, and Monitoring	PNC	<p>UV parameters on STM Tables for NF, WE, and DF refer to CCP: Verification of Primary Disinfection (OP-WT-ALL-P-010, rev7, 7May 2020). The CCP procedure notes that “UV equipment...is to be operated at the discretion of the Region and [used to] augment disinfection when primary disinfection is not achieved through application of sodium hypochlorite”. The procedure generically discusses use of UV for primary disinfection, but neither provides specific direction regarding use of UV for primary disinfection nor references external procedures for guidance.</p>

Element #	Finding	DWQMS Standard Element
16 – Sampling, Testing, and Monitoring	BP	The STM tables instruct the reader to reference <i>Confirmed Adverse Drinking Water Quality Results (ERP-WT-ALL-P-010)</i> when raw water samples that are tested by an external lab exceed the standards listed in O. Reg. 169/03. Raw water samples are not reportable if they exceed established standards, however, it may be beneficial to implement response protocols for due diligence purposes. Consider revising response actions for raw water exceedances to align with mandated requirements and/or exploratory measures.
16 – Sampling, Testing, and Monitoring	BP	Niagara Falls, Decew Falls, and Welland WTPs collect UV dose/flow information at a minimum sampling interval of 5 minutes in accordance with MDWL requirements. MECP inspection reports for the NF WTP show low-volume, intermittent flow with a UV dose of 0mJ/cm ² . There was no risk to water quality during these periods, as the UV units in question were off and primary disinfection was met through chlorination; however, it may be beneficial to classify the conditions under which UV dose will be analyzed, and a review of these reports to correct errant flows should be undertaken.
16 – Sampling, Testing, and Monitoring	BP	There is potential to improve clarity of all six sampling, testing, and monitoring (STM) tables, including addition of references to appropriate regulations; review and revision of sampling parameters; refinement of corrective actions; elimination of duplication; addition of definitions; and general updates.

Element #	Finding	DWQMS Standard Element
18 – Emergency Management	NC	Section 1.0 of the <i>W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019)</i> states that the ERP contact list is updated quarterly and distributed. Copies of the contact list found at the DeCew Falls WTP Control Room and in the Associate Director – Water’s office were found out of date. It was also unknown who was responsible to update the AD's personal ERP.
18 – Emergency Management	NC	Section 7.0 of the <i>W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019)</i> discusses continual improvement findings from mock emergencies, specifying that required action items are developed and assigned in consultation with management. The summary report from the 2019 mock emergency was completed by a third-party consultant, and there is no evidence that action items were entered into EtQ for assignment and completion.
18 – Emergency Management	PNC	Section 4.0 of the <i>W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019)</i> states that "during normal working hours, the Operations Manager or System Maintenance Manager shall assume the role of W-WW Incident Manager. After hours, the on-call ORO or System Maintenance Manager (or designate) shall assume the role of the W-WW Incident Manager." While managers seem to be aware of these role designations, auditors were unable to find evidence that the roles were formally communicated to staff.

Element #	Finding	DWQMS Standard Element
18 – Emergency Management	PNC	Section 7.0 of <i>W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019)</i> discusses the role of the Manager of Quality and Compliance, Water in planning and executing tests of the ERP. The Manager role was eliminated in Q2 2020. It is unclear who has assumed the responsibilities previously assigned to this role.
18 – Emergency Management	BP	Section 1.0 of the <i>W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019)</i> states that the EOC is activated when an emergency event cannot be effectively managed and mitigated by the W-WW ERP. It may be beneficial to consider parameters for “trickle-down” activation, i.e., when an emergency originating outside of W-WW necessitates a W-WW response. If a procedure exists that defines the response in more detail, it should also be referenced in the ERP.
18 – Emergency Management	BP	<p>There is an opportunity to improve/clarify processes for management of hard copies of the ERP:</p> <ul style="list-style-type: none"> • Responsibilities for distribution of hard copy documents to staff. • Responsibilities for distribution of hard copy documents to external parties. • Differences in distribution processes for full manual reviews vs. updates to individual procedure could also be clarified. • Identification of printed ERP procedures "CONTROLLED DOCUMENTS" while associated SOPs are marked as “uncontrolled”.

Element #	Finding	DWQMS Standard Element
18 – Emergency Management	BP	Where watermain breaks warrant debriefing, it would be a best practice to ensure that the work order number for the associated watermain break report is included in the debrief form so the report can be easily located.
18 – Emergency Management	BP	The memo "COVID-19 Corporate Daily Report and Safe Use of Regional Vehicles" (31Mar2020) outlines requirements for daily monitoring of PPE and cleaning supply inventories. Daily checklists were completed and submitted electronically using the eRIS logbook, but were changed to weekly in June 2020. It is unclear who is responsible to review the checklists or how paper copies are managed. The Operating Authority may also wish to consider using the "managed workflow" in eRIS to ensure that checklist reviews are documented and action items are promoted.
18 – Emergency Management	BP	Section 3.0 of the W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019) states that "communication with media is to be coordinated by the Corporate Communication Specialist". It may be beneficial to further define the relationship between the Corporate Specialist and the W-WW Education and Engagement Coordinator, as well as to outline how social media communications are managed.
18 – Emergency Management	BP	The NIIMS mobile app (for in-the-field access) was recently removed, making it difficult for staff to obtain mapping information in the field. It may be beneficial to consider reinstating the app or finding an alternate way to provide staff with access to NIIMS.

Element #	Finding	DWQMS Standard Element
18 – Emergency Management	BP	Auditors heard about processes for addressing resident concerns from various sources (direct receipt, social media, online portal entries). It may be beneficial to add public communications as a branch in the <i>Emergency Response Communication Tree (ERP-ALL-ALL-V-001, rev4, 22Oct2019)</i> and to describe associated processes in the <i>W-WW Emergency Response Plan (ERP-ALL-ALL-P-001, rev7, 22Oct2019)</i> .
18 – Emergency Management	BP	It may be beneficial to consider smaller drills for the purpose of testing emergency response procedures that have not been tested through large-scale mock emergencies.
18 – Emergency Management	BP	Section 5.2.2 of <i>Post-Event Debriefing (ADM-ALL-ALL-P-009, rev4, 1Apr2020)</i> recommends that "for longer-term events, periodic debriefing sessions can be conducted throughout the event response...[at] the discretion of the appropriate Associate Director." The COVID-19 pandemic has been ongoing for approximately 14 months, and a formal debrief has yet to be conducted. It may be beneficial to conduct a debrief to ensure that lessons learned are adequately captured.
19 – Internal Audit	NC	Section 5.1.1 of <i>Internal Auditing (QMS-WT-ALL-P-190, rev9, 3Feb2020)</i> identifies responsibilities of the Lead auditor and specifies that the Lead Auditor must have completed Lead Auditor training for the DWQMS or for a similar standard. The Lead Auditor for the 2020 audit has completed ISO 9001 training, but was unable to provide a copy of the associated certificate. Additionally, it is not clear who assumed responsibility for audit planning, as the 2020 audit report does not identify the Lead Auditor.

Element #	Finding	DWQMS Standard Element
19 – Internal Audit	NC	Section 5.5.3 of <i>Internal Auditing (QMS-WT-ALL-P-190, rev9, 3Feb2020)</i> specifies that audit notes “should include the date of the audit, the name of the auditors, and the location of the audit”. Slides from the internal audit planning session also included a request to record this information, and the audit checklist template includes spaces to record these data. Date, name, and location information was recorded in its entirety on only 3 of 11 sets of audit notes from the 2020 Internal Audit.
19 – Internal Audit	NC	The 2020 Internal Audit Report notes that "auditor checklists were completed and reviewed with the Lead Auditor...[and]...are retained as per <i>Document & Records Control (QMS-WT-ALL-P-050, rev8, effective 6Jan2020)</i> ." Audit records in EtQ (Quality Record # REC-00187) show that several sets of audit notes are missing (D. Barrow, R. McCabe, J. Rose, M. Max)
19 – Internal Audit	BP	It was noted that some auditors had not had any refresher training since 2010. It may be beneficial to require internal auditor refresher training on a regular schedule (e.g. every five years).
19 – Internal Audit	BP	Section 5.5.3 of <i>Internal Auditing (QMS-WT-ALL-P-190, rev9, 3Feb2020)</i> recommends that “all suspected non-conformance issues be reviewed with the party being audited at the time of discovery”. The 2020 Internal Audit report includes 10 non-conformances, but in-situ reviews were only documented in audit notes for two of the non-conformances. As a best practice, it may be beneficial for auditors to mention these reviews in the audit notes.

Element #	Finding	DWQMS Standard Element
19 – Internal Audit	BP	Section 5.5.1 of <i>Internal Auditing (QMS-WT-ALL-P-190, rev9, 3Feb2020)</i> specifies responsibilities of the Lead Auditor. This auditor noted that in all the documentation, including the 2020 Internal Audit report found in Quality Record # REC-00187 that nowhere does it state the name of the Lead Auditor. For clarity in record keeping and transparency on roles and responsibilities be may be beneficial to identify the Lead Auditor in the audit notes/checklists and in the internal audit report.
19 – Internal Audit	BP	<i>Documents & Records Control (QMS-WT-ALL-P-050, rev8, effective 6Jan2020)</i> specifies retention times of “T+1 year active, 3 years inactive – selective retention” (as per bylaw) and 5 years (internal standard). The bylaw assigns a “selective” retention, meaning that there is an option to retain beyond the retention period where necessary. The Records Management module EtQ contains internal audit records from as far back as 2008. It may be beneficial to review and evaluate whether these records need to be retained.

Prepared by: Rachel Whyte

Date: April 23, 2021 (rev0)