SRB Technologies (Canada) Inc.

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2024 Annual Compliance and Performance Report

Reporting Period: January 1 – December 31, 2024

Licence Number: NSPFL-13.00/2034

Licence Condition: 3.2

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SRB Technologies (Canada) Inc.

2024 Annual Compliance and Performance Report

Submission date:	March 31, 2025
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Executive Summary

SRB Technologies (Canada) Incorporated (SRBT) is pleased to provide this compliance and performance report to the Canadian Nuclear Safety Commission (CNSC) as part of our licensed activities.

Our facility continues to process tritium safely, responsibly and efficiently, and we are proud of the level of performance and improvements achieved during 2024.

One action level exceedance occurred late in the year; otherwise, no nuclear safety-related events or significant safety-related issues occurred, and the safety of workers, the public and the environment was maintained at all times.

Primarily due to the single occurrence of an action level exceedance, a number of internal targets relating to gaseous tritium releases to atmosphere were missed in 2024.

During the year, SRBT processed 25,562,136 GBq of tritium into self-luminous light sources and safety devices; in comparison, in 2023, a total of 23,202,623 GBq of tritium was processed.

The ratio of the amount of tritium released to atmosphere compared to the amount of tritium processed was determined to be 0.18% at year's end. This ratio did not meet our annual internal target of 0.11%.

Tritium oxide releases to atmosphere rose in 2024 in comparison to the year previous, with 13,628 GBq of oxide being released (vs. 6,540 GBq in 2023).

The total amount of tritium (elemental + oxide) released to the environment through the gaseous effluent pathway increased (45,868 GBq) compared with the previous year (20,520 GBq), with the week of the action level exceedance accounting for slightly more than 37% of this total for the year.

The average weekly rate of gaseous tritium releases also exceeded our internal target for 2024; on the average, 882 GBq of tritium was released weekly, versus our internal target of less than 600 GBq per week.

Although internal targets were missed, SRBT fully complied with licenced limits relating to annual tritium releases via effluent pathways, with significant margin.

Once again, no staff member exceeded 1 mSv for the year – a value that represents the dose limit to the public. As well, no action levels were exceeded with respect to radiation doses. This is a testament to the continued diligence of our workers in maintaining radiation exposures as low as reasonably achievable.

The conservatively-calculated dose to the most-exposed member of the public remains far less than 1% of the prescribed annual limit of 1 mSv, as derived from direct sampling and monitoring of the local environment. Groundwater tritium concentrations continue to respond favorably to modified and optimized processing practices.

There were no lost-time injuries, and no significant safety-related events occurred relating to conventional health and safety, fire protection, packaging and transport, security or waste management.

In 2024, CNSC staff performed two inspections at the facility, resulting in a total of three compliance actions and six recommendations being raised, all of which were identified by CNSC staff as low safety significance that did not pose an immediate or unreasonable risk to the health and safety of persons or the environment.

Our Financial Guarantee for future decommissioning remains fully funded. The Financial Guarantee does not rely on insurance, letters of credit or third-party resources in order to ensure funding availability for future decommissioning of the facility; the funds are held in escrow for access via a Financial Agreement with the Commission.

We continue to improve and implement a successful and effective Public Information Program, and are striving to work towards a collaborative and open relationship with Indigenous communities in the area.

In July, SRBT hosted representatives from the Algonquins of Pikwakanagan First Nation (AOPFN) and CNSC staff for an extensive tour of the facility, and of the local environment surrounding the facility. A special environmental sampling campaign took place in the autumn within the Pikwakanagan community, in close consultation and collaboration with community members, Indigenous knowledge holders, and AOPFN Guardians.

In summary, although an isolated incident occurred with the action level exceedance, and a number of our internal targets for gaseous tritium emissions and worker dose were missed, 2024 remains a successful and safe year of operation for SRBT.

Continual improvement in compliance and safety is an ongoing mission, and we will always strive to reduce our operational impact on the environment, and to optimize safety and the effective doses to our workers and the public.

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Acronyms and Abbreviations

ACR	Annual Compliance Report / Annual Compliance and Performance Report
AOPFN	Algonquins of Pikwakanagan First Nation
Bq	Becquerel • MBq → megabecquerel • GBq → gigabecquerel • TBq → terabecquerel
BSI	British Standards Institute
CLC	Canada Labour Code
CLW	Clearance Level Waste
CNL	Canadian Nuclear Laboratories
CNSC	Canadian Nuclear Safety Commission
CSA	Canadian Standards Association
CSM	Conceptual Site Model
CVC	Compliance Verification Criteria
DRL	Derived Release Limit
DS	Downspout
ECR	Engineering Change Request
EffMP	Effluent Monitoring Program
EMP	Environmental Monitoring Program
EMS	Environmental Management System
ERA	Environmental Risk Assessment
FASC	Facility Access Security Clearance
FG	Financial Guarantee
FHA	Fire Hazard Assessment
GMP / GWMP	Groundwater Monitoring Program

Acronyms and Abbreviations (continued)

GTLS	Gaseous Tritium Light Source
HT	Elemental Tritium
HTO	Tritium Oxide
IAEA	International Atomic Energy Agency
IATA	International Air Transportation Agency
IEMP	Independent Environmental Monitoring Program
ISO	International Organization for Standardization
IT	Information Technology
LCH	Licence Conditions Handbook
LLW	Low-Level Waste
LSC	Liquid Scintillation Counting
LTI	Lost Time Incident
MDA	Minimum Detectable Activity
MSD	Musculoskeletal Disorder
MW	Monitoring Well
NC	No Change
NCR	Non-Conformance Report
NEW	Nuclear Energy Worker
NIST	National Institute of Standards and Technology
NSCA	Nuclear Safety and Control Act
NSPFL	Nuclear Substance Processing Facility Licence
OBT	Organically Bound Tritium
OFI	Opportunity for Improvement
OLC	Operating Limits and Conditions

Acronyms and Abbreviations (continued)

PAS	Passive Air Sampler
PDP	Preliminary Decommissioning Plan
PFD	Pembroke Fire Department
PIP	Public Information Program
PLC	Professional Loss Control
PUTT	Pyrophoric Uranium Tritium Trap
QA	Quality Assurance
QC	Quality Control
RDU	Remote Display Unit
REGDOC	Regulatory Document
RPD	Relative Percent Difference
RW	Residential Well
SAR	Safety Analysis Report
SASC	Special Annual Sampling Campaign
SAT	Systematic Approach to Training
SCA	Safety and Control Area
SRBT	SRB Technologies (Canada) Incorporated
Sv	Sievert • mSv → millisievert • μSv → microsievert
T2	Molecular Tritium Gas
TDG	Transportation of Dangerous Goods
TNA	Training Needs Analysis
UL	Underwriters Laboratories
VLLW	Very Low-Level Waste

Acronyms and Abbreviations (continued)

WHSC	Workplace Health and Safety Committee
WMP	Waste Management Program
WSIB	Workplace Safety and Insurance Board

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1. Introduction

1.1 General Introduction

For the period of January 1 – December 31, 2024, SRB Technologies (Canada) Inc. (SRBT) operated a tritium processing facility in Pembroke, Ontario, under Nuclear Substance Processing Facility Licence NSPFL-13.00/2034[1], issued by the Canadian Nuclear Safety Commission (CNSC).

The facility was operated in compliance with the regulatory requirements of the *Nuclear Safety and Control Act* (NSCA), our operating licence, and all other applicable federal, provincial and municipal regulations throughout the review period. As well, no new CNSC-licensed activities were implemented since the previous annual compliance and performance report.

Compliance was ensured by the continued implementation of our Management System and associated programs and procedures, coupled with a high level of independent internal and external oversight through audit and inspection activities.

During this period, there were no exceedances of radiation protection-related action levels, nor licence / regulatory limits associated with our operating licence. One environmental protection-related action level exceedance was reported to CNSC staff. No other reportable events took place.

The SRBT operating licence includes conditions that require SRBT to prepare and submit an annual compliance report (ACR). This requirement is currently defined as part of the compliance verification criteria (CVC) in the Licence Conditions Handbook (LCH)[2] relating to condition 3.2 of NSPFL-13.00/2034, which states:

> ***Annual Reporting***
>
> *The licensee shall submit an annual compliance report by March 31 of each year, covering the operation for the 12-month period from January 1 to December 31 of the previous year that meets the requirements of section 3 of REGDOC-3.1.2.*

The purpose of this report is to provide the required information in order to meet the requirements of conditions 3.2 of Licence NSPFL-13.00/2034, and the CVC in the associated LCH.

The information is reported in a format which meets the requirements of CNSC Regulatory Document 3.1.2, *Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills*[3], SRBT's Regulatory Reporting Program, and in consideration of regulatory feedback and comments regarding previous ACRs submitted in the past.

1.2 Facility Operation – Compliance Highlights and Significant Events

SRBT conducted its licenced activities safely and compliantly throughout 2024.

1.2.1 Tritium Processing

In 2024, SRBT conducted 4,463 tritium processing operations (light source filling), with a total of 25,562,136 GBq of tritium being processed into gaseous tritium light sources (GTLS).

Please refer to section 1.4, 'Production or Utilization' for additional details on tritium processing in 2024.

1.2.2 Distribution of Self-luminous Safety Products

In 2024, 670 shipments of our self-luminous safety products were made to customers in 19 different countries, including Canada.

Please refer to section 4.8, 'SCA – Packaging and Transport of Nuclear Substances' for additional details on the distribution of our products in 2024.

1.2.3 Acceptance of Expired Products

In 2024, a total of 12,111 expired (or otherwise removed from service) self-luminous safety 'EXIT' type signs were accepted by SRBT from Canadian and American sources, representing a total activity of 1,718.33 TBq of tritium. In 2023, 11,027 signs were processed representing 1,642.40 TBq of tritium.

These signs were disassembled safely and the light sources removed. A very small number of these signs were evaluated as having light sources that could be reused in other self-luminous devices. Lights that could not be repurposed were packaged and shipped to a licenced radioactive waste management service provider.

As well, an additional 194.63 TBq of tritium was accepted from international origins (i.e. other than Canada and the United States) in the form of expired tritium illuminated devices, such as aircraft signs, dials, gauges and other smaller equipment. These were also processed for shipment to a licenced waste management facility.

Please refer to section 4.5, 'SCA – Waste Management' and section 4.8, 'SCA – Packaging and Transport of Nuclear Substances' for additional details on the acceptance of expired self-luminous safety signs in 2024.

1.2.4 External Oversight

During the year, there were a total of ten major inspections or audits conducted by stakeholders and external parties on our operations.

CNSC staff conducted compliance inspections on two occasions in 2024; a general inspection was conducted in June[4], and an inspection focused on Radiation Protection was conducted in October[5]. All identified findings and non-compliances were found to be of low safety significance, did not pose immediate or unreasonable risks, and were dispositioned by SRBT accordingly.

BSI Management Systems, on behalf of the International Organization for Standardization (ISO), conducted a major audit in September 2024, which concluded that SRBT continues to effectively manage our operations in a fashion that ensures the elements of the scope of our certification with ISO 9001 are effectively addressed, and confirmed our continued certification.

One major customer of SRBT products conducted an independent audit of our operations in October 2024, while Underwriters Laboratories (UL) completed four quarterly audits as planned.

Additional details on the above noted external oversight of SRBT operations can be found in section 2.1, ‘SCA – Management System’.

Two focused facility inspections were conducted relating to fire protection. Both the Pembroke Fire Department (PFD) and Professional Loss Control (PLC) inspected the facility in 2024.

Details on fire protection-related inspections and audits can be found in section 4.4, ‘SCA – Emergency Management and Fire Protection’.

1.2.5 Internal Oversight

Ten internal compliance audits were conducted through the year, focused on all aspects of our operations and our organization. A total of nine non-conformance reports and fifteen opportunities for improvement were identified as a result of these activities, all of which have been addressed (or are in the process of being addressed) by the responsible managers.

Additional details on internal oversight of SRBT operations can be found in section 2.1, ‘SCA – Management System’.

1.2.6 Reported Events

Event reporting is governed internally by the SRBT Regulatory Reporting Program.

In 2024, SRBT experienced one reportable event that met the regulatory criteria for unplanned event reporting. An action level was exceeded for releases of tritium via the gaseous effluent pathway for the monitoring week ending December 3, 2024.

Additional details on this event are provided in Section 2.3.3 of this report, and both the preliminary and full reports to CNSC staff are available on SRBT's public website[6,7].

No other reportable events took place in 2024.

1.2.7 Operational Challenges

SRBT did not experience any notable operational challenges in 2024.

1.2.8 Summary of Significant Modifications

No significant modifications were implemented in the facility which pertain to our licensed activities in 2024, and there were no changes to the self-luminous safety light production capacity of the facility.

All minor and non-safety significant modifications to structures, systems and components were conducted in accordance with our change control processes.

Please refer to section 3.2, 'SCA – Physical Design', for more information regarding notable facility modifications carried out in 2024.

1.2.9 Summary of Organizational Structure and Key Personnel

At the conclusion of 2024, SRBT employed 39 employees and managers. No structural changes to the organization were implemented in 2024.

Please refer to section 2.1, 'SCA – Management System' for details regarding SRBT's organizational structure in 2024.

1.3 Summary of Compliance with Licence and OLCs

Throughout 2024, SRBT complied with the conditions of our operating licence[1], and possessed, transferred, used, processed, managed, stored and disposed of all nuclear substances and radiation devices related to and arising from the operation of the facility in compliance with regulatory requirements.

Specifically:

- All required programs have been implemented and maintained,
- The CNSC was notified as required of changes to the programs, processes and documents referenced in the management system / licensing basis,
- All required records have been established and maintained pursuant to the operating licence, the Nuclear Safety and Control Act and its regulations,
- All pertinent notifications were made, and written reports filed, within prescribed periods,
- A decommissioning strategy continues to be maintained for future use,
- A financial guarantee continues to be fully funded and maintained, for future decommissioning,
- Cost recovery fees were paid on time and in full, and
- Limits on releases of tritium to the atmosphere and sewer, and radiation dose limits to the public and SRBT nuclear energy workers were not exceeded.

SRBT also remained in compliance with requirements of all other federal and provincial regulations as pertaining to the operation of the facility, including the Canada Labour Code and associated regulations, as well as provincial regulations with respect to the management of hazardous materials and waste.

The following summary report is provided respecting SRBT compliance with the Operating Limits and Conditions (OLC) established within our Safety Analysis Report[8] (SAR) throughout the course of 2024.

Each applicable OLC is repeated below, with a statement of compliance.

1.3.1 Tritium Possession Limit

SRBT is authorized by licence to possess up to 6,000 TBq of tritium in any form.

SRBT possessed less than 6,000 TBq of tritium at all times during 2024.

Please refer to section 2.3, ‘SCA – Operating Performance’ for more details.

1.3.2 Tritium Processing – Precipitation

Tritium processing shall not occur during measurable periods of precipitation, as detected by the precipitation detection system or equivalent.

Tritium processing operations were only conducted during periods where measurable precipitation was not occurring during 2024.

Processing operations were ceased and equipment placed into a safe state when precipitation events occurred during operating hours.

1.3.3 Tritium Releases to Atmosphere – Tritium Oxide

SRBT shall not release in excess of 6.72E+13 Bq of tritium oxide to atmosphere in any year.

The total amount of tritium oxide (HTO) released to atmosphere in 2024 was equal to 1.36E+13 Bq (13,628 GBq), representing 20.3% of this licenced limit.

Please refer to section 4.3 ‘SCA – Environmental Protection’ for more details.

1.3.4 Tritium Releases to Atmosphere – Tritium Oxide + Elemental

SRBT shall not release in excess of 4.48E+14 Bq of total tritium as tritium oxide and tritium gas to atmosphere in any year.

The total amount of combined HTO and elemental tritium (HT) released to atmosphere in 2024 was equal to 4.59E+13 Bq (45,868 GBq), representing 10.2% of this licenced limit.

Please refer to section 4.3 ‘SCA – Environmental Protection’ for more details.

1.3.5 Minimum Differential Pressure Measurements for Tritium Processing

Tritium processing operations shall not occur unless the following differential pressures are achieved, as measured by the gauges on each of the active ventilation system stacks: • Rig Stack: 0.27 inches of water column • Bulk Stack: 0.38 inches of water column These measurements correspond to an average effective stack height of 27.8 metres, assuming a wind speed of 2.2 m/s.

At no time did tritium processing occur during 2024 when the noted differential pressures were not being achieved, as measured daily prior to operations commencing.

1.3.6 Tritium Releases to Sewer – Water-soluble Tritium

SRBT shall not release in excess of 2.00E+11 Bq of water-soluble tritium to the municipal sewer system in any year.

The total amount of water-soluble tritium released to the municipal sewer in 2024 was equal to 1.78E+09 Bq (1.78 GBq), representing just under 0.9% of this licenced limit.

Please refer to section 4.3 'SCA – Environmental Protection' for more details.

1.3.7 PUTT Filling Cycles

Any pyrophoric uranium tritium trap (PUTT) base is limited to 30 complete bulk splitter filling cycles, after which it is no longer permitted to be used for further tritium processing.

All tritium processing in 2024 was conducted using PUTTs that had been cycled 30 times or less on the bulk splitter.

1.3.8 PUTT / Bulk Container Tritium Loading Limit

> PUTTs are limited to less than 111,000 GBq of tritium loading at any time.
>
> Bulk containers are limited as follows:
>
> - SRBT shall request no more than 925,000 GBq per bulk container when submitting a purchase order to an approved supplier of tritium gas.
> - No bulk container shall exceed 1,000,000 GBq of tritium loading at any time.

In 2024, no PUTT was loaded with more than 111,000 GBq of tritium.

No bulk container was used in the facility in excess of the 1,000,000 GBq loading limit.

1.3.9 Bulk Container Heating Limit

> Bulk tritium containers are limited to a heating temperature of approximately 550°C, as measured by the thermocouple placed between the heating band and the container surface.
>
> Brief and small exceedances of this value are tolerable so long as they are not sustained, and the temperature is returned below this value as soon as possible.

Bulk tritium container heating operations were conducted in compliance with this limit throughout 2024.

1.3.10 On-site Depleted Uranium Inventory

> The on-site physical inventory of depleted uranium (virgin, in use and decommissioned bases) is limited to 10 kg.

The on-site inventory of depleted uranium did not exceed 10 kg in 2024.

Please refer to section 2.3, ‘SCA – Operating Performance’ for more details on inventory controls of depleted uranium in 2024.

1.4 Production or Utilization

1.4.1 Tritium Processing

In 2024, a total of 25,562,136 GBq of tritium was processed. This represents an increase of slightly over 10% from the 2023 value of 23,202,623 GBq.

The following table is presented to illustrate the five-year history of tritium processing at SRBT.

TABLE 1: TRITIUM PROCESSED: FIVE-YEAR TREND

YEAR	2020	2021	2022	2023	2024
TRITIUM PROCESSED (GBq)	27,887,498	29,392,257	26,940,372	23,202,623	25,562,136

1.4.2 Tritium Possession

SRBT is restricted by licence to possess no more than 6,000 TBq of tritium in any form at the facility at any time.

Throughout 2024, this possession limit was not exceeded. The maximum tritium activity possessed at any time during 2024 was 3,959 TBq in January. The monthly average inventory of tritium in the facility was 2,434 TBq.

At all times, unsealed source material was stored on tritium traps or in the handling volumes of tritium processing equipment.

The monthly data of tritium activity on site during calendar year 2024 can be found in **Appendix A** of this report.

1.5 Changes in Management System Documentation

In 2024, SRBT revised a number of key program-level management system documents associated with our licensing basis, following the change control provisions of our Licence Conditions Handbook[2].

These revisions were each submitted to CNSC staff for review and acceptance, including:

- Licence Conditions, Action Levels and Administrative Limits,
- Health and Safety Policy,
- Hazard Prevention Program,
- SHP-001, *Packing and Shipping – General Requirements,* and
- SRBT Preliminary Decommissioning Plan

In line with our mission and policy of continual improvement, process and procedure assessment and associated revision continued to be a managerial focus throughout the year.

In 2024, a total of 36 Engineering Change Requests were generated to control the revision and review of programs, procedures or forms, or to manage other changes in the facility structures, systems and components.

Specific details on the changes in documentation can be found in section 2.1, ‘SCA – Management System’.

2. Management SCAs

2.1 SCA – Management System

Throughout 2024, the SRBT Management System was effectively and thoroughly implemented, ensuring that our nuclear substance processing facility operations continued to meet the requirements detailed in our LCH[2], including key elements such as organization and responsibilities, capability of personnel, use of experience, work planning and control, process and change control, independent verification, non-conformance and corrective action.

A total of 36 non-conformance reports (NCR) and 38 opportunities for improvement (OFI) were raised in different areas of the company operations.

As of the end of 2024, 21 out of the 36 NCRs raised in 2024 had been addressed, reviewed for effectiveness and closed. The remaining 15 NCRs are still in progress due to the fact that they were raised in the later part of the year, or due to relative longer timeframes for the actions that are to be taken to resolve the issues identified.

For OFIs, 18 out of the 38 raised in 2024 have been addressed, reviewed for effectiveness and closed. The remaining 20 OFIs were either raised later in the year, and/or were assigned target completion due dates that have not yet been reached, and will be reviewed as per normal processes as they are addressed.

SRBT affirms that corrective actions and opportunities for improvement have been effective at resolving problems and promoting the concept of continual improvement within our management system in 2024.

Organizational Management Reviews were conducted in early 2024 by all program owners and responsible managers, including benchmarking and self-assessment activities. These reviews were focused on the 2023 calendar year. Reports were submitted to the Executive Assistant in preparation for the annual Management Review.

On September 3rd, 4th and 5th, the annual Management Review was conducted by way of a series of one-on-one meetings between key members of the Executive Committee and each of the individual program owners and responsible managers.

The results of benchmarking and self-assessment activities performed for the previous calendar year were reviewed and discussed, and areas where improvements could be made in the various company safety programs were highlighted.

The management system was found to be effective at meeting the current requirements of the NSCA, associated regulations and the conditions of the operating licence, as well as ISO 9001:2015, and customer requirements.

The 2024 Organizational Management Reviews are scheduled to take place in the second quarter of 2025, followed by Senior Management meetings to discuss the outputs of the reviews with responsible managers, and the identification of any opportunities for improvements, actions required to mitigate risks, and compliance or performance issues.

2.1.1 Staffing and Organization

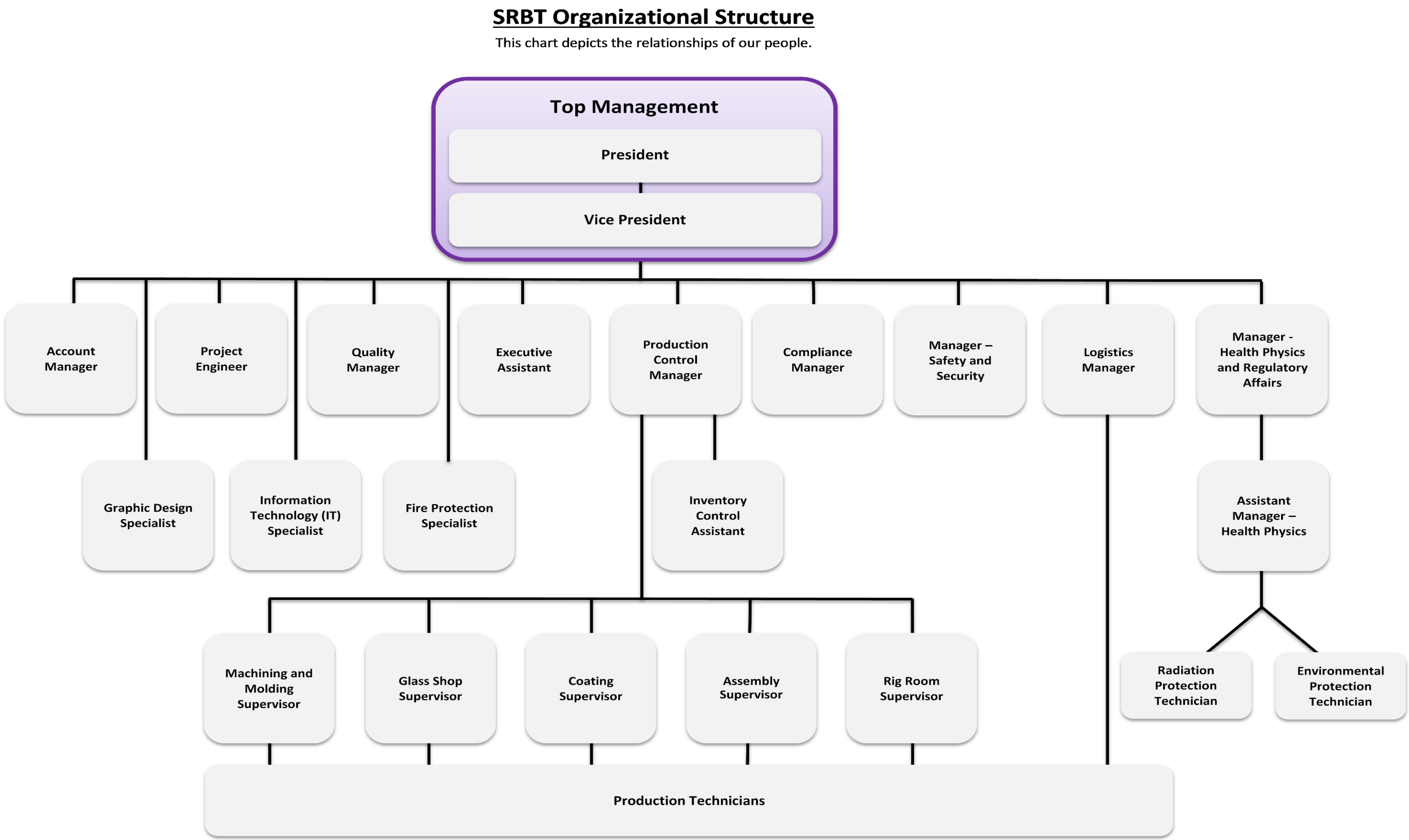
At the beginning of 2024, SRBT total staff complement stood at 38 employees.

Four new employees were hired during the year, and three employees left the employ of the company in 2024.

As of the end of 2024, the total working staff complement stood at 39 employees.

The organizational chart in Figure 1 represents the structure of the company, as of the end of 2024, that ensures SRBT meets *the Nuclear Safety and Control Act*, regulations and conditions of our operating licence.

FIGURE 1: ORGANIZATIONAL CHART



Sixteen administrative employees and twenty-three production / technician-level employees work at SRBT at the conclusion of the year.

Administrative employees include the two members of Senior Management:

- President has the overall responsibility for the facility and ensures that all licensing requirements are met.
- Vice President assumes the full duties of the President in his absence or otherwise assists the President in his duties.

At the conclusion of 2024, the administrative employees also include nine individuals at the Organizational Management level:

- Quality Manager is mainly responsible for ensuring the quality of products and the satisfaction of customers. They also provide input ensuring that our management system meets the requirements of the ISO 9001 standard.
- Logistics Manager is mainly responsible for the shipment, receipt and inventory control of radioactive materials, as well as import and export activities.
- Executive Assistant is mainly responsible for providing administrative support to the President, and for ensuring meeting minutes are recorded.
- Production Control Manager is mainly responsible for all company purchasing and production planning activities, and the distribution of work packages.
- Project Engineer is mainly responsible for developing and maintaining product specifications and manufacturing procedures, product research and development, and oversight of the change control process.
- Account Manager is mainly responsible for all company accounting activities.
- Manager – Safety and Security is mainly responsible for ensuring staff health and safety and ensuring compliance with the health and safety provisions of the *Canada Labour Code,* the *Canada Occupational Health and Safety Regulations*, and support for the Security Program.
- Compliance Manager is mainly responsible for performing independent internal audits and further ensuring facility compliance with external and internal requirements.
- Manager of Health Physics and Regulatory Affairs is mainly responsible for oversight of all company Health Physics activities, as well as communicating with CNSC staff on regulatory matters.

Five employees provide program oversight and/or directly assist individuals at the management support level,

- Graphic Design Specialist is responsible for coordinating changes to the company website, and for the design and development of public information products and sales literature.
- IT Specialist manages and maintains the facility computer network and provides a wide range of technical and engineering support.
- Fire Protection Specialist ensures that facility fire safety procedures are implemented, and for coordinating with the PFD for drills, inspection and training. This individual is also responsible for the day-to-day management of maintenance activities in the facility.
- Inventory Control Assistant oversees the receipt of all materials, including quality evaluation where applicable, and for general stores and materials.
- Assistant Manager – Health Physics is responsible for the day-to-day implementation of company Health Physics-related programs and processes, including coordinating the activities of technician-level resources assigned to the department.

At the technician level, there are two technician-level organizational positions within the Health Physics department:

- Environmental Protection Technician is primarily responsible for performing duties relating to environmental protection and monitoring.
- Radiation Protection Technician performs duties relating primarily to radiation protection.

Twenty-one production-focused employees include five Production Supervisors:

- Glass Shop Supervisor is responsible for all the activities within the Glass Shop Department.
- Coating Supervisor is responsible for all the activities within the Coating Department.
- Rig Room Supervisor is responsible for all the activities within the Rig Room Department.
- Assembly Supervisor is responsible for all the activities within the Assembly Department.
- Machining and Molding Supervisor is responsible for all the activities within the Machining and Molding Department.

These supervisors oversee the work of sixteen Production Technicians, who are responsible for performing production activities in accordance with company manufacturing procedures.

Throughout 2024, all safety-significant positions in the organization were staffed with qualified workers.

2.1.2 Committees

In 2024, committees have continued to be instrumental in the development and refinement of company programs and procedures, identifying new safety initiatives and ensuring continuing effective communication at all organizational levels.

Committees use meeting results as an opportunity for improvement and make recommendations accordingly. In 2024, a total of 71 committee meetings took place, compared to 80 in 2023, 73 in 2022, and 99 in 2021.

Committee meetings continue to be a key force to improve all aspects of our operations, and safety in general.

See Table 2 for a breakdown of the meetings held in 2024.

TABLE 2: COMMITTEE MEETINGS

COMMITTEE	NUMBER OF MEETINGS
PRODUCTION COMMITTEE	38
WORKPLACE HEALTH AND SAFETY COMMITTEE	13
HEALTH PHYSICS COMMITTEE	4
TRAINING COMMITTEE	3
MITIGATION COMMITTEE	3
FIRE PROTECTION COMMITTEE	2
MAINTENANCE COMMITTEE	2
WASTE MANAGEMENT COMMITTEE	2
PUBLIC INFORMATION COMMITTEE	2
EXECUTIVE COMMITTEE	1
SAFETY CULTURE COMMITTEE	1
TOTAL	**71**

2.1.3 Review of Quality Assurance and Management System Effectiveness

The SRBT management system is subject to both focused periodic reviews, as well as continuous review and improvement.

An internal audit of the SRBT management system is conducted annually. In 2024, this audit yielded no safety-significant findings.

Based upon the following factors, and the information presented in this report, it is concluded that the SRBT management system has been effective throughout the year:

- A very low frequency of lost-time injuries or incidents occurring in 2024,
- All workplace injuries were relatively minor in nature,
- Highest worker dose for 2024 is less than 1% of the regulatory limit,
- Maximum calculated public dose remains less than 1% of the regulatory limit for persons who are not nuclear energy workers,
- Continued low ratio of tritium released vs. processed,
- Gaseous tritium oxide releases were 20.3% of authorized limits, while combined oxide and elemental tritium releases were 10.2% of authorized limits,
- Tritium releases via liquid effluent were less than 1% of authorized limits,
- All conditions of our facility operating licence were met throughout the year,
- Very few CNSC-identified compliance issues from multiple inspections, with all findings identified by CNSC staff as being of low safety significance,
- Continued improvement of several key programs and processes, and
- Continuous registered certification to the latest revision of the ISO 9001 standard.

2.1.4 Internally Conducted Audits

2.1.4.1 Internal Audits of Internal Programs and Processes

The goal of SRBT's internal auditing process is to ensure that all licensed activities and company safety programs and procedures are being adhered to. Internal audits are often specifically focused on the same SCAs applied by the CNSC. The Compliance Manager implemented an audit schedule for 2024 that touched on several aspects of our operations. A total of ten internal audits were scheduled and completed.

Internal audits were conducted in the following areas of our operations:

- Production Departments
- Health and Safety
- Safety Analysis
- Management System
- Personnel Training
- Radiation Protection and Dosimetry Service
- Quality Department
- Environmental Protection - Effluent Monitoring Program,
- Security, and
- Waste Management

Internal audits resulted in 9 non-conformances (NCR) and 15 opportunities for improvement (OFI) being identified in 2024. Actions have been established and tracked in each case in order to drive compliance and continuous improvement.

For 2025, a total of eleven internal audits are included on the approved schedule.

2.1.4.2 Internal Audits of External Suppliers

In 2024, three external supplier audits were planned and carried out to ensure the acceptability of the management systems of key suppliers of goods and services.

These audits were completed through the Supplier Quality Audit Questionnaire process. No findings were identified through the conduct of these audits.

2.1.5 Externally Conducted Audits

During the year, there were a total of ten major inspections or audits conducted by stakeholders and external parties on our operations.

2.1.5.1 CNSC Inspections (2)

CNSC staff conducted compliance inspections at SRBT on two occasions in 2024.

In June, CNSC staff conducted a three-day general compliance inspection which included assessments of the following Safety and Control Areas (SCA):

- Management System (focus on Safety Culture)
- Operating Performance
- Conventional Health and Safety
- Environmental Protection
- Emergency Management and Fire Protection (focus on Fire Protection)
- Other Matters of Regulatory Interest (Public Information and Disclosure Program)

The inspection resulted in two compliance actions and six recommendations being raised[4], all of which were identified by CNSC staff as low safety significance that do not pose an immediate or unreasonable risk to the health and safety of persons or the environment.

SRBT responded to CNSC staff[9] by implementing specific actions to remedy identified non-compliances, as well as identifying opportunities for improvement based upon the recommendations provided.

In October, CNSC staff conducted a two-day compliance inspection focused on the SCA of Radiation Protection.

The inspection resulted in a single compliance action being raised[5], which was identified by CNSC staff as low safety significance that did not pose an immediate or unreasonable risk to the health and safety of persons or the environment. SRBT responded to CNSC staff[10] by implementing specific actions to remedy the identified non-compliance.

2.1.5.2 ISO Certification Audits (1)

On behalf of the International Organization for Standardization (ISO), BSI Management Systems conducted an audit of SRBT operations related to the quality management system on September 24 and 25, 2024, as part of the maintenance of SRBT's ISO 9001 certification.

Through the audit, SRBT was successful in maintaining continued certification. Three opportunities for improvement were identified.

2.1.5.3 Customer-Led Audits (1)

In October 2024, an external audit was executed by a major customer of our commercial safety signs. The audit was a product-focused quality audit of our facility. No findings were identified through this audit.

2.1.5.4 Underwriters Laboratories (4)

Underwriters Laboratories (UL) provides safety-related certification, validation, testing, inspection, auditing, advising and training services to a wide range of clients, including manufacturers.

UL performs quarterly visits of our facility. These visits are unannounced, and provide assurance that our UL-listed products are manufactured using the materials, procedures and testing parameters required under the specific UL listing.

In 2024, UL performed inspections on January 11, June 11, September 2 and November 27. No variations were identified as a result of these inspections.

2.1.5.5 Fire Protection Inspections (2)

Two focused facility inspections were conducted in 2024 relating to fire protection by parties other than SRBT.

The Pembroke Fire Department inspected the facility in September, finding one violation that was corrected in a timely manner.

An external fire protection consultant (PLC) conducted a N393-compliant site condition inspection in October. The inspection report included five findings which were addressed accordingly.

Details on these inspections can be found in section 4.4, 'SCA – Emergency Management and Fire Protection'.

2.1.6 Benchmarking and Self-assessments

In 2024, individuals responsible for specific programs and procedures at SRBT regularly looked at process problems, corrective actions as well as trending and used this information to benchmark elsewhere in or out of the organization in order to improve the effectiveness of these programs and procedures and to help define where improvements could be made.

Benchmarking against other similar CNSC licensees is encouraged. Documents describing the performance of similar CNSC licensees are made available for review, including:

- Commission Member Documents
- Proceedings, Including Reasons for Decision
- Documents from other licensees, including annual compliance reports

Self-assessments are also performed by Organizational Managers to identify, correct and prevent problems that hinder the achievement of the company's vision, mission, goals, values and policy and to assess the adequacy and effectiveness of the Quality Management System.

Self-assessments were performed by review of:

- Analysis and trending of performance data against historical data
- Input from stakeholders (public, contractors, regulators, etc.)
- Workplace inspections or observations
- Routine communications with staff to determine whether expectations are understood
- Training and coaching results
- Corrective and preventive actions raised throughout the organization
- Internal audit results

Both Benchmarking and Self-assessment reports formed key inputs into the annual Management Review meetings conducted in September.

The scope of these meetings was to fully and critically review our operations, to develop actions to address identified issues and risks, and to take advantage of opportunities for improvement.

The 2024 Management Review cycle is scheduled to be completed in the first half of 2025.

2.1.7 Programs and Procedures

2.1.7.1 Programs and Major Licensing Documents

In 2024, a number of key licensing basis documents and management system programs were revised in line with SRBT's mission of continuous improvement. These revised documents were submitted to CNSC staff, and subsequently implemented in compliance with the change processes described in SRBT's Licence Condition Handbook.

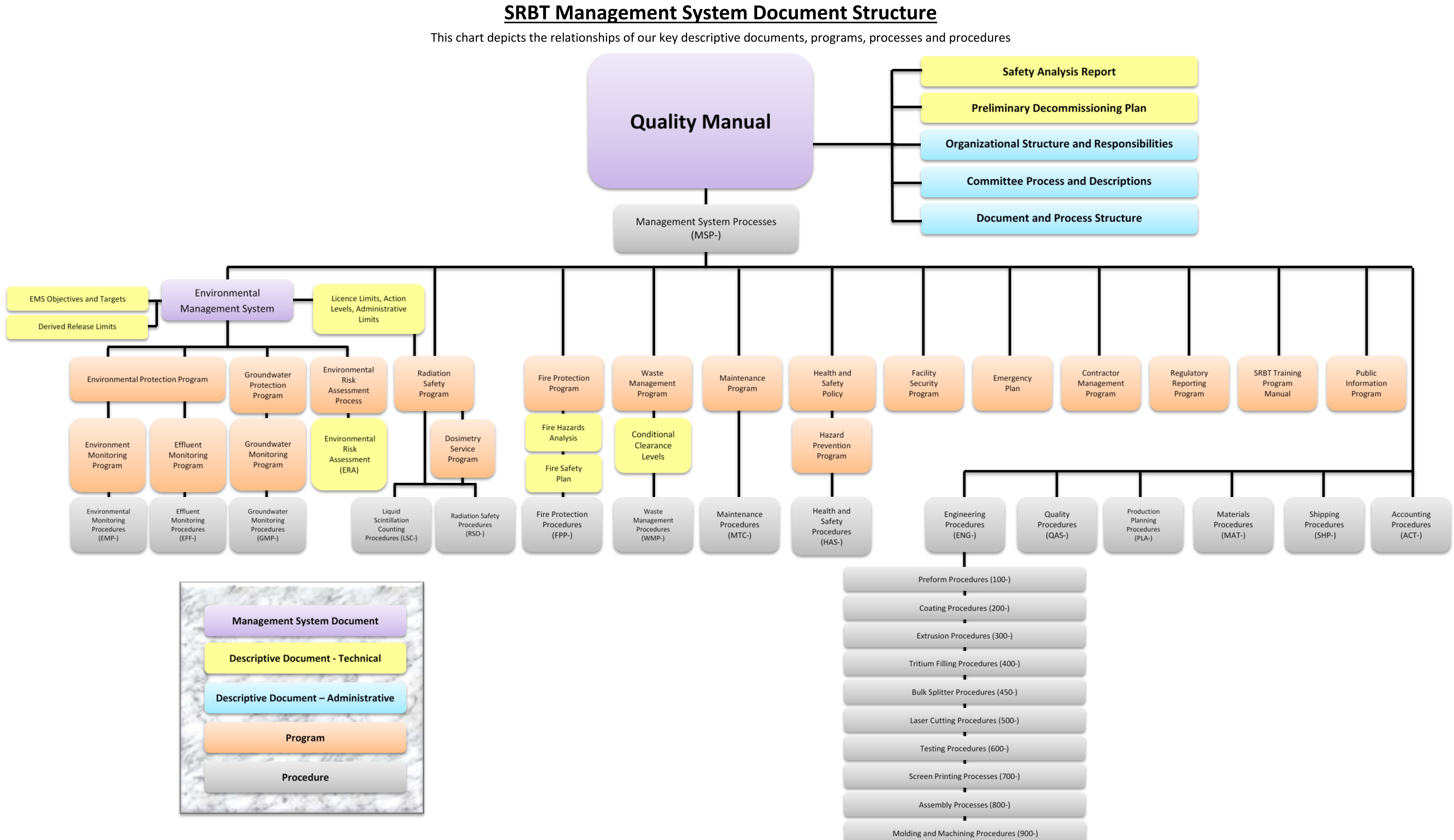
These included:

- Revision G of SRBT's management system document titled *Licence Limits, Action Levels and Administrative Limits* was submitted to CNSC staff on June 13, 2024[11], and was subsequently implemented on July 14, 2024 once the 30-day advance notice period had ended.
- Revision D of the Health and Safety Policy was submitted to CNSC staff on July 12, 2024[12], and was subsequently implemented on August 11, 2024 once the 30-day advance notice period had ended.
- Revision F of the Hazard Prevention Program was submitted to CNSC staff on September 25, 2024[13], and was subsequently implemented on October 26, 2024 once the 30-day advance notice period had ended.
- Revision J of procedure SHP-001, *Packing and Shipping - General Requirements* was submitted to CNSC staff on October 2, 2024 upon its implementation[14].
- The November 2024 revision of the SRBT Preliminary Decommissioning Plan was submitted to CNSC staff on November 29, 2024[15]. As of the end of calendar year 2024, SRBT awaits comments, requests for further information and acceptance of the revised plan from CNSC.

2.1.7.2 SRBT Management System Document Hierarchy

Figure 2 illustrates the Management System document hierarchy in place as of the end of 2024.

FIGURE 2: MANAGEMENT SYSTEM DOCUMENTS



2.1.7.3 Management System Changes

In 2024, a total of 36 Engineering Change requests (ECR) were filed relating to procedural or program changes in the SRBT management system.

The breakdown of program-related ECRs filed in 2024 is presented in Table 3 below:

TABLE 3: PROCEDURAL ECR SUMMARY

PROGRAM / AREA	NUMBER OF ECRs
RADIATION SAFETY	8
MATERIALS / PRODUCTION	7
ENGINEERING	4
HEALTH PHYSICS	4
QUALITY	3
CONVENTIONAL HEALTH AND SAFETY	3
ENVIRONMENTAL MONITORING AND PROTECTION	3
FIRE PROTECTION	2
SHIPPING AND RECEVING	1
MANAGEMENT SYSTEM	1
TOTAL	**36**

Note that where appropriate, one ECR may encompass more than one procedural improvement.

Procedural or programmatic changes were implemented for a variety of purposes. Many improvements have been incorporated as a result of the continuing oversight provided by SRBT’s internal audit processes, as well as a dedicated managerial focus on improvement initiatives in each area.

2.2 SCA – Human Performance Management

Throughout the course of 2024, SRBT ensured the programs that manage human performance were implemented effectively, and the interfaces between these programs and other aspects of our management system were maintained and executed. At all times a sufficient number of qualified workers were available to carry out licenced activities in a safe manner, and in accordance with regulatory requirements and SRBT safety programs.

At the outset of 2024, SRBT employed a total of 38 staff members. Four new employees were hired in 2024, including one co-op student, while three left the company (including the co-op student at the conclusion of their term). At the end of 2024 there are a total of 39 employees working at SRBT.

The overall performance of the human performance program implemented by SRBT continued to be satisfactory throughout 2024, and several improvements made will serve to continually increase its effectiveness.

2.2.1 Training

2.2.1.1 Annual All-Staff Training Session

Traditionally, once per calendar year, SRBT shuts down all manufacturing operations in order to conduct an all-day, all-staff training session.

The agenda for this training typically incorporates a wide variety of aspects of our operations. The majority of the day is dedicated to a refresher course in radiation protection, specifically focused on the unique type of radiological hazard present at SRBT.

This training was conducted on December 11, 2024, and was focused on information with respect to anticipated health effects from radiation exposure, tritium, proper handling of tritium throughout the facility, and equipment for personal radiation protection purposes. All trainees successfully challenged the associated written test for this training.

As well, training segments focused on Conventional Health and Safety, Fire Safety and Emergency Preparedness, Supervisory Awareness Program, and the SRBT Management System were also conducted with all staff.

Finally, a survey on Safety Culture was administered to all staff by the Safety Culture Committee, the results of which will help to continue to maintain and improve a healthy safety culture at the facility.

Based on course evaluation data, the annual all-staff training session provides an excellent opportunity for workers to refresh their training and knowledge on several of the safety-related aspects of working at SRBT.

2.2.1.2 Fire Extinguisher Training

Fire extinguisher training is typically conducted annually for all SRBT employees. The PFD provided this training on December 19, 2024.

2.2.1.3 Fire Protection Specialist Training

The Fire Protection Specialist continues to serve as a volunteer firefighter for a local fire department, and receives fire protection training from this department.

2.2.1.4 TDG Training

Transportation of Dangerous Goods (TDG) training for Shipping department staff is scheduled every two years. The training is conducted by an outside agency with expertise in the transport of dangerous goods.

A TDG training session was not scheduled for 2024, with the previous training having been conducted on February 13, 2023.

In line with the schedule of this training, the next TDG training session will be held in February 2025.

2.2.1.5 Health and Safety Training

The Manager – Safety and Security, as well as another member of the SRBT Health and Safety Committee attended an off-site conference in June 2024.

Training topics covered included:

- Contractor Safety: Legal Obligations of an Employer
- Safe and Suitable Work: The Life of a WSIB Claim
- Safe Material Handling: Enhancing Compliance Efforts Through Ergonomics and MSD Prevention

The Manager – Safety and Security also attended a 3-day Labour Program online training seminar with topics including:

- Psychological Health and Safety: Legislation, Workplace Factors, and Conflict Resolution

- Canada Labour Code, Part II: Overview
- Investigating Hazardous Substances and Exposure Risks
- Canada Labour Code, Part IV: Administrative Monetary Penalties
- How to Prepare for an Occupational Health and Safety Inspection

All SRBT employees attended annual training in December 2024 that included training on Workplace Hazardous Materials Information Systems, updates to the SRBT Hazard Prevention Program, and refresher training on personal protective equipment, eye protection, hearing protection, ladder safety, and proper lifting techniques.

2.2.2 Systematic Approach to Training Program

SRBT continues to implement a systematic approach to training (SAT) as part of our overall training program, and the Training Committee actively ensures that the processes described in the SRBT Training Program Manual are managed effectively and improved on an ongoing basis.

Three meetings of the Training Committee were held in 2024, with the annual program evaluation being held in January, the annual SAT-analysis review taking place in June, and the annual review of the qualification of SAT-based trainers being conducted in September.

There was one instance where a new activity, substance or equipment was brought to the Training Committee for a categorization decision during the year. The sole instance was determined to be eligible for management as Category 1 training activities (non-SAT based), and was assigned to the responsible manager to ensure that training was performed as needed.

Qualification management processes continue to ensure that SAT-qualified staff members maintain their skills through frequency of performance requirements, and that the qualification of SAT-based trainers continues to be evaluated periodically.

Refresher training modules were provided on several occasions, including the annual refresher training for certain infrequently performed work tasks that score high on the difficulty and importance scale (as part of SAT-based task analysis).

The training needs analysis (TNA) process was implemented on three occasions:

- Introduction of a new concentrated chemical detergent for decontamination purposes (also the sole categorization activity in 2024),
- In response to the human performance-related aspects of the action level exceedance reported in December, and
- To meet a requirement of CSA N393-22 pertaining to the conduct of a fire safety TNA, to identify and document the staff training that is necessary for the implementation of the Fire Protection Program.

The frequent use of this documented TNA process has been very helpful at ensuring a level of appropriate training is provided to SRBT staff when required, and in achieving and maintaining a low rate of significant human performance-related issues.

The following table compiles information on the number of qualified workers assigned tasks that are trained in accordance with a SAT-based method at the end of 2024.

TABLE 4: WORKER QUALIFICATION IN SAT-BASED ACTIVITIES

SAT WORK ACTIVITY	FULLY QUALIFIED WORKERS	WORKERS PROGRESSING TOWARD FULL QUALIFICATION
SAT-HP-01: ADVANCED HEALTH PHYSICS INSTRUMENTATION	2	2
SAT-HP-02: LIQUID EFFLUENT MANAGEMENT AND CONTROL	4	0
SAT-HP-03: WEEKLY STACK MONITORING	2	2
SAT-HP-04: BIOASSAY AND DOSIMETRY	3	1
SAT-OP-01: TRITIUM PROCESSING – FILLING AND SEALING LIGHT SOURCES	6	1
SAT-OP-02: BULK SPLITTER OPERATIONS	4	2
SAT-OP-03: HANDLING PUTTS	3	3
SAT-SHP-01: IMPORT AND EXPORT PROCESSES	3	1
SAT-FPP-020: HOT WORKS	5	0

2.3 SCA – Operating Performance

SRBT has continued to operate the facility safely and in compliance with our operating licence[1] throughout 2024. Our programs and processes have continued to evolve to meet or exceed regulatory requirements and expectations, with safety as an overriding priority in all aspects of our licensed activities.

A summary of compliance with operational limits and conditions can be found under section 1.3 of this report, while a summary of annual production / utilization data can be found in section 1.4 of this report.

A description of the internal and external audits conducted relating to licensed activities can be found under sections 2.1.4 and 2.1.5 of this report.

2.3.1 Ratio of Tritium Released to Processed

In 2024, our team continued to strive to minimize the amount of tritium released to the environment for every unit of tritium processed – we refer to this as the ‘released to processed’ ratio. This ratio is an excellent indicator of the overall effectiveness of our emission reduction initiatives.

The following table illustrates how this ratio has trended over the past five years.

TABLE 5: TRITIUM RELEASED TO PROCESSED RATIO: FIVE-YEAR TREND

DESCRIPTION	2020	2021	2022	2023	2024
TOTAL TRITIUM RELEASED TO ATMOSPHERE (GBq/YEAR)	25,186	28,729	26,590	20,520	45,868
TRITIUM PROCESSED (GBq/YEAR)	27,887,498	29,392,257	26,940,372	23,202,623	25,562,136
RELEASED / PROCESSED (%)	**0.09**	**0.10**	**0.10**	**0.09**	**0.18**

The 2024 target of 0.11% released vs. processed ratio was missed, primarily due to an action level exceedance that occurred during the monitoring week of Nov. 26 – Dec. 3. Refer to section 2.3.3 of this report for details on this event.

Removing that week from the 2024 data results in a 51-week average ratio which would still have slightly exceeded the target (0.112%).

2.3.2 Objectives and Targets

SRBT performance against key objectives and targets for 2024 is tabled below.

TABLE 6: 2024 PERFORMANCE TARGETS AND METRICS

DESCRIPTION	2024 TARGET	2024 PERFORMANCE
MAXIMUM DOSE TO NUCLEAR ENERGY WORKER	≤ 0.50 mSv	0.52 mSv
AVERAGE DOSE TO NUCLEAR ENERGY WORKER	≤ 0.050 mSv	0.067 mSv
COLLECTIVE WORKER DOSE	≤ 2.50 p·mSv	2.83 p·mSv
CALCULATED DOSE TO MEMBER OF THE PUBLIC	≤ 0.0040 mSv	0.0026 mSv
WEEKLY AVERAGE TRITIUM RELEASES TO ATMOSPHERE	≤ 600 GBq / week	882 GBq
RATIO OF TRITIUM EMISSIONS VS. PROCESSED	≤ 0.11	0.18%
TOTAL TRITIUM EMISSIONS LIQUID EFFLUENT PATHWAY	≤ 6 GBq	1.78 GBq
ACTION LEVEL EXCEEDANCES ENVIRONMENTAL	≤ 1	1
ACTION LEVEL EXCEEDANCES RADIATION PROTECTION	≤ 1	0
CONTAMINATION CONTROL FACILITY-WIDE PASS RATE	≥ 95.5%	95.7%
LOST TIME INJURIES	0	0
MINOR INJURIES REPORTABLE TO WSIB	≤ 5	0
MINOR INCIDENTS / FIRST AID INJURIES (NON-REPORTABLE)	≤ 15	11

Target values are set at the outset of each calendar year by various committees. Program data is tracked and trended throughout the year in order to ensure that appropriate measures can be taken in an effort to ensure a high level of safety performance and target achievement.

Where targets are missed, the factors and causes are researched by the responsible Committee, and specific actions are documented and tracked to improve performance where feasible.

In some cases, production considerations can result in effects that were not anticipated when the annual targets were originally set. As well, non-routine events such as action level exceedances can also influence target achievement.

2.3.3 Reportable Events

One reportable event occurred during 2024. The action level associated with the weekly release of total tritium to atmosphere via the gaseous effluent pathway was exceeded for the monitoring period of November 26 – December 3.

During a light source filling run, the processing rig being used was mis-configured by the qualified production technician, resulting in an unrecoverable loss of elemental tritium gas to the active ventilations systems.

This event represented the first action level exceedance in nearly ten years at SRBT. A total of 17,138 GBq was released to atmosphere as gaseous effluent for the weekly monitoring period, compared to the action level of 5,000 GBq in one monitoring week. The licenced limit for this category of gaseous release is 448,000 GBq in any calendar year.

Based on the modelled Derived Release Limits (DRL) for the SRBT facility, releases of this type and magnitude in one weekly monitoring period corresponds to 0.753% of the site-specific weekly release limits. This results in a worst-case effective dose projection of just under 0.15 µSv to the most exposed member of the public (a modelled, representative adult worker).

The event was reported to CNSC staff in compliance with the SRBT Regulatory Reporting Program, and the reporting requirements of the SRBT operating licence. Both the initial report and the full report were submitted to CNSC staff within the required timeframes, and were both posted to the SRBT website.

The causes of the event have been thoroughly investigated, and several actions taken to prevent recurrence and to lessen the impact of any similar events in the future. Please refer to the full report on the SRBT website[7] for a complete description of all aspects of this event.

2.3.4 Inventory Control Measures

2.3.4.1 Tritium

SRBT has continuously possessed, transferred, used, processed, managed and stored all nuclear substances related to the operation of our facility in compliance with the requirements of our licence. A number of inventory control measures are in place to ensure that tritium on site does not exceed the possession limit prescribed by our operating licence.

The maximum amount of tritium possessed by SRBT at any one time during 2024 was 3,959 TBq, which represents 66% of the facility possession limit. The average monthly inventory on site was 2,434 TBq.

Tritium on site is found in:

- Bulk containers and tritium traps,
- New light sources,
- New product that contain light sources,
- Work in progress,
- Waste,
- Expired light sources taken out of product,
- Products that contain expired light sources, and
- Non-conforming product.

Refer to **Appendix A** for additional details on tritium inventory in 2024.

2.3.4.2 Depleted Uranium

SRBT possessed a reported 8.743 kg of depleted uranium in metallic form at the beginning of 2024.

This material is used in tritium ‘traps’ as storage media for tritium gas on our processing equipment, a well-understood and widely-used strategy for manipulating and storing tritium in its gaseous, elemental state.

By using depleted uranium in this fashion, we can ensure that the quantity of gaseous tritium being used during any given processing operation is restricted. This helps to ensure that the consequences of any unplanned event are minimized with respect to radiation and environmental protection, by ensuring that any release of tritium is limited.

In July, the material on hand underwent an annual physical inventory process. All materials were accounted for, and unused material reweighed. The recorded mass of material was confirmed to be correct, and no inventory change or adjustment was made.

At the conclusion of 2024, the mass of depleted uranium on site is 8.743 kg. A limit of 10 kg of this material in inventory is applied as part of the operating limits and conditions in the SAR.

The breakdown of this inventory at the conclusion of 2024 is as follows:

TABLE 7: DEPLETED URANIUM INVENTORY BREAKDOWN AT THE END OF 2024

QTY	DESCRIPTION	DEPLETED URANIUM IN EACH (GRAMS)	TOTAL DEPLETED URANIUM (GRAMS)
1	LOOSE FORM – CONTAINER 1	N/A	921
1	LOOSE FORM – CONTAINER 2	N/A	4,911
9	ACTIVE P.U.T.T.	30 +/- 5 grams	290
22	NON-ACTIVE P.U.T.T.	30 +/- 5 grams	701
6	AMERSHAM CONTAINERS	320	1,920
		TOTAL	**8,743**

2.3.5 Liquid Scintillation Quality Assurance and Control

2.3.5.1 Routine Performance Testing

As a component of SRBT's Dosimetry Services Licence, Routine Performance Testing is performed on both liquid scintillation counters on a quarterly basis, as required by CNSC REGDOC-2.7.2, *Dosimetry, Volume II, Technical and Management System Requirements for Dosimetry Services*[16].

These quality assurance tests are performed to demonstrate that liquid scintillation counting assays in support of the dosimetry service are operated in a predictable and consistent way.

This testing was carried out every 3 months as required throughout 2024 on each of the two 'TriCarb 2910' units, with no failures reported.

2.3.5.2 Weekly LSC Performance Check

SRBT quality assurance requirements for liquid scintillation counting include weekly instrument performance checks using National Institute of Standards and Technology (NIST) traceable standards of a blank, H-3 and C-14 standards.

All tests have been performed on both TriCarb 2910 Liquid Scintillation Counting (LSC) units, and included an assessment of the instrument efficiency for tritium measurement, the figure of merit, the tritium background measurement, and a chi-square test. An instrument must meet acceptability criteria on a weekly basis, or the unit is removed from service pending corrective maintenance or actions.

2.3.5.3 Assay Quality Control Tests

Reference standards traceable to NIST are prepared in-house, and are analyzed and checked against quality control acceptance criteria with every batch of liquid scintillation counting samples being analyzed.

All tests were performed as required with every assay throughout 2024, in order to ensure quality control of LSC laboratory processes.

3. Facility and Equipment SCAs

3.1 SCA – Safety Analysis

The overall safety case for SRBT continues to be effectively validated and maintained through the implementation of our management system.

Preventive measures and strategies for potential hazards are built into our programs and processes. Key safety processes include independent verification, frequent internal audit and oversight, and management by designated committees.

Operating practices and management system processes in 2024 have continued to be conducted in full alignment with the latest version of SRBT's SAR. There were no significant changes to the facility or our operations that had any direct bearing on the safety analysis in 2024.

Please refer to section 1.3 of the report for a complete assessment of SRBT compliance against the Operating Limits and Conditions in the SAR.

3.2 SCA – Physical Design

As a manufacturing company, SRBT owns and operates several pieces of equipment, many of which constitute structures, systems and components which have a bearing on safety and our licensed activities.

Such equipment includes the active ventilation systems and associated emissions monitoring equipment, fire detection and suppression systems, tritium processing rigs, tritium-in-air monitors, and liquid scintillation counters.

The overall facility design is also a key aspect of our operations, and must be managed and controlled safely. The SRBT change control process helps to ensure that modifications are controlled, reviewed, accepted, and recorded using an Engineering Change Request.

Modifications to structures, systems and components associated with our licensed activities are conducted in accordance with these change control processes and overall management system.

No significant changes in physical design of production- or safety-related facility systems or components took place in 2024. There were no changes to the self-luminous tritium light source production capacity of the facility.

All minor and non-safety significant modifications to structures, systems and components were conducted in accordance with our change control processes.

3.3 SCA – Fitness for Service

All equipment, including all safety-related equipment, is kept in a condition that is fit for service through the implementation of the Maintenance Program. The facility and equipment associated with the facility were effectively maintained and operated within all manufacturer requirements.

Note that, although the Maintenance Program incorporates several program elements associated with nuclear power plants as best practice (such as critical spares, master equipment lists, etc.), aging management is not an element that is formally included as a specific strategy.

Documented maintenance meetings were initiated and held by the Maintenance Committee throughout 2024. As part of management review processes, an annual review of 2024 activities will be conducted in 2025, including data pertaining to equipment failures, maintenance activity success rates, non-conformances, procedural revisions, and audit findings.

Maintenance records are kept on file including completed work orders of preventative maintenance activities. A maintenance schedule is created and managed by the Fire Protection Specialist, which effectively captures all safety-significant planned preventative maintenance activities, whether performed by SRBT personnel or an approved contractor, and includes maintenance inspections as required by the Fire Protection Program.

As well, corrective maintenance was tracked, trended and reviewed to assess the performance of equipment, and to identify any preventative activities which may improve performance.

Preventative maintenance was scheduled and performed in 2024 on key facility equipment as per **Appendix B and C** of this report.

3.3.1 Ventilation

The ventilation of the facility is such that the air from the facility flows to the area with greatest negative pressure in Zone 3 which has the highest potential for tritium contamination where all tritium processing takes place. This area and part of Zone 2 are kept at high negative pressure with the use of two air handling units which provide a total airflow of approximately 10,000 cubic feet per minute.

The air handling units are connected to a series of galvanized stainless-steel ducts. In addition to providing ventilation for the facility these air handling units also provide local ventilation to a number of fume hoods which are used to perform activities that have a potential for tritium contamination and exposure.

All ventilation systems were maintained fit for service throughout 2024. Corrective and preventative maintenance was identified and performed according to the requirements of the Maintenance Program and operational procedures. Key equipment is maintained either on a quarterly or semi-annually basis, with technical equipment maintenance being performed by fully licensed and certified heating, ventilation and air conditioning contract providers.

A listing of the ventilation equipment maintained in 2024 can be found in **Appendix C** of this report.

3.3.2 Stack Flow Performance

Stack maintenance is performed by a third party, in order to ensure effective performance of the ventilation system and minimize airflow reductions from the beginning to the end of the maintenance cycle to ensure accuracy of results.

Pitot tubes that were installed in the stacks are maintained by a third party to ensure stack airflows are at design requirements. This essentially allows for daily stack flow verification in addition to more detailed annual stack flow verification performed by a third party.

The annual stack flow performance verification was performed on September 13, 2024 by a third party. The inspection confirmed that the stacks continue to perform to design requirements. SRBT continues to monitor and trend the results of the annual stack performance verification.

3.3.3 Liquid Scintillation Counters

The two TriCarb 2910 LSC units were subjected to an annual preventive maintenance procedure on June 12, 2024. No significant concerns or issues were identified during the maintenance activity.

There were no instances where corrective maintenance was required on either LSC unit in 2024.

Both systems will continue to be preventively maintained and calibrated on an annual basis by a qualified service representative from the manufacturer of the equipment, to ensure their functionality, accuracy and reliability.

3.3.4 Portable Tritium-in-Air Monitors

Portable tritium-in-air monitors are maintained and made available throughout the facility. The portable units are used to investigate potential sources of tritium leakage, and for personnel protection. As of the end of 2024, SRBT owns a total of eleven portable monitors.

Seven of these monitors are typically deployed for routine use at the facility (two in Zone 1, two in Zone 2 and three in Zone 3), while two are kept stored as spares, and one is kept on standby at the Pembroke Fire Hall as part of an emergency preparedness kit. An additional unit is used by our sister company in North Carolina.

As required by our Radiation Safety Program, all in-service tritium-in-air monitors were calibrated and maintained at least once during 2024, with all records of the maintenance kept on file.

3.3.5 Stationary Tritium-in-Air Monitors

The ambient air in selected key areas of the facility is continuously monitored using stationary tritium-in-air monitors. As of the end of 2024, SRBT owns a total of ten stationary monitors.

Five of these monitors are typically deployed for continuous workplace airborne tritium monitoring at the facility.

Three of these five monitors are strategically located in Zone 3; one in the Rig Room where gaseous tritium light sources are filled and sealed; one in the Laser Room where a laser is used to cut and seal small gaseous tritium light sources, and light sources are inspected; and one in the Tritium Laboratory where tritium is transferred from bulk supply containers to filling containers.

One stationary tritium-in-air monitor is located in Zone 2 in the Assembly Area, where gaseous tritium light sources are pre-packed in preparation for shipping or installed into device housings.

One stationary tritium-in-air monitor is located in the Shipping area in order to provide an early warning signal of a problem should a light or device be damaged during packaging activities.

Two other units are used for real-time monitoring and recording of tritium released as gaseous effluent. All in-service monitors operate 24 hours a day to ensure that any upset conditions are identified and addressed quickly.

Two units are available as spares if needed. As well, one additional unit is used by our sister company in North Carolina.

As required by our Radiation Safety Program, all tritium-in-air monitors were calibrated and preventively maintained at least once during 2024. All facility monitors functioned effectively and continuously throughout the year, with all records of maintenance retained on file.

3.3.6 Stack Monitoring Equipment

Stack monitoring equipment is incorporated for each of two main air-handling units. For each air-handling unit, the monitoring equipment includes:

- A tritium-in-air monitor connected to a real-time recording device,
- An alarming remote display unit (RDU) in Zone 3,
- A bubbler system for discriminately collecting HTO and HT in the sampled stream of effluent,
- A flow measurement device with elapsed time, flow rate and volume of the sampled stream of effluent, and
- A dedicated back-up power supply servicing the monitors, bubbler systems and flow meters, capable of providing several hours of uninterrupted power to the equipment during a power failure.

Each tritium-in-air monitor is connected to a real-time recording device (electronic datalogger), and was calibrated and preventively maintained as required in 2024.

The tritium monitors, datalogger and RDUs are included in calibration verification activities on a quarterly basis.

Bubbler systems (and spare systems) were also maintained throughout the year, with a bi-monthly maintenance cycle being implemented on all in-service stack monitoring equipment.

3.3.7 Stack Monitoring Verification Activities

The annual verification activity for the stack monitoring systems was completed in February 2024, where independent third-party measurements provided validation that SRBT systems and processes continue to effectively measure weekly gaseous tritium emissions.

3.3.8 Weather Station

Maintenance of the weather station is performed as per the manufacturer's recommendation, every two years, with batteries being replaced every four years. Preventative maintenance of the weather station was last completed on September 6, 2023.

The next preventative maintenance of the weather station is due in 2025, including battery replacement.

3.3.9 Air Compressor

Process tasks at SRBT require the use of a compressed air system. The air compressor is subject to quarterly preventative maintenance activities, and semi-annual belt changes, all of which were carried out throughout 2024. During periods of high usage rates, additional maintenance is performed on the compressor as an extra precaution to ensure ideal performance.

During preventative maintenance of the main compressor motor, the backup compressor is brought online to minimize production downtime. Once the maintenance is completed on the main compressor, the backup is then inspected and maintained by the contractors to ensure it will perform as intended should any problems arise with the main compressor.

4. Core Control Processes SCAs

4.1 SCA – Radiation Protection

4.1.1 Dosimetry Services

Pursuant to our Dosimetry Service Licence[17], SRBT assesses the radiation dose to its employees and to contract workers who may have exposure to tritium.

SRBT implements a dedicated Dosimetry Service Program in support of compliance with the requirements of this licence. The assessment of dose to personnel, due to tritium uptake, is performed in accordance with CNSC REGDOC-2.7.2, *Dosimetry, Volume II, Technical and Management System Requirements for Dosimetry Services*[16].

All dosimetry results were submitted on a quarterly basis to Health Canada in a timely fashion for input into the National Dose Registry. A final annual report was also submitted as required.

SRBT participated in the annual Tritium Urinalysis Performance Test sponsored by the National Calibration Reference Centre for Bioassay, Radiation Surveillance and Health Assessment Division, Radiation Protection Bureau of Health Canada. The participation is a regulatory requirement for Dosimetry Service Providers.

SRBT received the Certificate of Achievement for successful participation in the Tritium Urinalysis Performance Test from the National Calibration Reference Centre for Bioassay and In Vivo Monitoring for the year 2024[18].

As required by the licence, SRBT has submitted the 2024 Annual Compliance Report to CNSC staff for the Dosimetry Service Licence[19].

4.1.2 Staff Radiation Exposures and Trends

All SRBT staff members are classified as Nuclear Energy Workers and participate in the dosimetry program.

Those who work in Zones 1 and 2 provide bioassay samples for tritium concentration assessment on a bi-weekly frequency due to the very low probability of uptake of tritium. Those assigned to work in Zone 3 provide bioassay samples on a weekly frequency due to the higher probability of chronic uptake of tritium.

There were no occurrences of any personnel contamination events in 2024.

The maximum effective dose received by any person employed by SRBT in 2024 was 0.52 mSv, a value which is well within the regulatory limit for a nuclear energy worker of 50.0 mSv per calendar year.

The average effective dose for all staff was calculated to be 0.067 mSv, while the collective dose for all workers was measured as 2.83 person·mSv.

The tables found in **Appendix D** of this report provide the radiological dose data for workers at SRBT for 2024, as well as a comparison of dosimetry results for the preceding five years.

4.1.3 Action Levels for Dose and Bioassay Level

Dose and bioassay tritium concentration action levels are defined in SRBT's *Licence Limits, Action Levels and Administrative Limits* document.

Radiation protection-related action levels were reviewed and revised in June 2024, in line with the requirements of the LCH and CNSC REGDOC-2.7.1, *Radiation Protection*. They are next due for review in June 2029.

The current radiation protection-related action levels are as follows:

TABLE 8: ACTION LEVELS FOR RADIATION PROTECTION

PERSON	PERIOD	ACTION LEVEL
NUCLEAR ENERGY WORKER	QUARTER OF A YEAR	0.50 mSv
	1 YEAR	1.50 mSv
	5 YEAR	4.00 mSv
PREGNANT NUCLEAR ENERGY WORKER	BALANCE OF THE PREGNANCY	0.10 mSv
PERSON WHO IS NOT A NUCLEAR ENERGY WORKER	1 YEAR	0.01 mSv

PARAMETER	ACTION LEVEL
BIOASSAY RESULT – ANY SAMPLE	400 Bq/ml

In 2024 there were no exceedances of an action level for dose or bioassay tritium concentration at SRBT.

4.1.4 Administrative Limits for Dose and Bioassay Level

Dose and bioassay tritium concentration administrative limits are also defined in SRBT's *Licence Limits, Action Levels and Administrative Limits* document.

Radiation protection-related administrative limits are as follows:

TABLE 9: ADMINISTRATIVE LIMITS FOR RADIATION PROTECTION

PERSON	PERIOD	ACTION LEVEL
NUCLEAR ENERGY WORKER	QUARTER OF A YEAR	0.40 mSv
	1 YEAR	1.20 mSv
	5 YEAR	3.20 mSv
PREGNANT NUCLEAR ENERGY WORKER	BALANCE OF THE PREGNANCY	0.08 mSv
PERSON WHO IS NOT A NUCLEAR ENERGY WORKER	1 YEAR	0.008 mSv

PARAMETER	ACTION LEVEL
BIOASSAY RESULT – ANY SAMPLE	320 Bq/ml

In 2024 there were no exceedances of an administrative limit for dose or bioassay tritium concentration at SRBT.

4.1.5 Contractor Dose

In 2024, SRBT did not employ contract staff to perform work that presented a significant radiological hazard.

Seven screening bioassay samples were obtained and measured from contracted tradespersons who provided maintenance support in areas other than Zone 1.

None of these samples exceeded our internal screening criteria requiring the calculation of effective dose.

To summarize, no contractor received a recordable dose due to activities performed at the SRBT facility in 2024.

4.1.6 Discussion of Significance of Dose Control Data

A tabular summary of effective dose metrics for 2024 is provided in **Appendix D.**

4.1.6.1 Maximum Dose

The maximum effective dose to any staff member in 2024 was 0.52 mSv. This individual works in Zone 3 and performs tritium processing operations in Zone 3 as their primary duty.

In 2023, the maximum dose to a staff member was 0.39 mSv; the 2024 value of 0.52 mSv thus represents a 33% increase in the maximum dose to a worker from the previous year, and failure to meet the internal target of less than 0.50 mSv for this metric.

The maximum individual dose for the current five-year regulatory dosimetry period (January 1, 2021 – December 31, 2025) is equal to 1.66 mSv (0.34 mSv in 2021 + 0.46 mSv in 2022 + 0.38 mSv in 2023 + 0.48 mSv in 2024).

Although the target was not met, the very low absolute value represented by this maximum dose supports the conclusion that the Radiation Safety Program and the Health Physics Team are achieving a high level of performance, and that workers are properly and adequately trained in safely conducting activities that may pose a radiation hazard.

SRBT continuously strives to lower the maximum dose to workers by using several strategies, including training, contamination monitoring, frequent and routine use of portable tritium-in-air monitors during processing operations, and the continuous oversight of the Health Physics Team during key activities on the shop floor.

The maximum worker dose over the past five years is trended in Figure 3 for comparison, and a distribution chart for all annual worker dose is provided in Figure 4.

FIGURE 3: MAXIMUM ANNUAL WORKER DOSE (2020-2024)

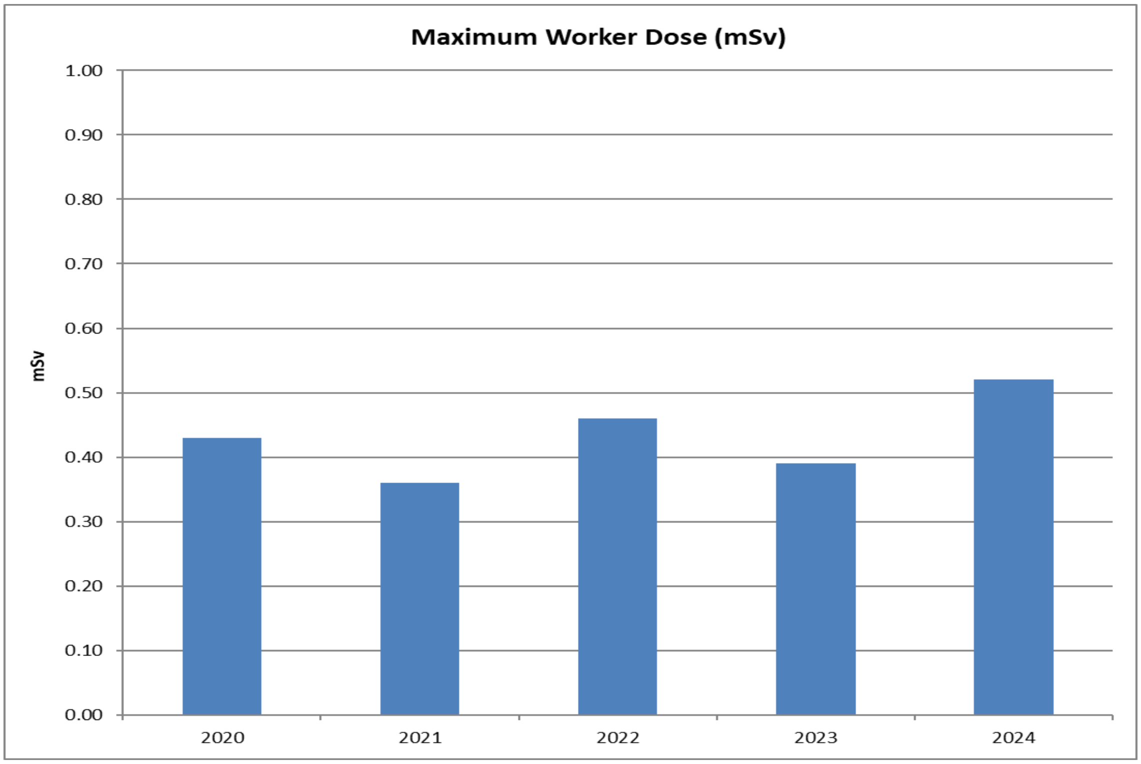
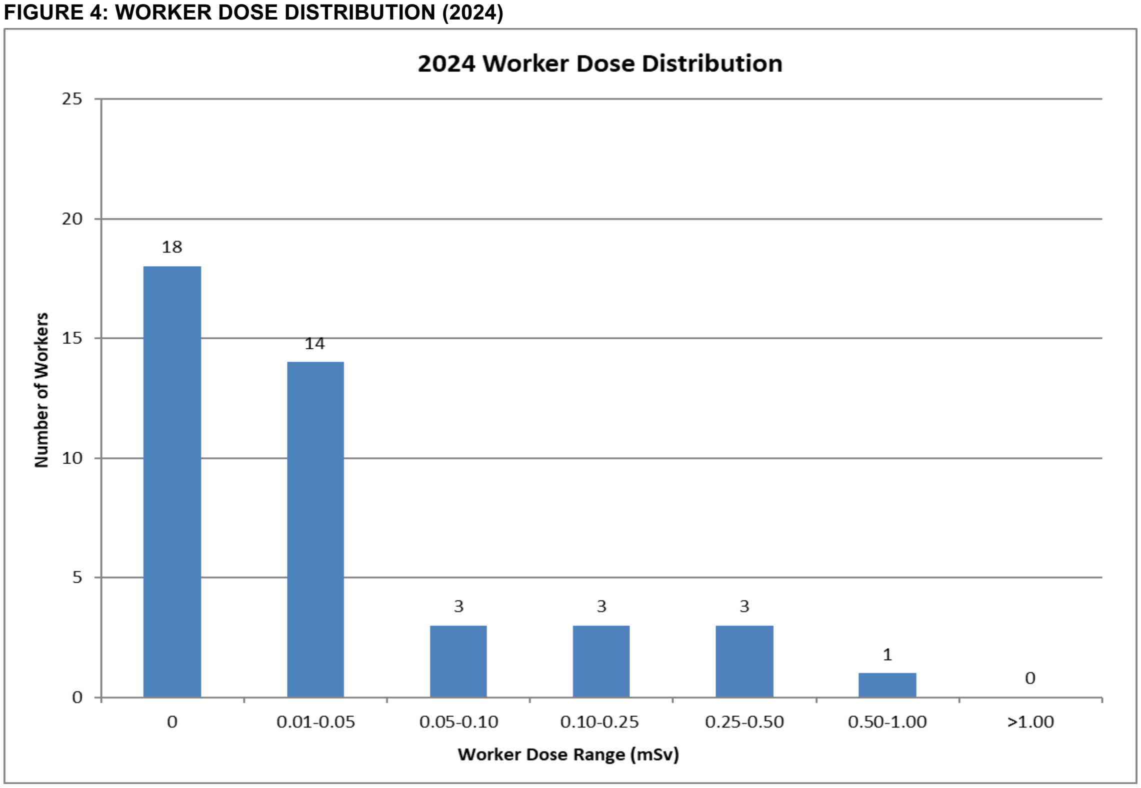


FIGURE 4: WORKER DOSE DISTRIBUTION (2024)



4.1.6.2 Average Dose

The average dose to workers at SRBT in 2024, including those workers whose dose value was zero, was 0.067 mSv. In 2023, the average dose to workers was 0.038 mSv.

A total of 18 workers incurred effective doses of less than 0.01 mSv in 2024 (i.e. zero dose). Taking into consideration only 'non-zero' doses, the average effective dose was 0.12 mSv in 2024.

The average dose to all nuclear energy workers (NEW) at SRBT over the past five years is trended in Figure 5 for comparison.

FIGURE 5: AVERAGE ANNUAL WORKER DOSE – ALL NEW (2020-2024)

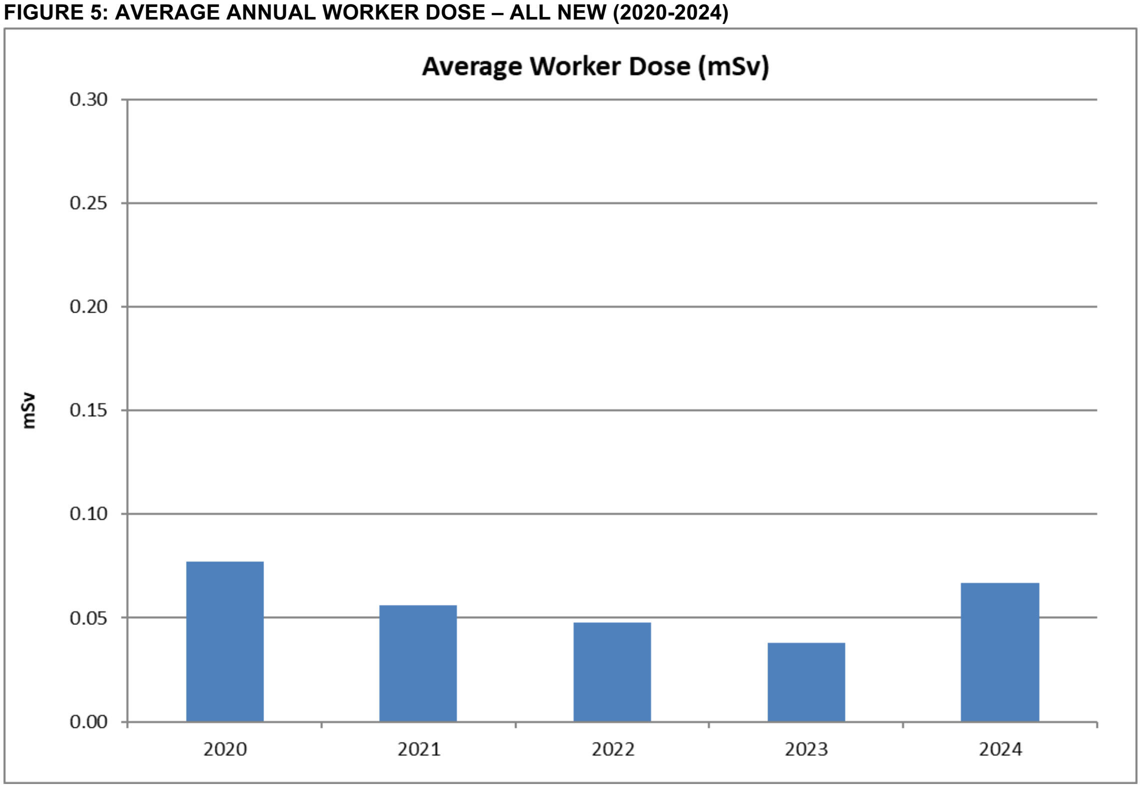
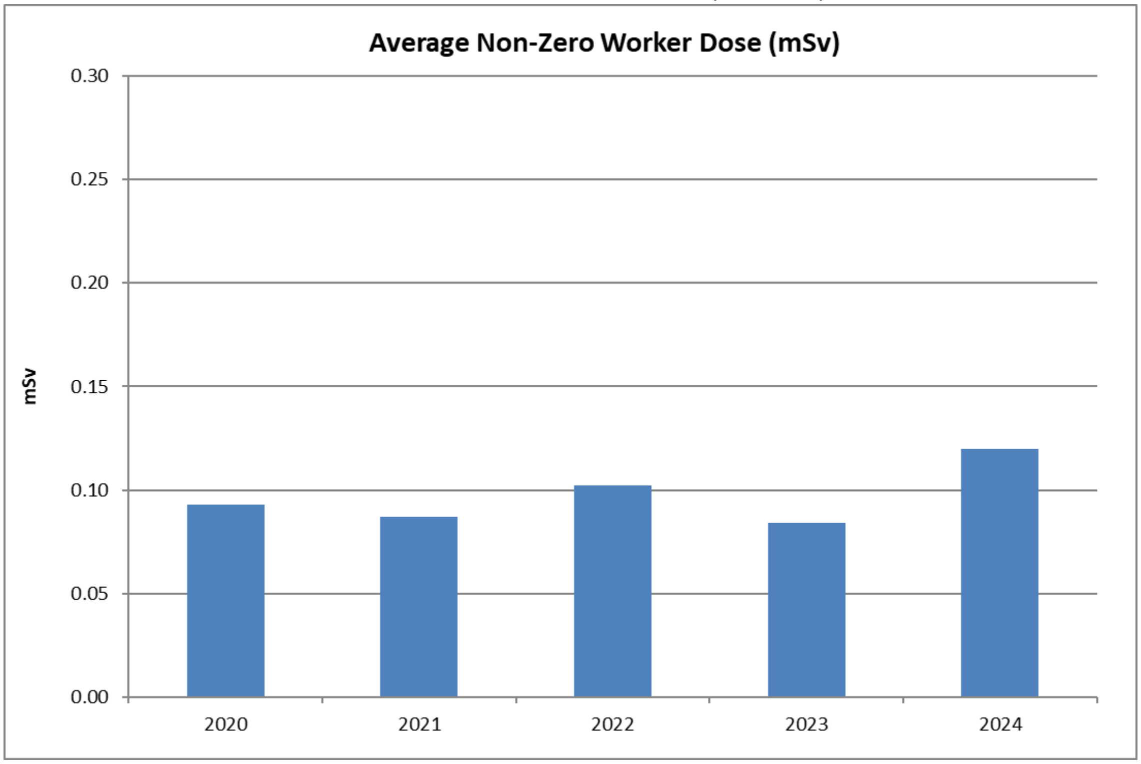


Figure 6 illustrates the average dose for those workers who received ‘non-zero’ doses.

FIGURE 6: AVERAGE ANNUAL WORKER DOSE – NON-ZERO DOSES (2020-2024)

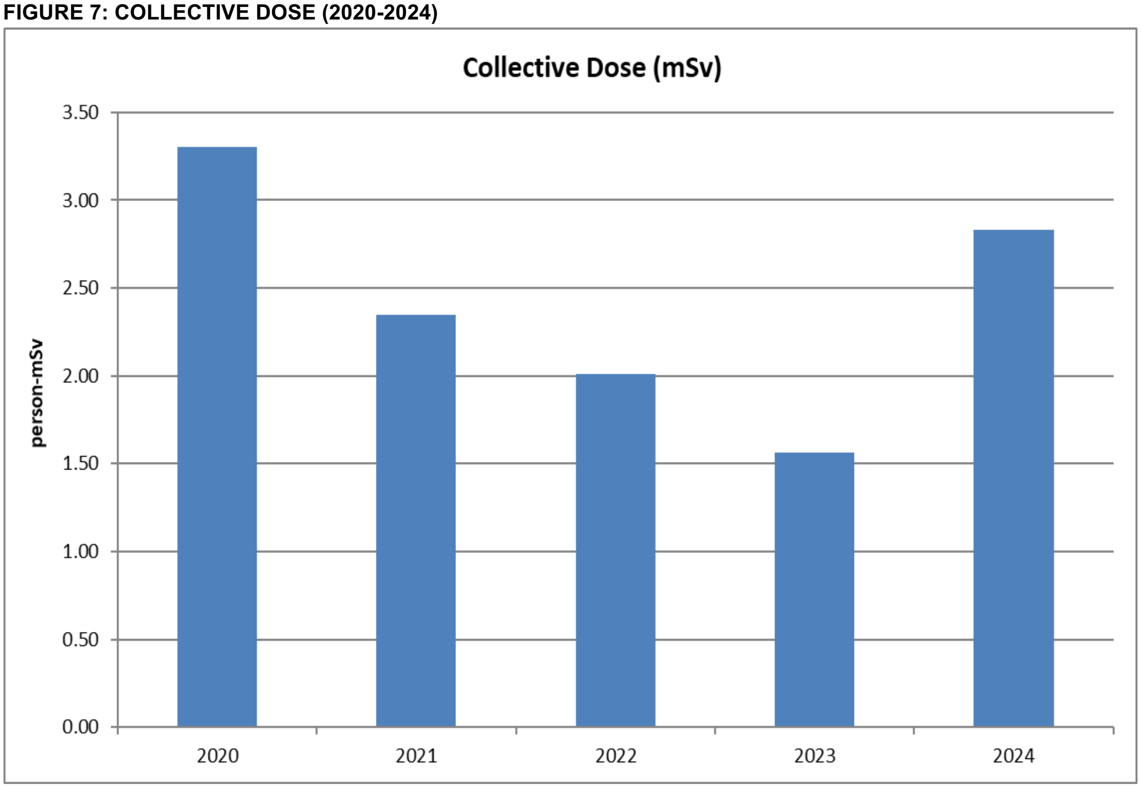


4.1.6.3 Collective Dose

The collective dose to all workers at SRBT in 2024 was 2.83 person·mSv. In 2023, the collective dose was 1.56 person·mSv.

The collective dose to all workers at SRBT over the past five years is trended in Figure 7 for comparison.

FIGURE 7: COLLECTIVE DOSE (2020-2024)



4.1.6.4 Dose to Members of the Public

The effective dose to members of the public is discussed extensively in section 4.3.5 of this report.

4.1.7 Contamination Control and Facility Radiological Conditions

Tritium contamination control is maintained by assessment of non-fixed tritium contamination levels throughout the facility by means of swipe method and liquid scintillation counting of the swipe material. SRBT has in place the following administrative surface contamination limits:

TABLE 10: ADMINISTRATIVE LIMITS FOR SURFACE CONTAMINATION

ZONE	SURFACES	ADMINISTRATIVE SURFACE CONTAMINATION LIMITS
1	ALL SURFACES	4.0 Bq/cm^2
2	ALL SURFACES	4.0 Bq/cm^2
3	ALL SURFACES	40.0 Bq/cm^2

An overview of contamination monitoring results for 2024 has been tabulated and is included in **Appendix E** of this report.

A total of 8,088 routine contamination assessments were performed in 2024:

- 612 swipes were taken in Zone 1 resulting in a pass rate of 95.4% of assessments being measured below the administrative level of 4 Bq/cm^2.
- 1,668 swipes were taken in Zone 2 resulting in a pass rate of 95.9% of assessments being measured below the administrative level of 4 Bq/cm^2.
- 5,808 swipes were taken in Zone 3 resulting in a pass rate of 95.6% of assessments being measured below the administrative level of 40 Bq/cm^2.

All swipe results are reported to the area supervisors. The area supervisor and the Health Physics Team reviews the results to determine where extra cleaning effort is necessary.

A comparison of the data for the last five years is presented in the table below:

TABLE 11: PASS RATE FOR CONTAMINATION ASSESSMENTS: FIVE-YEAR TRENDS

ZONE	2020	2021	2022	2023	2024
1	96.4%	97.1%	98.2%	97.2%	95.4%
2	96.7%	97.5%	98.0%	97.0%	95.9%
3	96.1%	95.6%	97.0%	96.8%	95.6%

Overall, routine contamination measurements conducted throughout the facility in 2024 fell below the administrative limits 95.7% of the time, achieving the internal target of a pass rate of ≥ 95.5%.

The Health Physics Team continues to track and trend all facility contamination control data throughout the year, with a focused quarterly review to identify areas for improvement.

Two routinely monitored areas failed to meet the applicable acceptance criteria at least 70% of the time when assessed over a full calendar quarter:

- Frequently during the second quarter of 2024, both the fume hood in the Laser Room and the fume hood dedicated to expired sign disassembly did not meet the acceptance criterion of less than 40.0 Bq/cm^2 (averaged over 100 cm^2) for Zone 3. Pass rates of 61.02% and 67.80% were observed for the quarter for these two areas, respectively.

  The Health Physics Team noted these low pass rates in their meeting of July 10. A greater level of attention to the daily cleaning regimen was requested of workers in these areas, which ultimately met the acceptance criteria at far higher rates for the remainder of 2024.

With respect to the monitoring of airborne tritium contamination throughout the facility, SRBT's Radiation Safety Program includes several processes that measure and control airborne tritium hazards in our facility:

- Stationary tritium-in-air monitors are strategically located throughout the facility, with audible alarms triggered at conservative tritium concentrations.
- All staff are trained in the use of portable tritium-in-air monitors for self-protection purposes; these are also strategically located in the facility for quick use when needed.
- A series of passive air samplers are distributed throughout the facility, allowing for weekly averaging of tritium concentrations in key areas.
- The Health Physics Team logs all stationary tritium-in-air monitor alarm events, in order to track and trend frequency of occurrence, to facilitate radiological assessments and/or investigations, and to drive improvements in process safety.

Zone alarm cause / frequency and passive air sampling data is routinely assessed by the Health Physics Team in order to identify any areas of concerns or trends.

The frequency of zone alarms increased in 2024 when compared to 2023; a total of 49 alarms were experienced throughout the facility in 2024, compared to 33 during the previous year.

A comparison of the data for the last five years is presented in the table below:

TABLE 12: ZONE ALARMS: FIVE-YEAR TREND

ZONE	2020	2021	2022	2023	2024
1	0	3	2	1	2
2	71	52	31	27	36
3	40	17	12	5	11
All	**111**	**72**	**45**	**33**	**49**

4.1.8 Discussion on the Effectiveness of Radiation Protection Program

Based upon the following factors and the overall evidence presented in this report, it is concluded that the SRBT's radiation protection program has been effective throughout the year.

Key points:

- The highest worker dose for 2024 was 0.52 mSv, or 1.04% of the regulatory limit of 50 mSv.
- For the tenth consecutive year, every SRBT NEW incurred an effective dose of far less than 1 mSv.
- Collective dose and average dose remain low in relation to production levels.
- Contamination control data demonstrates a high level of control and a low rate of contamination in excess of administrative limits. The internal target of a pass-rate of 95.5% or greater was achieved.
- There were no personnel contamination events at the facility in 2024.
- The frequency of airborne contamination events (zone alarms) continued to remain low, and in line with historical trends over the past three years.
- Radiation protection equipment issues are minimal, with a continuing investment in new equipment leading to an excellent track record of maintenance and fitness for service.
- Radiation protection training results demonstrate that staff has a good appreciation and knowledge of how to protect themselves from hazards.

It is acknowledged that a number of metrics in this area did marginally rise in 2024, due in part to increased production demands during the warmer and more humid months of the year. The increases in these areas are not believed to be indicative of any degradation in the performance of SRBT's Radiation Safety Program.

4.1.9 Occupational Dose Targets

As described in the 2023 annual compliance report, the occupational dose targets for 2024 were set as 0.50 mSv (maximum dose to staff member), 0.050 mSv (average dose to all staff) and 2.50 p-mSv (collective dose). These values all remained low and relatively stable, but all three of these targets were missed.

The sole target achieved was in relation to radiation protection-related action level exceedances, for which there were none in 2024.

SRBT projects that in 2025, the maximum and average doses to workers should continue to remain low and relatively stable, and that certain improvements should also help increase the probability of target achievement.

With these considerations, the occupational dose targets for calendar year 2025 have been left unchanged from those applied in 2024:

- Maximum dose: ≤ 0.50 mSv
- Average dose: ≤ 0.050 mSv
- Collective dose: ≤ 2.50 p-mSv
- Action level exceedances: No more than 1 instance (no change)

4.1.10 Summary of Radiation Protection Training and Effectiveness

All new staff members receive introductory training in radiation safety, even if they are not expected to handle nuclear substances as part of their responsibilities.

In 2024, four new employees were hired and were provided with this initial training that is required for declaration as a NEW; each passed the associated test and were declared as NEWs.

On December 11, 2024, SRBT held its annual all-staff training session, which includes a comprehensive training presentation specifically regarding radiation protection concepts and requirements, specifically tailored to the type of hazard at SRBT. Open dialogue is always encouraged with a question-and-answer session, and a closed-book written test is provided to all participants.

All trainees successfully achieved better than the benchmark grade of 75% on the multiple-choice test administered at the conclusion of the radiation safety training session. All incorrect answers on the test were discussed in detail with each employee individually, in order to ensure full understanding following the completion of the training.

4.1.11 Summary of Radiation Protection Equipment Performance

In 2024, all equipment associated with radiation protection at SRBT performed acceptably, and all key maintenance activities, such as instrument calibration, were performed as required.

Radiation protection equipment includes liquid scintillation counters, portable tritium-in-air monitors, stationary tritium-in-air monitors and portable radiation detectors (‘RadEye’ type alpha/beta/gamma detectors).

There were no instances of corrective maintenance required for the liquid scintillation counters or tritium-in-air monitors in 2024.

The rate of the need for corrective maintenance on all radiation protection equipment remains acceptable, and SRBT owns and maintains spare instruments that remain ready to be put into service should the need arise.

4.1.12 Summary of Radiation Protection Improvements

SRBT’s Radiation Safety Program provides an effective level of radiological protection to our workers, and continues to be improved over time.

In 2024, the following improvements were implemented:

- Five radiation safety program-associated procedures, and a number of forms, were revised to capture improvement opportunities.
- A new employee was onboarded and added to the Health Physics Team in March as a graduate of the Applied Nuclear Science and Radiation Safety program at Algonquin College.
- Data presentation and analysis during meetings of the Health Physics Team continues to be effective, and improved over time.

4.2 SCA – Conventional Health and Safety

4.2.1 Jurisdiction

SRBT is subject to federal jurisdiction thus, the *Canada Labour Code Part II* (CLC Part II) and the *Canada Occupational Health and Safety Regulations*.

4.2.2 Conventional Health and Safety Program

Being under federal jurisdiction in 2024, the Health and Safety Policy for the SRBT facility was compliant with the requirements of the CLC Part II, and the *Canada Occupational Health and Safety Regulations*. A full review of this policy was completed in 2024, as required by the regulations (once every 3 years).

4.2.3 Workplace Health and Safety Committee

In accordance with Section 135 (1) of the CLC Part II, SRBT maintains a Workplace Health and Safety Committee (WHSC).

The Committee is comprised of four representatives. Under section 135(10) of the CLC Part II the Committee is required to meet no less than nine times per year.

The Committee met a total of 13 times in 2024 (12 regular meetings and 1 special meeting), with all meeting minutes kept on file.

4.2.4 Inspections, Audits and Reviews

The following inspections, audits and reviews were conducted in 2024:

- Twelve monthly facility-wide safety inspections, conducted by members of the WHSC. These inspections identified only minor issues that were immediately corrected.

- An internal audit of the SRBT Health and Safety program was conducted in 2024, resulting in four opportunities for improvement being identified, two of which have been addressed and completed and two which are currently in process. The next scheduled internal audit of the program is scheduled to be completed in 2025.

4.2.5 Minor Incidents

There were 10 minor incidents that met internal reporting criteria in 2024. A breakdown of the type of minor incidents occurring in 2024 is provided:

- Minor Cuts – 4
- Overexertion – 2
- Impact – 2
- Slip or Trip – 1
- Sliver in Finger – 1

None of these minor incidents required a visit to the hospital, nor a report to the Workplace Safety and Insurance Board.

4.2.6 Lost Time Incidents

In 2024, no lost time incidents (LTI) occurred.

The following table summarizes the frequency of occurrence of LTIs over the past five years:

TABLE 13: LOST TIME INCIDENTS: FIVE-YEAR TREND

DESCRIPTION	2020	2021	2022	2023	2024
LOST TIME INCIDENTS	0	0	0	0	0

SRBT's continuing goal is to have zero LTIs each year; the fact that this goal was achieved in 2024 speaks to the effectiveness of our conventional health and safety program.

4.2.7 Health and Safety Performance Targets

SRBT sets programmatic targets that are tracked by responsible safety committees throughout the year. Actions are taken that are intended to help the organization reach safety goals / objectives / targets, as well as when they may be missed.

In 2024, SRBT set the following targets for the area of Conventional Health and Safety:

- Zero lost time incidents (experienced zero – goal achieved)
- Less than or equal to 5 workplace injuries classified as reportable to Workplace Safety and Insurance Board (experienced zero – goal achieved)
- No more than 15 minor incidents (10 were recorded – goal achieved)

These three conventional health and safety targets remain unchanged for 2025.

4.2.8 Reporting

In accordance with Section 15.10 (1) of Part XV of the *Canada Occupational Health and Safety Regulations,* the Employer's Annual Hazardous Occurrence Report was submitted to Employment and Social Development Canada prior to March 1, 2024, as required.

In accordance with Section 9 of the *Policy Committees, Work Place Committees and Health and Safety Representatives Regulations*, the Work Place Committee Report was submitted to the Regional Safety Officer at Canada Labour prior to March 1, 2024, as required.

4.2.9 Health and Safety Training

The Manager – Safety and Security, as well as another member of the SRBT Health and Safety Committee attended an off-site conference in June 2024.

Training topics covered included:

- Contractor Safety: Legal Obligations of an Employer
- Safe and Suitable Work: The Life of a WSIB Claim
- Safe Material Handling: Enhancing Compliance Efforts Through Ergonomics and MSD Prevention

The Manager – Safety and Security also attended a 3-day Labour Program online training seminar with topics including:

- Psychological Health and Safety: Legislation, Workplace Factors, and Conflict Resolution
- Canada Labour Code, Part II: Overview
- Investigating Hazardous Substances and Exposure Risks
- Canada Labour Code, Part IV: Administrative Monetary Penalties
- How to Prepare for an Occupational Health and Safety Inspection

All SRBT employees attended annual training in December 2024 that included training on Workplace Hazardous Materials Information Systems, updates to the SRBT Hazard Prevention Program, and refresher training on personal protective equipment, eye protection, hearing protection, ladder safety, and proper lifting techniques.

4.2.10 Health and Safety Initiatives and Improvements

In 2024, the following health and safety initiatives and improvements were implemented:

- New procedure for Coating Department washing process created,
- Forklift licence renewal for six employees
- 3-year review of the SRBT Health and Safety Policy
- 3-year review of the SRBT Hazard Prevention Program

4.3 SCA – Environmental Protection

This section of the report will provide environmental protection compliance information, including results from environmental, effluent and groundwater monitoring, an assessment of compliance with any licence limits, historical trending where appropriate, and quality assurance/quality control results for the monitoring.

As part of SRBT's overall Environmental Protection Program, and as an input into the design of the environmental, effluent and groundwater monitoring programs, a conceptual site model (CSM) can provide a valuable representation of the factors and elements that are considered for monitoring within the boundaries of the program.

SRBT has been in operation since 1990, and has performed extensive monitoring of effluent, the environment and groundwater over the course of operations since then. In 2007, a comprehensive analysis was performed of the operations of the facility (including historical practices) in order to identify the sources of tritium that could affect the environment and the groundwater.

As well, in 2008 the significant environmental aspects of facility operation were initially established, and have been reviewed periodically since then in order to identify if there are other processes or operations that have been introduced that could lead to an impact on the environment.

These analyses, coupled with decades of operational experience, results in the establishment of a simplified CSM that shows the significant pathways and environmental interactions pertaining to the release of the sole radiological contaminant of potential concern – tritium.

A pictographic representation of these source – receptor pathways is provided below in Figure 8, and should be consulted when considering the information provided in the next three subsections of this report.

On April 22, 2021, CNSC staff accepted SRBT's Environmental Risk Assessment[20] (ERA), after comments and feedback had been addressed by SRBT[21].

The ERA complies with the requirements of CSA Standard N288.6-12, *Environmental risk assessments for Class I nuclear facilities and uranium mines and mills*.

Human and ecological conceptual models of tritium interactions with the environment near the site are described within the ERA, and are included in Figures 9, 10, 11 and 12. Species included are conservatively representative of the local flora and fauna.

FIGURE 8: CONCEPTUAL SITE MODEL

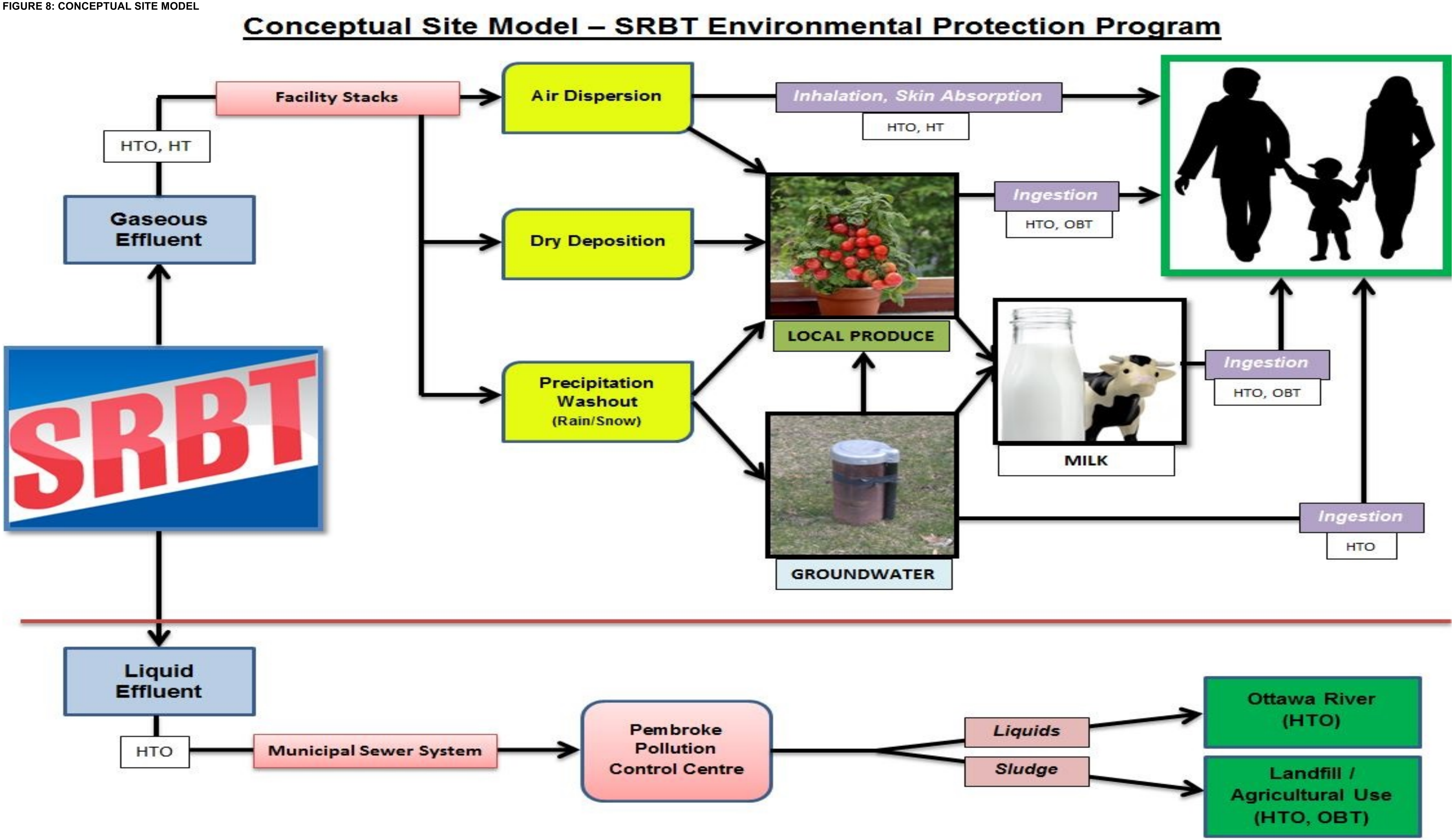


FIGURE 9: HUMAN EXPOSURE PATHWAYS (HTO/T2, GASEOUS SOURCES)

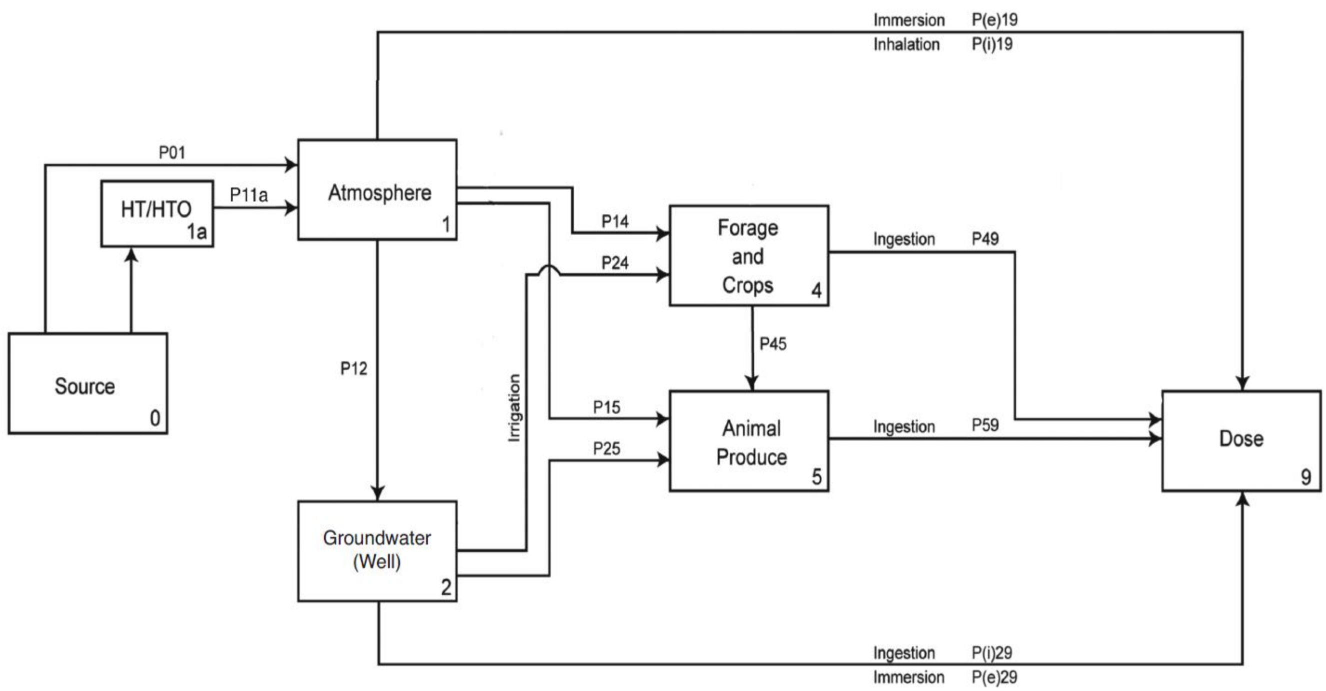


FIGURE 10: HUMAN EXPOSURE PATHWAYS (HTO/T2, LIQUID SOURCES)

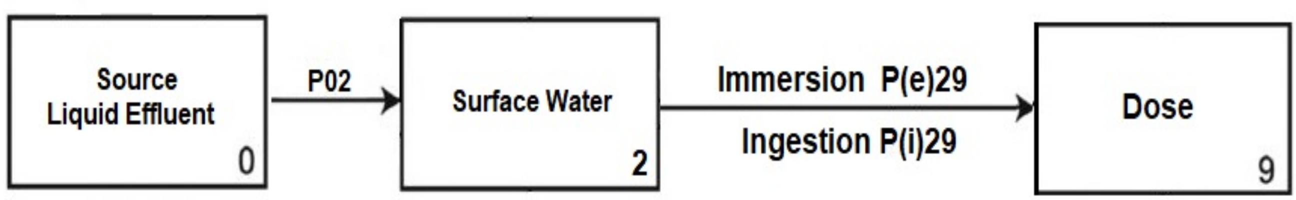


FIGURE 11: CONCEPTUAL ECOLOGICAL MODEL - TERRESTRIAL

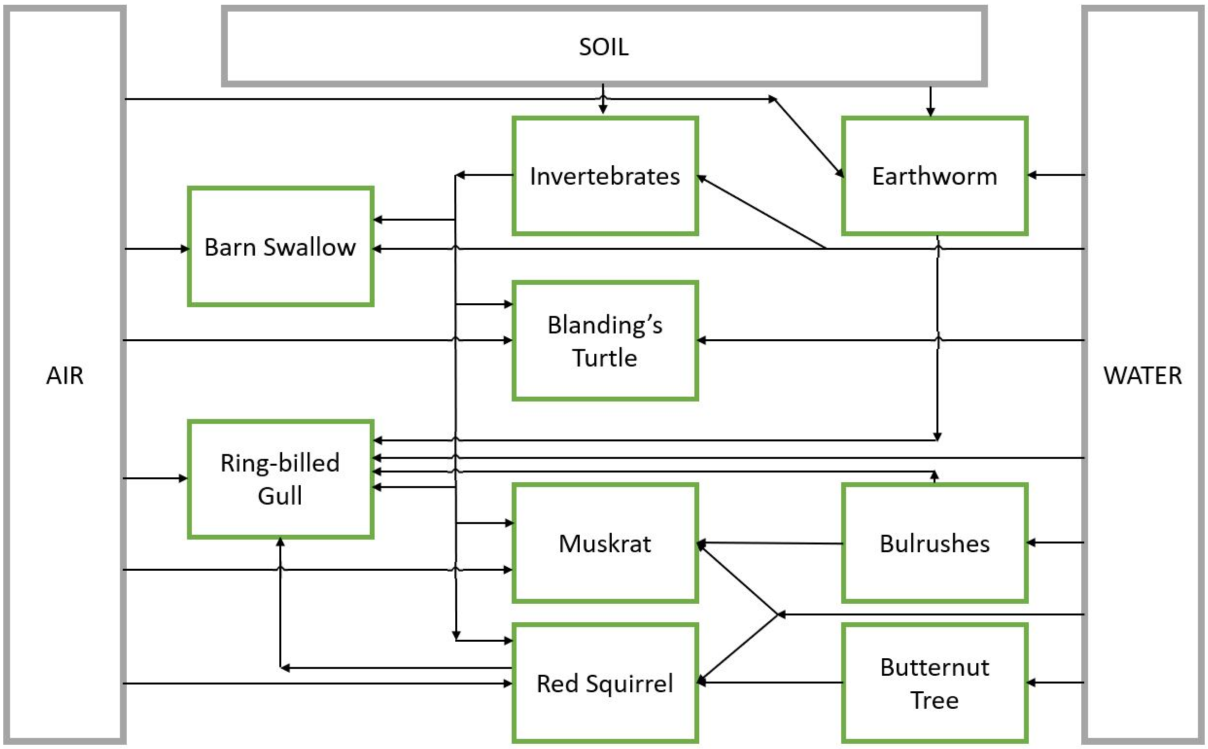
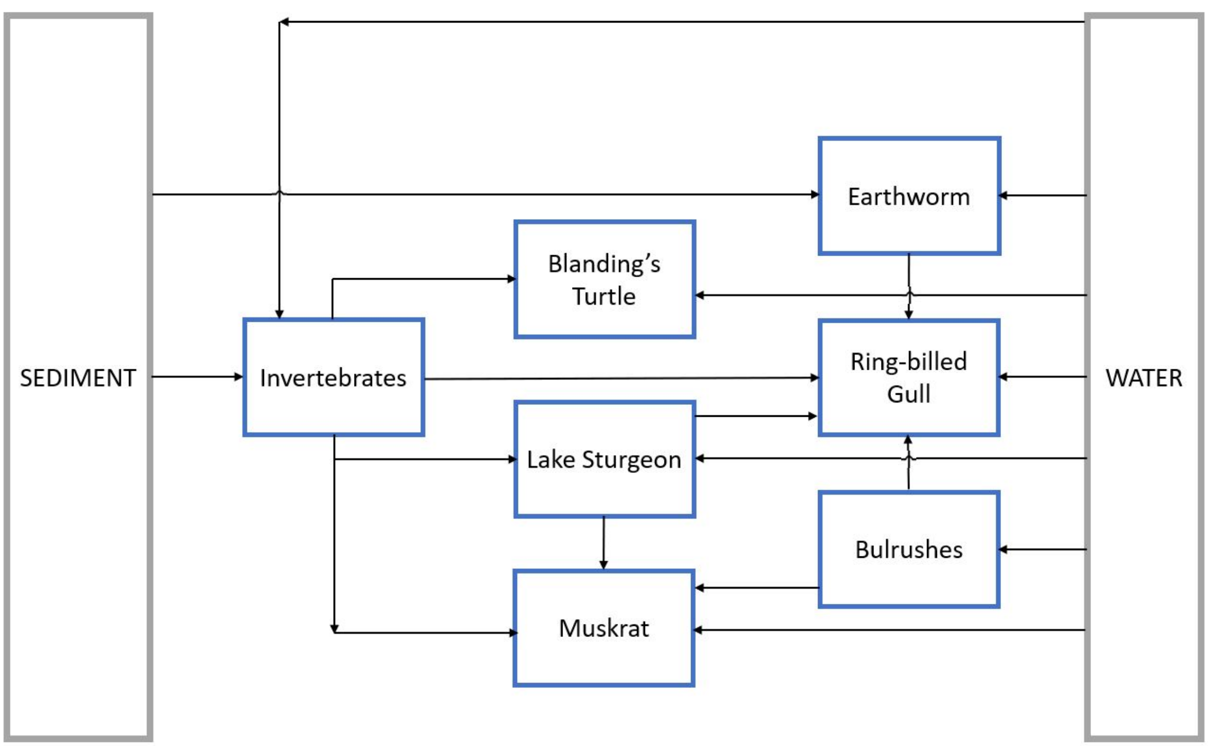


FIGURE 12: CONCEPTUAL ECOLOGICAL MODEL – AQUATIC / RIPARIAN



As part of ensuring compliance with the reporting requirements of several N288-series of standards, SRBT has committed to ensuring that the information required by each applicable in-force standard to be reported annually pertaining to the Environmental Monitoring Program (EMP), Effluent Monitoring Program (EffMP) and Groundwater Monitoring Program (GMP) is included our annual compliance report.

A summary of the requirements of each of the applicable standards is provided here.

N288.4-10: Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills: Section 11.2.2 – "The report shall include":

TABLE 14: REPORTING REQUIREMENTS (N288.4-10)

	REQUIREMENT	REPORT SECTION
a	The results of the EMP, including measurements of the monitored hazardous and/or nuclear substances, physical stressors, and physical and biological parameters, including their statistical analyses (i.e. assessment of changes through space and time).	4.3.1 **Appendices F through M**
	Radiation doses calculated as doses to receptors where this is required.	4.3.5 **Appendix R**
	An assessment of the EMP results compared with the previous performance indicator targets.	4.3 Reference is made to previous years for performance indication.
	Documentation and justification of any deviations from field sampling, and analytical and data management procedures.	4.3.1.9 4.3.1.10
b	A summary and assessment of the field and laboratory QA/QC results including any non-conformances.	4.3.1.11
c	A summary of the audit and review results and subsequent corrective actions.	4.3.7
d	A summary of any proposed modifications to the EMP.	4.3.8
e	Documentation, assessment and review of any supplementary studies that have been initiated, completed, or both.	4.3.1.12

N288.5-11: Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills: Section 11.2.2 – "The report shall include the results of the effluent monitoring program, including at least":

TABLE 15: REPORTING REQUIREMENTS (N288.5-11)

	REQUIREMENT	REPORT SECTION
a	The amount or concentration of radioactive nuclear substances and hazardous substances released, as required to demonstrate compliance with regulatory limits and performance with respect to any other release target (e.g., action levels).	4.3.2 Action levels and other targets: 4.3.2.2, 4.3.2.4 and 4.3.2.5 **Appendices O and P**
b	The characteristics of the effluents.	4.3.2
c	The results of any toxicity testing conducted (if required).	Not applicable
d	A summary and assessment of the field and laboratory QA/QC results, including any non-conformance.	4.3.2.6
e	A statement of uncertainties inherent in the monitoring results and any dose estimates derived from them.	4.3.2.7 Dose estimates are derived using EMP data
f	A summary of the audit and review results and subsequent corrective actions.	4.3.7
g	A summary of any proposed modifications to the effluent monitoring program.	4.3.8
h	Documentation, assessment, and review of any supplementary studies that have been initiated or completed, or both.	4.3.2.8

N288.7-15: Groundwater protection programs at Class I nuclear facilities and uranium mines and mills: Section 11.1 – "A facility should prepare annual monitoring reports documenting the GWMP, which include the following":

TABLE 16: REPORTING REQUIREMENTS (N288.7-15)

	REQUIREMENT	REPORT SECTION
a	The results of the GWMP including i) completeness of monitoring activities (identify if all planned activities were accomplished); ii) measurements of the monitored substances, biological, and hydrogeological parameters based on program objectives; and iii) data analysis and interpretations.	4.3.3 **Appendix N**
b	Relevant groundwater and hydrogeological characteristics.	4.3.3 **Appendix Q**
c	Doses calculated for the identified receptors (if doses have been calculated to aid in interpreting GWMP results).	Not applicable: GMP data does not contribute to dose calculations (residential wells fall within scope of EMP)
d	A summary and assessment of the field and laboratory QA results, including any non-conformances.	4.3.3.3
e	A statement of uncertainties inherent in the monitoring results and any dose estimates derived from them (where applicable).	4.3.3.4 4.3.5
f	Documentation of any supplementary studies that have been initiated, completed, or both (with references to the original studies).	4.3.3.5
g	An overall statement of data quality and discussion of results in terms of data performance and acceptance criteria.	4.3.3.6
h	Discussion of monitoring results in terms of program objectives and the conceptual site model.	4.3.3.7
Note 1	A summary of any audits performed, their results, and any corrective actions taken as a result of the audit's findings may also be included in the reporting.	4.3.7

4.3.1 Environmental Monitoring

SRB Technologies (Canada) Inc. implements a comprehensive EMP that provides data for site-specific determination of tritium concentrations along the various pathways of exposure to the public due to the activities of the operations.

4.3.1.1 Passive Air Monitoring

A total of 40 passive air samplers (PAS) are deployed in the environment near the SRBT facility.

Air at each location is sampled over the course of a month, and an average air concentration for that period is derived based on the concentration of tritium in the sampling liquid, and known air sample exchange rates.

Thirty-five of these samplers are located within a two-kilometer radius from the SRBT facility, in eight sectors, ranging in stepped distances of 250, 500, 1,000, and 2,000 meters. The remaining five samplers are much further from the facility, and are intended to assess areas not expected to be impacted by routine SRBT processing operations.

Several duplicate samplers are included for quality assurance purposes. A number of samplers are also located specifically to provide data for assessment of the defined critical group members.

EMP PAS results for 2024 can be found in the table in **Appendix F** of this report, along with maps of the position of each sampler in the array. The table shows the average HTO concentrations for the samplers located in each of the eight compass sectors for the given sampling period.

Monthly minimum detectable activities achieved throughout the year averaged 0.66 Bq/m^3, with a maximum of 0.82 Bq/m^3 for any given sampling month.

Average tritium oxide in air concentrations for each month of 2024 are graphically represented for each of the eight compass sectors, and for each sampled distance from the facility, in **Appendix G** of this report.

The PAS array represents the tritium exposure pathways for inhalation and skin absorption; results are used in the calculations for effective dose to representative persons (members of the public) for 2024.

Tritium oxide emissions, overall tritium emissions (oxide + elemental), and the sum of the average concentrations of all passive air samplers each increased compared to the previous year.

The sum of the average concentration for all passive air samplers in 2024 was 87.36 Bq/m^3, which is reflective of an increase from the value of this metric observed in 2023 (53.32 Bq/m^3). These measurements correlate well with the increase in gaseous tritium oxide releases that took place over the course of 2024 (13,628 GBq), compared with releases from 2023 (6,540 GBq).

The observed increases in these environmental release metrics is primarily due to an increase in production throughput, particularly during a warmer and more humid summer season. As well, the action level exceedance for gaseous tritium releases during the week of November 26 – December 3 played an obvious role in these elevated metrics.

4.3.1.2 Precipitation Monitoring

Eight precipitation monitors are installed near existing air monitoring stations that are located approximately 250 m from the facility. Precipitation is collected as an aggregate sample over the course of each month, and then analyzed for tritium concentration.

Typically, SRBT's analysis of precipitation samples results in a minimum detectable activity (MDA) of between 19 - 21 Bq/L, a value which can identify significant concentrations of tritium in precipitation, and provides the resolution needed to determine the level of risk to the public and the environment.

Results in 2024 ranged between values that were below the MDA (33.3% of all samples obtained), up to a maximum of 370 Bq/L (sampler 4P for the Nov. 6, 2024 – Dec. 4, 2024 sample).

The average tritium concentration for all eight precipitation monitors in 2024 was 62 Bq/L.

Table 17 summarizes the five-year trends for the average and maximum concentrations of collected precipitation samples for each calendar year.

TABLE 17: PRECIPITATION MONITORING: FIVE-YEAR TREND

DESCRIPTION	2020	2021	2022	2023	2024
AVERAGE CONCENTRATION DURING YEAR (Bq/L)	34	46	36	38	62
MAXIMUM CONCENTRATION DURING YEAR (Bq/L)	518	560	682	227	370

The geographic distribution of the sample collectors, coupled with any given meteorological conditions during and shortly after tritium processing, is expected to yield some variations in the data year-to-year.

Precipitation monitoring results for 2024, along with maps showing locations, and five-year trends for each sampling location, can be found in **Appendix H** of this report.

4.3.1.3 Muskrat River Monitoring

Samples of the Muskrat River downstream from SRBT are collected and analyzed monthly, in duplicate, as part of the EMP.

Typically, SRBT's analysis of Muskrat River samples results in an MDA of around 10 Bq/L, a value which can identify significant or abnormal concentrations of tritium in the river, and provides the resolution needed to determine the level of risk to the public and the environment.

All obtained samples of the river water in 2024 fell below the MDA for tritium concentration.

Muskrat River monitoring results are trended in **Appendix I** of this report, along with a map showing the location where the sampling is routinely performed.

4.3.1.4 Downspout Runoff Monitoring

Tritium concentrations are measured in all facility downspouts (DS). The samples were collected periodically by SRBT for tritium concentration assessment. Runoff from downspouts was collected during four precipitation events during 2024, with a total of 45 samples being assessed.

The complete set of data for 2024 can be found in **Appendix J**, along with a map of the sample points around the building housing the facility.

The average tritium concentration for all downspouts / facility runoff samples in 2024 was 120 Bq/L; in 2023, this value was 662 Bq/L. Excluding sample results that were less than the MDA the average result in 2024 was 235 Bq/L.

The highest value measured was from heavy rainfall draining through DS-4 on July 10 at 1500h (411 Bq/L), while the lowest values measured were 22 individual measurements that were less than the MDA. (between 40-48 Bq/L).

Table 18 summarizes the five-year trends for the average and maximum concentrations of collected downspout runoff samples for each calendar year.

TABLE 18: DOWNSPOUT RUNOFF MONITORING: FIVE-YEAR TREND

DESCRIPTION	2020	2021	2022	2023	2024
AVERAGE CONCENTRATION DURING YEAR (Bq/L)	1,030	58	182	662	120
MAXIMUM CONCENTRATION DURING YEAR (Bq/L)	6,766	678	1,118	10,483	411

Downspout monitoring was originally initiated as part of the efforts to characterize sources of tritium impacting the groundwater aquifer beneath the SRBT facility in the mid-2000s.

The practice of monitoring the water that is shed from the building rooftop drainage systems represents only a very brief snapshot in time of the conditions at the time of sampling.

There is no significant environmental risk from tritium present in downspout water, as demonstrated by the continuing decrease in groundwater tritium concentrations over the past several years.

It is important to recognize that there are several independent factors that influence the measured tritium concentration in any given sample, including:

- Significant rainfall after periods of time with elevated gaseous tritium-oxide releases tend to result in higher downspout concentrations being measured.
- How long it has been since a significant rainfall event has occurred – drier periods with high rates of tritium processing, followed by a significant rainfall tend to result in higher measured concentrations.
- The overlap between the time the rainfall event began and was detected, and the time it took to put tritium processing operations into a safe state. On occasion, quick onset of a heavy rainfall event can result in probable deposition from entrainment of any released tritium as processing operations are shut down.
- The time between the onset of precipitation and the act of obtaining the samples – the longer amount of time between these events, the lower the concentration of tritium is expected to be.
- Higher rainfall rates can lead to lower concentrations due to the sheer volume of water being drained; however, higher rates of rain can also cause rooftop ponding which will entrain surface tritium that may not have otherwise been taken up by a less intense rainfall.
- Weather factors during processing can influence deposition patterns. Rainfall that occurs quickly after periods of processing where west to east wind patterns dominate have a greater impact on downspout results, as opposed to other wind directions, since the active ventilation system effluent plume will drift over the facility.

4.3.1.5 Produce Monitoring

Produce from three local residential gardens were sampled in 2024, and a locally-grown product was also obtained through a commercial storefront.

Produce samples were analyzed by a third-party laboratory to establish free-water tritium concentration, as well as an assessment of organically-bound tritium (OBT) in specific samples (produce sample minimum detectable activity = approximately 1.4 Bq/L of sample water measured; MDA per kilogram dependent on water content ratio of a given sample type).

The official results were compiled and reported to the participating members of the public, and are also posted on our website. This data is used in the calculations for annual estimated dose to the public for 2024.

The average free water tritium concentration in all produce offered by local residents in 2024 was 57 Bq/kg, compared to the 2023 value of 38 Bq/kg.

The maximum measured value in 2024 was 189 Bq/kg measured in a sample of tomatoes; this measurement represents less than 0.2% of the SRBT benchmark value, as well as the CNSC Independent Environmental Monitoring Program screening value for free water tritium in fresh produce.

At this same address, a cucumber sample was measured to be 171 Bq/kg, and a sample of carrot measured to be 113 Bq/kg, giving an average produce measurement at this location of just under 158 Bq/kg.

The average free water tritium concentration in locally-grown produce offered by commercial entities was measured as 2.0 Bq/kg in a sample of rhubarb.

For OBT, samples of tomatoes and cucumbers from two residential gardens were measured at concentrations ranging from 0.2 – 6.0 Bq OBT/kg, while commercially-obtained rhubarb was measured at 0.8 Bq OBT/kg.

Produce monitoring results and maps showing produce sampling locations for calendar year 2024 can be found in **Appendix K** of this report, along with graphs comparing the five-year trends of each location.

4.3.1.6 Milk Monitoring

Milk from both a local producer and from a local distributor is sampled every six months. The samples were collected and analyzed for tritium concentration by a qualified third-party laboratory. The data is used in the calculations for critical group annual estimated dose each year.

Tritium concentrations in milk remained very low, with measurements ranging from less that the MDA of 2 Bq/L, up to 8 Bq/L in the September sample from a store-purchased carton from a local distributor. The average of all milk samples obtained was 4 Bq/L.

Milk monitoring results for 2024 can be found in **Appendix L** of this report.

4.3.1.7 Weather Data

A weather station near the facility collects data on a continuous basis.

Weather data is primarily used as part of the continuous meteorological characterization of the site over time, in support of the establishments of Derived Release Limits and the Environmental Risk Assessment.

See weather data for 2024 in **Appendix M**.

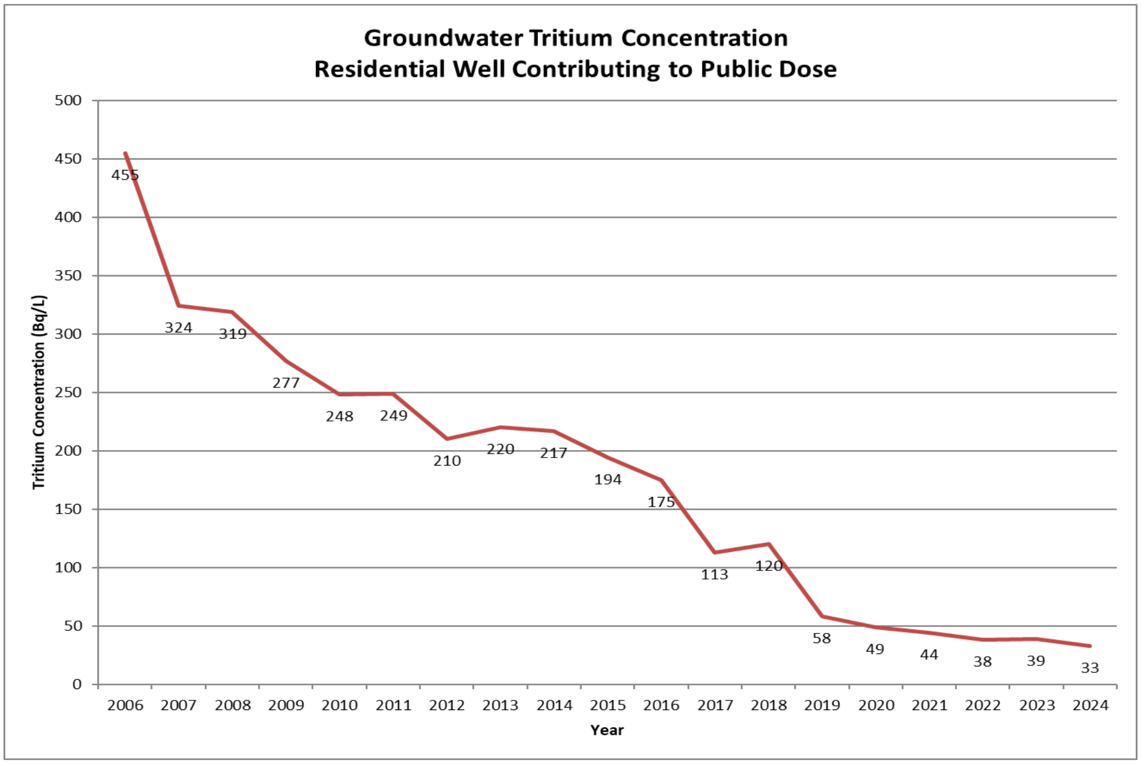
4.3.1.8 Residential Drinking Water

Several nearby local residences permit SRBT to acquire samples of drinking water during the year, to provide additional data for our program. A qualified, independent third-party laboratory collects and analyzes residential drinking water samples (MDA = approximately 3 – 4 Bq/L).

In 2024, the highest residential well tritium concentration value was measured as 33 Bq/L (in March at RW-3), a value that is well below the Ontario Drinking Water Quality Standard of 7,000 Bq/L.

Figure 13 illustrates the trend in maximum sampled tritium concentration in all sampled residential wells, since the program of monitoring began in 2006.

FIGURE 13: RESIDENTIAL WELL TRITIUM CONCENTRATION TREND (2006-2024)



Derived public dose values attributed to residential well water consumption have decreased since the inception of the monitoring program as a direct result of our efforts to minimize our environmental impact.

Residential well monitoring results for 2024 can be found in **Appendix N** of this report.

4.3.1.9 Deviations from Field Sampling Procedures

In 2024, there were no noted occurrences of deviations from field sampling procedures.

SRBT performs field sampling activities in accordance with internal procedures for the following sample types:

- EMP passive air sampling
- Precipitation
- Muskrat River
- Facility downspouts

Qualified independent service providers continue to sample and/or analyze the following sample types:

- Produce
- Milk
- Residential drinking water
- Sludge cake from the Pembroke Pollution Control Centre

4.3.1.10 Deviations from Analytical and Data Management Procedures

In 2024, there were no noted occurrences of deviations from analytical and data management procedures.

SRBT routinely analyzes the following sample types, in accordance with internal procedures:

- EMP passive air sampling
- Precipitation
- Muskrat River
- Facility downspouts

Qualified independent service providers continue to analyze the following sample types:

- Produce
- Milk
- Residential drinking water
- Sludge cake from the Pembroke Pollution Control Centre

SRBT manages all EMP data in accordance with controlled procedures; there were no deviations from these procedures in 2024.

4.3.1.11 Field and Laboratory QA/QC Results and Non-conformances

Field and laboratory EMP operations include several quality assurance and quality control (QA/QC) activities. Field QA/QC activities include duplicate sampling of five passive air sampler stations, duplicate lab analysis of a precipitation sample, duplicate sampling of the Muskrat River, and the use of trip / method blanks for samples obtained in the field.

Laboratory QA/QC activities include duplicate samples and blanks, as well as laboratory reference standards. Sample QC is tested using spike recovery and relative percent difference (RPD) tests.

The following table illustrates the five-year trend in pertinent QA/QC acceptance criteria data for the EMP:

TABLE 19: EMP QUALITY CONTROL DATA: FIVE-YEAR TREND

CALENDAR YEAR	2020	2021	2022	2023	2024
BENCHMARK VALUE EXCEEDANCES	0	0	0	0	0
DUPLICATE RPD EXCEEDANCES	10	7	1	7	10
REFERENCE STANDARD ACCURACY EXCEEDANCES	0	0	0	0	0
BLANK SAMPLE COUNT RATE > MAX ACCEPTABLE	0	0	0	0	0
SAMPLE ACQUISITION SUCCESS RATE	98.5%	98.6%	99.5%	99.2%	98.9%
QC CHECK PASS RATE	96.6%	99.2%	99.9%	99.2%	98.9%

In 2024, 629 of 636 (98.9%) planned, routine environmental samples were successfully obtained.

The seven samples that were not obtained included:

- One PAS sample was lost when a duplicate PAS sample vial at SW250 was found spoiled on the ground,
- The commercial farm gate that has traditionally participated in our produce sampling campaigns was found to be permanently closed; an alternative source of locally-grown produce was eventually found,
- One residential well sample that could not be obtained due to the absence of the homeowner at the time of sampling, and
- One downspout (DS-1) did not drain sufficient water for sampling during the course of the entire year (four sampling events).

A total of 878 of 888 (98.9%) EMP acceptance criteria / QC checks / benchmark value comparisons passed their check. Most importantly, no measured EMP sample exceeded established benchmark values in 2024.

The ten checks that did not initially meet established criteria all related to the derivation of an RPD greater than 40% between two duplicate sample results for passive air sampling. In each case, the values of activity were re-assessed to confirm if a deviation was present, and the results dispositioned.

Average concentrations at these locations were assigned conservatively for each sampling period where occurred.

4.3.1.12 Supplementary Studies

The special annual sampling campaign (SASC) was conducted for the fourth consecutive year, focused on environmental media that had not been traditionally sampled as a matter of routine under the SRBT EMP prior to the ERA process having been completed in 2021.

The data collected as a result of the SASC will be used as input into future revisions of the ERA.

The 2024 SASC took place in the community of Pikwakanagan, in close collaboration with members of the Algonquins of Pikwakanagan First Nation (AOPFN). This was the first sampling campaign completed within the AOPFN community since 2021.

The planning of the sampling campaign, the selection of sample types, and the locations of each sample type taken were all planned and executed in partnership with AOPFN Guardians and knowledge holders. Sampling took place over the course of three hours on November 1, 2024.

The sample types obtained in 2024 included:

- Raspberry Leaf,
- Ironwood Bark,
- Cedar Leaf,
- Mullein Leaf,
- Sumac Berry,
- Creek water from the woods near the AOPFN Consultation Offices,
- Well water from the AOPFN Consultation Office kitchen area,
- Lake water from Golden Lake, and
- A sample of moose meat harvested by AOPFN community members in 2024, taken from Algonquin Park Basin Depot area.

The cultural significance of each type of sample, and the locations from where it was obtained, was taken into account during the sample campaign planning and execution.

Samples were transported the same day to the independent third-party laboratory that routinely provides SRBT with tritium analysis of plant materials.

As of the end of 2024, final measurement results are still pending from the laboratory for these samples.

Once the results are received, they will be immediately shared with the AOPFN Guardians and interested community members.

The data collected as part of the SASC will serve as a key input into the next iteration of the ERA, scheduled to be submitted to CNSC staff for review by April 10, 2026.

4.3.2 Effluent Monitoring

SRBT monitors two main effluent streams from the facility for tritium as part of our Effluent Monitoring Program (EffMP).

Tritium releases via the gaseous effluent pathway (active ventilation) are monitored in real time using ‘bubbler’ capture systems, with integrated measurements being conducted weekly to determine total emissions and verify compliance with licence limits and action levels.

Liquid effluent is retained in batches and analyzed for tritium concentration prior to being released to sewer.

4.3.2.1 Gaseous Effluent

In 2024, SRBT operated well within release limits to atmosphere that are described in the Licence Conditions Handbook associated with NSPFL-13.00/2034.

A summary of the releases of tritium oxide and total tritium in 2024 is tabled below:

TABLE 20: GASEOUS EFFLUENT DATA (2024)

NUCLEAR SUBSTANCE AND FORM	ANNUAL LIMIT (GBq)	2024 RELEASED (GBq)	% LIMIT	WEEKLY AVERAGE (GBq)	HIGHEST WEEKLY RELEASE (GBq)
TRITIUM AS TRITIUM OXIDE (HTO)	67,200	13,628	20.3%	262	530 *(Oct. 22-29)*
TOTAL TRITIUM AS TRITIUM OXIDE (HTO) AND TRITIUM GAS (HT)	448,000	45,868	10.2%	882	17,138 *(Nov. 26 – Dec. 3)*

Please refer to **Appendix O** for a complete data set on tritium releases to atmosphere in 2024.

Details on the past five years of gaseous effluent data are provided in the following table for ease of trend analysis:

TABLE 21: GASEOUS EFFLUENT: FIVE-YEAR TREND

NUCLEAR SUBSTANCE AND FORM	2020 (GBq)	2021 (GBq)	2022 (GBq)	2023 (GBq)	2024 (GBq)
TRITIUM OXIDE (HTO)	9,755	8,387	8,816	6,540	13,628
TOTAL TRITIUM AS TRITIUM OXIDE (HTO) AND TRITIUM GAS (HT)	25,186	28,729	26,590	20,520	45,868

When analyzing the operation's performance at reducing emissions it is important to assess the releases to atmosphere against the amount of tritium the facility processed. This provides an indication of how effective emission reduction initiatives have been successful in reducing emissions.

The following table defines the ratio of tritium released to atmosphere against tritium processed in the past five years:

TABLE 22: TRITIUM RELEASED TO ATMOSPHERE vs PROCESSED: FIVE-YEAR TREND

YEAR	TRITIUM RELEASED TO ATMOSPHERE (GBq/YEAR)	TRITIUM PROCESSED (GBq/YEAR)	% RELEASED TO PROCESSED
2020	25,186	27,887,498	0.09
2021	28,729	29,392,257	0.10
2022	26,590	26,940,372	0.10
2023	20,520	23,202,623	0.09
2024	45,868	25,562,136	0.18

The 2024 target of 0.11% released vs. processed ratio was missed, primarily due to an action level exceedance that occurred during the monitoring week of Nov. 26 – Dec. 3. Refer to Section 2.3.3 of this report for details on this event. Removing that week from the 2024 data results in a 51-week average ratio which would still have slightly exceeded the target (0.112%).

The releases that occurred between Nov. 26 – Dec. 3 constituted 37.4% of the total tritium released via the gaseous effluent pathway for 2024.

Comparing that week of releases with the SRBT Derived Release Limits, if the same amount of tritium was released every week over the course of a calendar year, the conservatively derived effective dose to a member of the public would approximately be 7.6 μSv (or 0.8% of the regulatory limit of 1 mSv).

4.3.2.2 Air Emission Targets

SRBT set an annualized total tritium emission target at the beginning of 2024 of ≤ 600 GBq / week (averaged over the year), a target which was missed (882 GBq / week) primarily due to the aforementioned action level exceedance. Removing that week from the 2024 data results in an average of 563 GBq / week, which would have met the target.

For calendar year 2025, SRBT has left the tritium emission target unchanged at a value of ≤ 600 GBq / week, on average, based upon projected production rates and the performance achieved during normal operations in 2024.

The 2024 targeted tritium released to processed ratio of ≤ 0.11% was also missed (0.18%) for similar reasons. For this metric, the 2024 target has been kept set at ≤ 0.11%.

4.3.2.3 Liquid Effluent

In 2024, SRBT operated well within release limit to sewer that are described in the Licence Conditions Handbook associated with NSPFL-13.00/2034.

TABLE 23: LIQUID EFFLUENT DATA (2024)

NUCLEAR SUBSTANCE AND FORM	LIMIT (GBq/YEAR)	RELEASED (GBq/YEAR)	% OF LIMIT
TRITIUM – WATER SOLUBLE	200	1.78	0.89%

Total liquid effluent releases in 2024 increased when compared to 2023 values (1.78 GBq in 2024 vs. 0.68 GBq in 2023), primarily due to a single order of miniature light sources that exhibited a higher rate of failure of water-immersion leak testing (a component of product quality assurance).

Details on the past five years of liquid effluent data are provided in the table below for ease of trend analysis:

TABLE 24: LIQUID EFFLUENT: FIVE-YEAR TREND

NUCLEAR SUBSTANCE AND FORM	2020 (GBq)	2021 (GBq)	2022 (GBq)	2023 (GBq)	2024 (GBq)
TRITIUM – WATER SOLUBLE	5.56	3.07	1.49	0.68	1.78

Please refer to **Appendix P** for a complete data set of liquid effluent releases to sewer in calendar year 2024.

4.3.2.4 Liquid Effluent Target

SRBT set a total tritium release target at the beginning of 2024 of ≤ 6 GBq for the year, a target that was achieved. SRBT has set the total liquid effluent release target at 5 GBq for 2024.

4.3.2.5 Action Level Exceedances

In 2024, there were no instances of an action level exceedance related to liquid effluent monitoring at SRBT.

One action level exceedance took place relating to gaseous effluent. The action level associated with the weekly release of total tritium via the gaseous effluent pathway was exceeded for the monitoring period of November 26 – December 3.

Details on this event can be found in Section 2.3.3 of this report.

4.3.2.6 Summary of Field and Laboratory QA/QC

Effluent monitoring activities include several procedural steps that ensure acceptable quality assurance and control, including duplicate / triplicate sample acquisition and measurement, the use of process blanks, and the measurement of known reference standards as part of the assay of activity in collected sample media.

All EffMP QA/QC results obtained in 2024 were acceptable with no identified non-conformances.

4.3.2.7 Statement of Uncertainties Inherent in Monitoring Results

Uncertainties associated with effluent monitoring at SRBT may be present at several points in the process.

For gaseous effluent, such uncertainties include: sampling representativeness, total airflow collected, catalytic efficiency of HT to HTO conversion, capture efficiency of sample media, standard measurement errors associated with liquid scintillation counting, sample acquisition errors such as volume of drawn sample for analysis, and errors in stack flow rate and differential pressure measurement.

For liquid effluent, such uncertainties include: sample volume, liquid effluent volume, standard measurement errors associated with liquid scintillation counting, and sample acquisition errors such as volume of drawn sample for analysis.

In order to ensure that the uncertainties inherent in monitoring results are kept acceptably low, SRBT ensures that a third-party laboratory conducts independent verification procedures of effluent monitoring processes on an annual basis. The acceptance criterion for deviation between the final assessed measurements is +/-30%.

For the intercomparison exercise completed in 2024, there were a limited number of individual data points measured in excess of this criterion; however, the overall weekly emissions profile of both species of gaseous tritium releases through the active ventilation systems were confirmed to be well within the final acceptance criteria.

The QA/QC processes associated with SRBT effluent monitoring contribute to the confidence in the results. As well, the data gathered from the EMP is assessed against the data from the gaseous effluent monitoring process on a frequent basis to verify that results are relatively consistent with each other.

The inherent uncertainties associated with effluent monitoring are well within acceptable bounds when contrasted against the measured releases, and the licenced limits and derived release limits for gaseous tritium releases by each pathway.

4.3.2.8 Supplementary Studies

In 2024, no supplementary studies were conducted relating to effluent monitoring at SRBT.

4.3.2.9 Hazardous Substance Releases

In 2024, SRBT continued to operate the facility under a Certificate of Approval (Air), number 5310-4NJQE2, issued by the Ontario Ministry of the Environment in accordance with section 9 of the Ontario Environmental Protection Act.

No hazardous non-radiological substances are released from the facility through either gaseous or liquid effluent pathways in any significant quantity.

4.3.3 Groundwater Monitoring

SRBT implements and maintains a comprehensive Groundwater Monitoring Program (GMP) as part of our Groundwater Protection Program.

Dedicated, engineered sampling wells are used to establish tritium concentrations in the groundwater each month at various depths and in differing geologic strata. Variations are trended over time to measure the response of historical contamination of the local aquifer.

Since the program was established, groundwater measurements and trends have been in very good agreement with established hydrogeological modelling predictions.

While most of the released tritium in the air is dispersed, some of it will reach the soil through dry and wet deposition. Infiltrated precipitation brings tritium into the groundwater below it. The deposition of tritium on and around the facility from air emissions and resulting soil moisture and standing water are the sole direct contributor to tritium found in groundwater. Groundwater is affected by the percolation of soil moisture and standing water from the surface.

Tritium concentrations in groundwater are expected to gradually decrease once all historical emissions have flushed through the system and/or decayed with some influence of higher concentrations in nearby wells from lateral underground water flow. This continues to be confirmed by routine monitoring of the existing network of wells. The rate at which this decrease occurs is dependent on the level and speed of recharge of the groundwater on and around the SRBT facility.

4.3.3.1 Groundwater Tritium Concentration

Groundwater monitoring well results for 2024 can be found in **Appendix N** of this report.

MW06-10: The highest average tritium concentration in any well remains in monitoring well MW06-10 which is directly beneath the area where the active ventilation stacks are located. As of the end of 2024, this represents the only well where tritium concentration exceeds the Ontario Drinking Water Guideline value of 7,000 Bq/L.

The average concentration of tritium measured in MW06-10 in 2024 was 23,701 Bq/L, a value that is lower than the average measured in 2023 (26,220 Bq/L).

A graph trending the average annual concentration of tritium in MW06-10 since commissioning of the well is provided in Figure 14, while the five-year trend is highlighted in Figure 15 in red, along with trends of the maximum (green) and minimum (blue) monthly measurements each year.

MW07-13: The average concentration of MW07-13 continues to fall; in 2024 the average measurement was 1,576 Bq/L. This well exhibits the highest average tritium concentration of any monitoring well, other than MW06-10.

This well was the last monitoring well to have been measured above the provincial drinking water guideline value of 7,000 Bq/L (April 2018), other than MW06-10. The concentration of tritium at this location has continued to consistently trend downward over time.

A graph trending the average annual concentration of tritium in MW07-13 since commissioning of the well is Figure 16, while the five-year trend is highlighted in Figure 17 in red, along with trends of the maximum (green) and minimum (blue) monthly measurements each year.

FIGURE 14: MW06-10 AVERAGE TRITIUM CONCENTRATION TREND (2006-2024)

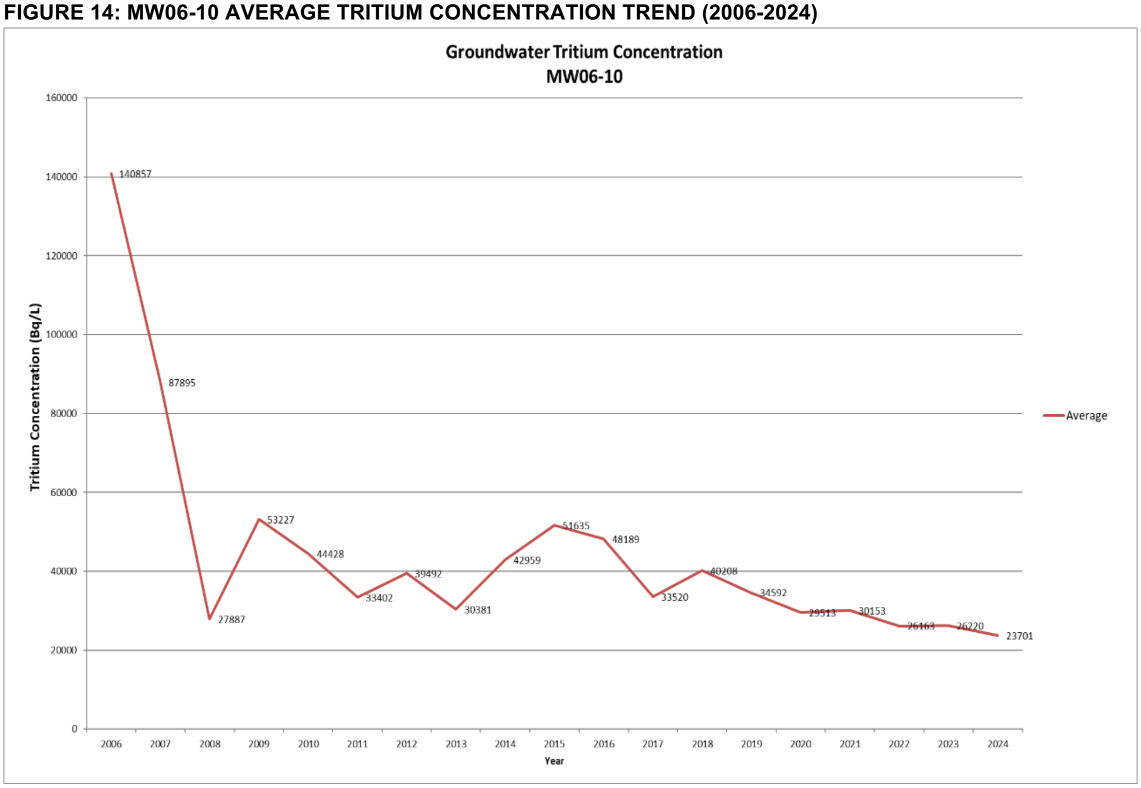


FIGURE 15: MW06-10 FIVE-YEAR TREND (2020-2024)

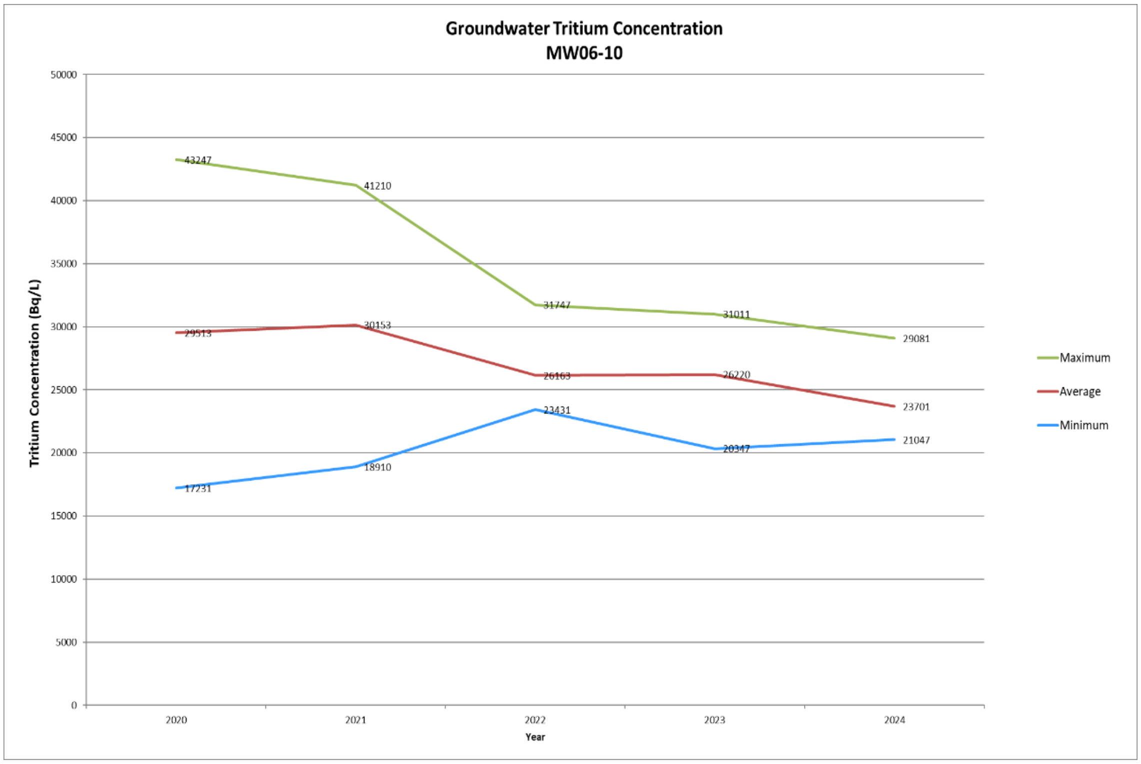


FIGURE 16: MW07-13 AVERAGE TRITIUM CONCENTRATION TREND (2007-2024)

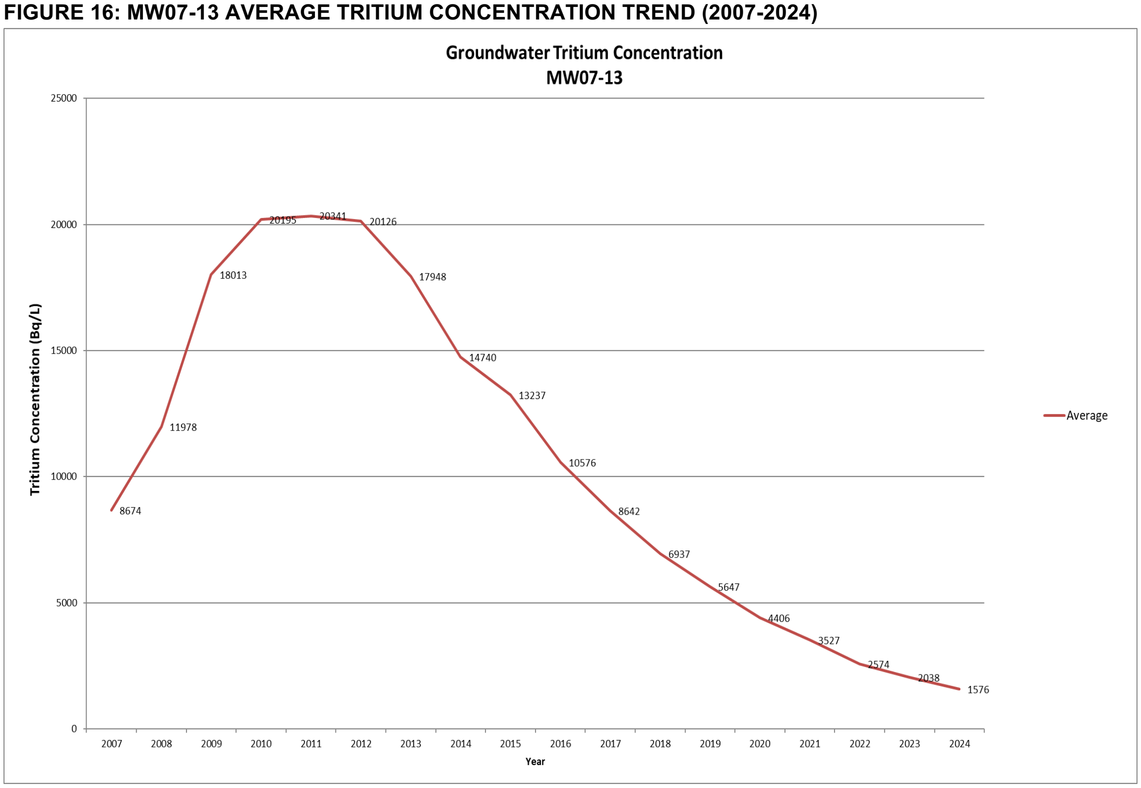
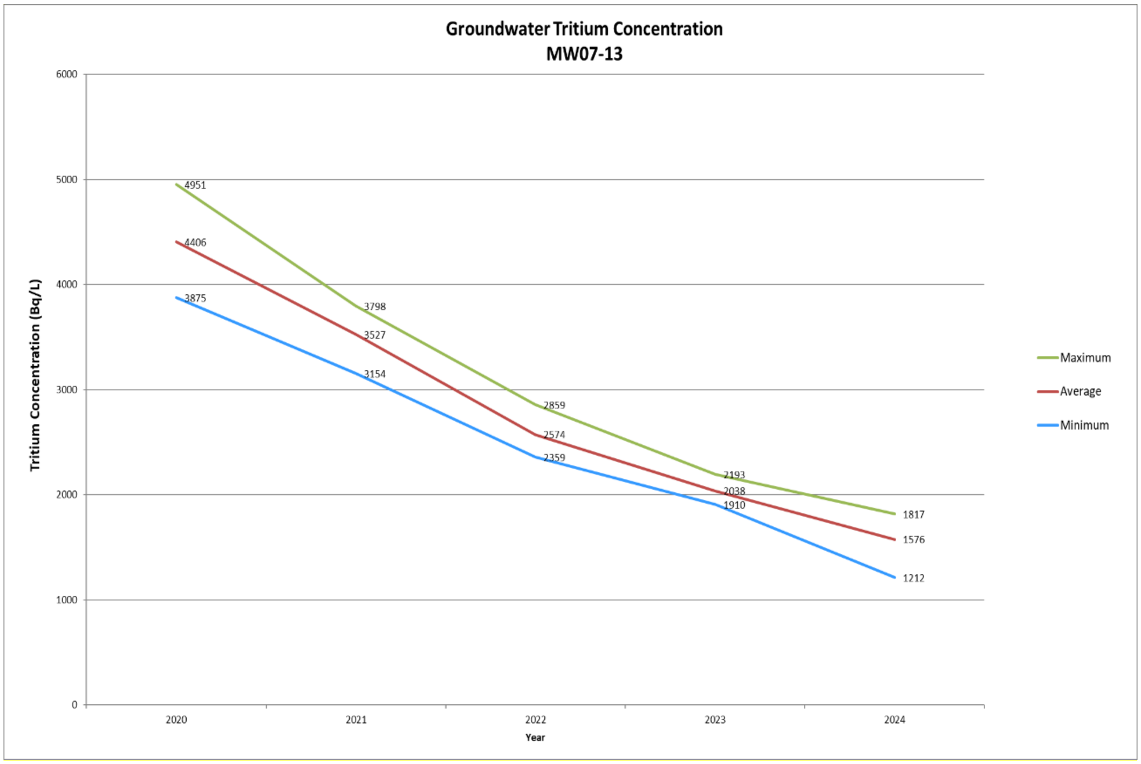


FIGURE 17: MW07-13 FIVE-YEAR TREND (2020-2024)



Looking back over the past several years, tritium concentrations in all monitoring wells have continued to decline.

The average annual concentration across all dedicated monitoring wells in 2024 is 32.6% of the average measured in 2015. Well MW07-18 has shown the greatest change (91% decrease compared to 2015 conditions), while MW07-12 exhibited the smallest change (10% decrease).

In 2024, 26 out of 29 SRBT-installed groundwater monitoring wells exhibited an average tritium concentration that was lower than the previous year. One well showed no change, and two wells exhibited slightly higher concentrations.

Table 25 compares the annualized average tritium concentration of the 29 dedicated, SRBT-installed groundwater monitoring wells for eight years, between 2015 through 2024.

Comparisons are made in the columns on the right-hand side of the table using a three-colour gradient, where green indicates decreasing concentrations, white indicating stable, and red indicating a relative increase for the years being compared. Darker shades of green and red indicate greater relative decreases or increases for any specific comparison.

TABLE 25: AVERAGE TRITIUM CONCENTRATION IN MONITORING WELLS

Well ID	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015	2024/2023	2024/2022	2024/2021	2024/2020	2024/2019	2024/2018	2024/2017	2024/2016	2024/2015
	(Annualized average tritium Bq/L)										(%)								
MW06-1	474	424	456	651	762	1,045	1,334	1,946	2,753	4,338	111.7	104.1	72.8	62.2	45.3	35.5	24.4	17.2	10.9
MW06-2	469	489	609	736	877	1,031	1,160	1,166	1,467	1,965	95.9	77.1	63.7	53.5	45.5	40.5	40.3	32.0	23.9
MW06-3	140	141	166	199	244	367	469	683	1,029	1,218	98.7	84.2	70.2	57.2	38.1	29.8	20.4	13.6	11.5
MW06-8	455	475	507	550	579	679	724	780	848	906	95.7	89.7	82.7	78.5	67.0	62.9	58.3	53.6	50.2
MW06-9	940	1,044	1,127	1,366	1,527	1,774	1,952	2,224	2,476	2,731	90.0	83.4	68.8	61.6	53.0	48.2	42.3	38.0	34.4
MW06-10	23,701	26,220	26,163	30,153	29,513	34,592	40,208	33,520	48,189	51,635	90.4	90.6	78.6	80.3	68.5	58.9	70.7	49.2	45.9
MW07-11	699	759	811	858	924	1,053	1,122	1,099	1,344	1,521	92.1	86.2	81.5	75.7	66.4	62.3	63.6	52.0	46.0
MW07-12	419	438	416	435	422	425	468	467	469	463	95.7	100.7	96.3	99.4	98.7	89.6	89.8	89.3	90.4
MW07-13	1,576	2,038	2,574	3,527	4,406	5,647	6,937	8,642	10,576	13,237	77.3	61.2	44.7	35.8	27.9	22.7	18.2	14.9	11.9
MW07-15	923	990	1,004	1,076	1,262	1,399	1,505	1,617	1,810	1,680	93.3	91.9	85.8	73.1	66.0	61.4	57.1	51.0	55.0
MW07-16	559	624	685	897	1,003	1,240	1,433	1,649	1,879	2,188	89.5	81.6	62.3	55.7	45.1	39.0	33.9	29.7	25.5
MW07-17	229	237	267	296	272	338	359	335	602	780	96.5	85.9	77.4	84.3	67.8	63.8	68.5	38.0	29.4
MW07-18	490	649	842	1,102	1,494	2,000	2,192	2,739	3,690	5,491	75.4	58.1	44.4	32.8	24.5	22.3	17.9	13.3	8.9
MW07-19	575	650	665	959	1,198	1,468	1,889	1,926	2,500	3,222	88.5	86.5	60.0	48.0	39.2	30.4	29.9	23.0	17.9
MW07-20	207	222	244	296	326	438	498	571	670	775	93.1	84.7	69.9	63.4	47.3	41.5	36.2	30.9	26.7
MW07-21	263	289	351	363	393	545	778	879	1,009	1,121	90.9	74.8	72.2	66.8	48.2	33.8	29.9	26.0	23.4
MW07-22	546	611	639	729	783	921	974	1,023	1,131	1,171	89.4	85.3	74.9	69.6	59.3	56.0	53.3	48.2	46.6
MW07-23	812	908	1,013	1,147	1,252	1,443	1,572	1,743	1,929	2,206	89.3	80.1	70.8	64.8	56.2	51.6	46.5	42.1	36.8
MW07-24	1,107	1,226	1,340	1,511	1,644	1,839	1,928	2,022	2,206	2,314	90.3	82.6	73.2	67.3	60.2	57.4	54.7	50.2	47.8
MW07-26	209	238	291	421	514	697	904	1,190	1,491	1,941	87.9	71.9	49.6	40.6	30.0	23.1	17.5	14.0	10.8
MW07-27	1,027	1,131	1,439	1,696	1,994	2,683	3,136	3,589	4,292	4,869	90.8	71.4	60.5	51.5	38.3	32.7	28.6	23.9	21.1
MW07-28	378	444	520	670	705	843	1,017	1,063	1,311	1,446	85.1	72.6	56.4	53.6	44.8	37.1	35.5	28.8	26.1
MW07-29	531	667	760	1,075	1,485	2,058	2,415	2,472	3,395	3,950	79.6	69.9	49.4	35.7	25.8	22.0	21.5	15.6	13.4
MW07-31	214	255	240	325	182	352	407	186	440	756	83.7	89.1	65.7	117.4	60.7	52.4	114.8	48.5	28.2
MW07-32	63	44	42	54	59	75	70	76	155	128	144.6	152.4	116.4	107.2	84.3	90.9	83.2	40.9	49.5
MW07-34	618	753	908	1,153	1,297	1,526	1,889	2,291	2,822	3,312	82.0	68.0	53.5	47.6	40.5	32.7	27.0	21.9	18.6
MW07-35	912	1,076	1,297	1,550	1,898	2,256	2,637	3,015	3,448	3,945	84.8	70.3	58.8	48.0	40.4	34.6	30.2	26.4	23.1
MW07-36	1,027	1,112	1,105	1,154	1,468	1,716	2,008	2,109	2,618	2,892	92.3	92.9	88.9	69.9	59.8	51.1	48.7	39.2	35.5
MW07-37	658	658	677	717	763	821	830	871	989	1,009	100.0	97.2	91.7	86.3	80.1	79.3	75.5	66.6	65.2
AVERAGE	**1,387**	**1,545**	**1,626**	**1,920**	**2,043**	**2,458**	**2,856**	**2,824**	**3,708**	**4,249**	89.7	85.3	72.2	67.9	56.4	48.6	49.1	37.4	32.6
													Average aquifer concentrations have decreased 67.4% since 2015.						**67.4**

Several factors can influence the concentration of tritium in any given well, including the rate of precipitation accumulation, contaminant dispersion patterns, and the lateral and vertical migration of historical contaminant plumes. Measured concentrations may also be reflective of operational conditions from many years ago.

4.3.3.2 Groundwater Level Measurements

The water levels are measured in monitoring wells prior to purge and sampling. Analysis of this data shows consistent trends from year to year when comparing season to season.

A compilation of groundwater level measurements for 2024 can be found in **Appendix Q** of this report.

4.3.3.3 Summary of Field and Laboratory QA/QC

Field and laboratory operations pertaining to groundwater monitoring include several quality assurance and quality control activities.

Quality control activities include duplicate sampling of certain wells, duplicate laboratory subsampling, and the use of trip / method blanks during sampling campaigns.

As well, several quality control checks are performed as part of the liquid scintillation counting procedures employed by both the third party and SRBT.

In 2024, 116 samples of groundwater were successfully obtained and analyzed, representing 100% of the samples attempted. There were no failures of field or laboratory quality control checks for GMP data during 2024.

SRBT's Groundwater Monitoring Program requires the completion of an inter-laboratory testing exercise on an annual basis. This exercise is typically completed during the June sampling period.

Five groundwater monitoring wells were sampled by SRBT in duplicate on June, and were subsequently analyzed for tritium concentration by both SRBT and a qualified, independent laboratory.

The results obtained fell well within the acceptance criteria of +/-20% relative difference, adding confidence in the quality and accuracy of the data generated by the program.

4.3.3.4 Statement of Uncertainties Inherent in Monitoring Results

Uncertainties associated with SRBT groundwater monitoring may be present at certain points in the process.

The main uncertainties relate to standard measurement errors associated with liquid scintillation counting, and sample acquisition errors such as volume of drawn sample for analysis.

In order to provide assurance of accuracy and precision, SRBT conducts an annual intercomparison sampling and analysis activity with our primary contracted third party in June, as required by the GMP.

Five wells were sampled and measured by SRBT concurrently with the third party, with good agreement between the results obtained in-house and those obtained by the contracted service provider.

The inherent uncertainties associated with groundwater monitoring are well within acceptable bounds when contrasted against the tritium concentrations that may present an unacceptable risk to the public.

4.3.3.5 Supplementary Studies

In 2024, no supplementary studies were conducted relating to groundwater monitoring at SRBT.

4.3.3.6 Data Quality, Performance and Acceptance Criteria

Overall, the quality of data gathered as part of SRBT groundwater monitoring activities is successful in ensuring a high level of performance in monitoring, and in demonstrating that acceptance criteria (such as the limits on dose to the public) continue to be met.

All trip blanks, field duplicates, laboratory duplicates and quality control checks during liquid scintillation counting met performance criteria throughout 2024.

4.3.3.7 Program Objectives and Conceptual Site Model

The main objective of the GMP implemented by SRBT is to provide information to assess risks from site-affected groundwater to human health and the environment, ultimately to determine if the risk to the environment and the public from SRBT operations remains acceptably low.

Only one well monitored on a regular basis exceeds the Ontario Drinking Water Guideline value of 7,000 Bq/L. This well is a dedicated, engineered groundwater monitoring well very near to the facility within a secured area, and is not available to be used as a source of water consumption.

With respect to the conceptual site model, the highest average concentration of potable groundwater obtained from a residential well continues to show a generally stable or decreasing trend over time (see discussion in section 4.3.1.8 earlier in this report).

SRBT concludes that the comprehensive array of groundwater monitoring activities conducted continue to meet program objectives, and adheres to the conceptual site model developed as part of the Environmental Management System, as illustrated earlier in this report in Figure 8.

4.3.4 Other Monitoring

On occasion SRBT conducts monitoring of other environmental media in order to provide continued assurance of the safety of our operations.

4.3.4.1 Soil Monitoring

No soil monitoring was conducted in 2024.

4.3.4.2 Sludge Monitoring

In March and September 2024, SRBT collected routine samples of sludge cake from the Pembroke Pollution Control Centre.

These samples are analyzed for the concentration of tritium in the free water contained within (expressed in Bq/L), as well as for organically-bound tritium in the dry mass of material (expressed in Bq/kg).

Sludge data does not factor into the calculation of public dose; however, given previously expressed stakeholder interest, SRBT has integrated sludge cake monitoring as part of the routine EMP activities.

All sludge samples are analyzed by an independent laboratory. The averaged annual results obtained for the past five years are tabled below.

TABLE 26: SLUDGE MONITORING: FIVE-YEAR TREND

NUCLEAR SUBSTANCE AND FORM	2020	2021	2022	2023	2024
FREE-WATER TRITIUM (Bq/L)	31	30	44	11	21
OBT FRESH WEIGHT (Bq/kg)	260	167	468	93	97

4.3.5 Public Dose

The calculation methods used to determine the dose to the representative persons as defined in the SRBT EMP are described in the program and in procedure EMP-014, *Interpretation and Reporting Requirements for EMP Data.*

All data and tables relating to the calculation of the dose to the public can be found in **Appendix R**.

For 2024, the dose has been calculated using the effective dose coefficients found in Canadian Standards Association (CSA) Guideline N288.1-14[22].

TABLE 27: CSA GUIDELINE N288.1-14 EFFECTIVE DOSE COEFFICIENTS FOR H-3

AGE GROUP	EFFECTIVE DOSE COEFFICIENT – INHALATION (HTO) (μSv/Bq)	EFFECTIVE DOSE COEFFICIENT – INGESTION (HTO) (μSv/Bq)	EFFECTIVE DOSE COEFFICIENT – INGESTION (OBT) (μSv/Bq)
INFANT	8.0E-5	5.3E-5	1.3E-4
CHILD	3.8E-5	2.5E-5	6.3E-5
ADULT	3.0E-5	2.0E-5	4.6E-5

NOTE: The dose coefficients listed for inhalation account for skin absorption, as per Table C.1 of N288.1-14.

The dose assessed for the group of representative persons is a summation of:

- Tritium uptake from inhalation and absorption through skin at the place of residence and/or the place of work, ($P_{(i)19}$ and $P_{(e)19}$), and
- Tritium uptake due to consumption of well water (P_{29}), and
- Tritium uptake due to consumption of produce (P_{49}), and
- Tritium uptake due to consumption of dairy products (P_{59}).

Dose due to inhalation

The closest residence to SRBT is located by passive air sampler NW250 approximately 240 meters from the point of release. The 2024 average concentration of tritium oxide in air at passive air sampler NW250 has been determined to be **4.99 Bq/m^3**.

Three passive air samplers are located close to the SRBT facility and represent the tritium oxide in air ($P_{(i)19}$ and $P_{(e)19}$) concentrations for the representative person (adult worker) at samplers 1, 2, and 13.

The sampler indicating the highest tritium oxide in air concentration is used to calculate the P_{19} dose values to a person while at work. The highest average result for 2024 between these samplers is **8.35 Bq/m³** at PAS # 1.

Inhalation rates for each of the three age groups from N288.1-14[23] are as follows:

TABLE 28: CSA GUIDELINE N288.1-14 INHALATION RATES

AGE GROUP	INHALATION RATE (m^3/a)
INFANT	2,740
CHILD	7,850
ADULT	8,400

Inhalation dose to adult workers is calculated using the inhalation rates found in CSA Guideline N288.1-14[23], and assuming 2,080 hours (23.744%) of work per year with 6,680 hours (76.256%) at home (a total of 8,760 hours per year).

$P_{(i)19}$: Adult worker dose due to HTO inhaled at residence

The average value for tritium oxide in air for the sampler taken as representing the place of residence for the defined representative person equals 4.99 Bq/m^3.

$$P_{(i)19r} = [H\text{-}3_{air}]\ (Bq/m^3) \times \text{Resp. Rate}\ (m^3/a) \times \text{Occup. Factor} \times DCF_{H3}\ (\mu Sv/Bq)$$
$$= 4.99\ Bq/m^3 \times 8{,}400\ m^3/a \times 0.76256 \times 3.0E\text{-}05\ \mu Sv/Bq$$
$$= 0.959\ \mu Sv/a$$

$P_{(i)19}$: Adult worker dose due to HTO inhaled at work

Taking the highest concentration between Passive Air Samplers #1, #2, and #13 is Passive Air Samplers #1 at 8.35 Bq/m^3.

$$P_{(i)19w} = [H\text{-}3_{air}]\ (Bq/m^3) \times \text{Resp. Rate}\ (m^3/a) \times \text{Occup. Factor} \times DCF_{H3}\ (\mu Sv/Bq)$$
$$= 8.35\ Bq/m^3 \times 8{,}400\ m^3/a \times 0.23744 \times 3.0E\text{-}05\ \mu Sv/Bq$$
$$= 0.500\ \mu Sv/a.$$

$P_{(i)19}$: Adult resident dose due to HTO inhaled at residence

The average value for tritium oxide in air for the sampler representing the place of residence for the defined representative person equals 4.99 Bq/m^3:

$$P_{(i)19} = [H\text{-}3_{air}]\ (Bq/m^3) \times \text{Resp. Rate}\ (m^3/a) \times DCF_{H3}\ (\mu Sv/Bq)$$
$$= 4.99\ Bq/m^3 \times 8{,}400\ m^3/a \times 3.0E\text{-}05\ \mu Sv/Bq$$
$$= 1.257\ \mu Sv/a$$

$P_{(i)19}$: Infant resident dose due to HTO inhaled at residence

The average value for tritium oxide in air for the sampler representing the place of residence for the defined representative person equals 4.99 Bq/m^3:

$P_{(i)19}$ = [H-3_{air}] (Bq/m^3) x Resp. Rate (m^3/a) x DCF_{H3} (μSv/Bq)
= 4.99 Bq/m^3 x 2,740 m^3/a x 8.0E-05 μSv/Bq
= 1.094 μSv/a

$P_{(i)19}$: Child resident dose due to HTO inhaled at residence

The average value for tritium oxide in air for the sampler representing the place of residence for the defined representative person equals 4.99 Bq/m^3:

$P_{(i)19}$ = [H-3_{air}] (Bq/m^3) x Resp. Rate (m^3/a) x DCF_{H3} (μSv/Bq)
= 4.99 Bq/m^3 x 7,850 m^3/a x 3.8E-05 μSv/Bq
= 1.489 μSv/a

Dose due to skin absorption

The dose due to skin absorption is wholly accounted for by the application of the inhalation dose conversion factors applied above. Please see CSA N288.1-14, Table C.1 footnotes for details on dose conversion factors and how they account for skin absorption.

Dose due to consumption of well water

The tritium uptake due to consumption of well water is calculated by taking the average tritium concentration of the water sampled.

Using the following annual consumption rates (at the 95th percentile) derived from information found in CSA Guideline N288.1-14[24]:

TABLE 29: CSA GUIDELINE N288.1-14 WATER CONSUMPTION RATES

AGE GROUP	WELL WATER CONSUMPTION RATE (L/a)
INFANT	305.7
CHILD	482.1
ADULT	1,081.1

In 2024, the highest average concentration in a residential well used as the sole source of the drinking water was found in RW-3 at 183 Mud Lake Road, equal to **33 Bq/L**. This value will therefore be used in the calculation of the public dose.

P_{29}: Adult dose due to consumption of well water

P_{29} = $[H\text{-}3]_{well}$ x M x 2.0E-05 µSv/Bq;
= [33 Bq/L] x 1,081.1 L/a x 2.0E-05 µSv/Bq
= 0.714 µSv/a

P_{29}: Infant dose due to consumption of well water

P_{29} = $[H\text{-}3]_{well}$ x M x 5.3E-05 µSv/Bq;
= [33 Bq/L] x 305.7 L/a x 5.3E-05 µSv/Bq
= 0.535 µSv/a

P_{29}: Child dose due to consumption of well water

P_{29} = $[H\text{-}3]_{well}$ x M x 2.5E-05 µSv/Bq;
= [33 Bq/L] x 482.1 L/a x 2.5E-05 µSv/Bq
= 0.398 µSv/a

Dose due to consumption of produce

The tritium uptake due to consumption of produce, both locally purchased and home grown is calculated by taking the average tritium concentration of produce purchased from the local market and assuming the consumption of 70% of the annual total of produce from this source, and by taking the average tritium concentration from local gardens and assuming the consumption of 30% of the annual total of produce from this source.

These fractions are based upon the site-specific survey previously conducted by SRBT, which determined that the home-grown fraction of plant products consumed by residents in the surrounding area was approximately 30% - a slightly higher value than that recommended in the generic guidance of N288.1-14 (20-25%).

Using the following annual consumption rates for produce derived using information found in CSA Guideline N288.1-14[25]:

TABLE 30: CSA GUIDELINE N288.1-14 PRODUCE CONSUMPTION RATES

AGE GROUP	FRUIT CONSUMPTION RATE (Kg/a)	ABOVE-GROUND VEGETABLES CONSUMPTION RATE (Kg/a)	ROOT VEGETABLES CONSUMPTION RATE (Kg/a)	TOTAL CONSUMPTION RATE (Kg/a)
INFANT	76.6	36.1	12.1	124.8
CHILD	124.4	97.6	43.2	265.2
ADULT	149.2	192.3	71.8	413.3

The average tritium concentration in local produce purchased from the sampled commercial market in 2024 was **2.0 Bq/kg**, while the highest average concentration in produce from a local residential garden was **157.7 Bq/kg**.

P_{49}: Adult dose due to consumption of produce (HTO)

P_{49HTO} = [[$H_{prod,market}$] + [$H_{prod,res}$]] x 2.0E-05 μSv/Bq
= [[H-3_{veg}] (Bq/kg) x (kg) x 0.7] + [H-3_{veg}] (Bq/kg) x (kg) x 0.3]] x 2.0E-5 μSv/Bq
= [[2.0 Bq/kg x 413.3 kg/a x 0.7] + [157.7 Bq/kg x 413.3 kg/a x 0.3]] x 2.0E-05 μSv/Bq
= 0.403 μSv/a

P_{49}: Infant dose due to consumption of produce (HTO)

P_{49HTO} = [[$H_{prod,market}$] + [$H_{prod,res}$]] x 5.3E-05 μSv/Bq
= [[H-3_{veg}] (Bq/kg) x (kg) x 0.7] + [H-3_{veg}] (Bq/kg) x (kg) x 0.3]] x 5.3E-5 μSv/Bq
= [[2.0 Bq/kg x 124.8 kg/a x 0.7] + [157.7 Bq/kg x 124.8 kg/a x 0.3]] x 5.3E-05 μSv/Bq
= 0.322 μSv/a

P_{49}: Child dose due to consumption of produce (HTO)

P_{49HTO} = [[$H_{prod,market}$] + [$H_{prod,res}$]] x 2.5E-05 μSv/Bq
= [[H-3_{veg}] (Bq/kg) x (kg) x 0.7] + [H-3_{veg}] (Bq/kg) x (kg) x 0.3]] x 2.5E-5 μSv/Bq
= [[2.0 Bq/kg x 265.2 kg/a x 0.7] + [157.7 Bq/kg x 265.2 kg/a x 0.3]] x 2.5E-05 μSv/Bq
= 0.323 μSv/a

In 2024, SRBT directly monitored OBT concentrations in tomatoes and cucumbers in residential gardens, as well as from rhubarb from the commercial market source.

The OBT concentration from the residential produce was measured as 5.0 Bq/kg, while for the commercial produce a value of 0.8 Bq/kg was measured.

P_{49}: Adult dose due to consumption of produce (OBT)

P_{49OBT} = [[$H_{prod,market}$] + [$H_{prod,res}$]] x 4.6E-05 μSv/Bq
= [[H-3_{veg}] (Bq/kg) x (kg) x 0.7] + [H-3_{veg}] (Bq/kg) x (kg) x 0.3]] x 4.6E-5 μSv/Bq
= [[0.8 Bq/kg x 413.3 kg/a x 0.7] + [5.0 Bq/kg x 413.3 kg/a x 0.3]] x 4.6E-05 μSv/Bq
= 0.039 μSv/a

P_{49}: Infant dose due to consumption of produce (OBT)

P_{49OBT} = [[$H_{prod,market}$] + [$H_{prod,res}$]] x 1.3E-4 μSv/Bq
= [[H-3_{veg}] (Bq/kg) x (kg) x 0.7] + [H-3_{veg}] (Bq/kg) x (kg) x 0.3]] x 1.3E-4 μSv/Bq
= [[0.8 Bq/kg x 124.8 kg/a x 0.7] + [5.0 Bq/kg x 124.8 kg/a x 0.3]] x 1.3E-4 μSv/Bq
= 0.033 μSv/a

P_{49}: Child dose due to consumption of produce (OBT)

P_{49OBT} = [[$H_{prod,market}$] + [$H_{prod,res}$]] x 6.3E-5 μSv/Bq
= [[H-3_{veg}] (Bq/kg) x (kg) x 0.7] + [H-3_{veg}] (Bq/kg) x (kg) x 0.3]] x 6.3E-5 μSv/Bq
= [[0.8 Bq/kg x 265.2 kg/a x 0.7] + [5.0 Bq/kg x 265.2 kg/a x 0.3]] x 6.3E-5 μSv/Bq
= 0.034 μSv/a

Total dose due to consumption of produce:

P_{49}: Adult dose due to consumption of produce (HTO + OBT)

P_{49} = P_{49HTO} + P_{49OBT}
= 0.403 μSv/a + 0.039 μSv/a
= 0.442 μSv/a

P_{49}: Infant dose due to consumption of produce (HTO + OBT)

P_{49} = P_{49HTO} + P_{49OBT}
= 0.322 μSv/a + 0.033 μSv/a
= 0.355 μSv/a

P_{49}: Child dose due to consumption of produce (HTO + OBT)

P_{49} = P_{49HTO} + P_{49OBT}
= 0.323 μSv/a + 0.034 μSv/a
= 0.357 μSv/a

Dose due to consumption of local milk

The tritium uptake due to consumption of milk, from a local producer and distributor is calculated by taking the average tritium concentration of the milk sampled. Using the following annual milk consumption rates derived using information found in CSA Guideline N288.1-14[26]:

TABLE 31: CSA GUIDELINE N288.1-14 MILK CONSUMPTION RATES

AGE GROUP	MILK CONSUMPTION RATE (kg/a)
INFANT	340.0
CHILD	319.6
ADULT	188.5

The average concentration in milk in 2024 was measured as 4.00 Bq/L; adjusting for the density of milk, a specific activity of 4.00 Bq/L x 0.97 L/kg = **3.880 Bq/kg** is calculated.

P_{59}: Adult dose due to consumption of milk

P_{59} = $[H\text{-}3]_{dairy}$ x M x 2.0E-05 µSv/Bq;
= [3.880 Bq/kg] x 188.5 kg/a x 2.0E-05 µSv/Bq
= 0.015 µSv/a

P_{59}: Infant dose due to consumption of milk

P_{59} = $[H\text{-}3]_{dairy}$ x M x 5.3E-05 µSv/Bq;
= [3.880 Bq/kg] x 340.0 kg/a x 5.3E-05 µSv/Bq
= 0.070 µSv/a

P_{59}: Child dose due to consumption of milk

P_{59} = $[H\text{-}3]_{dairy}$ x M x 5.3E-05 µSv/Bq;
= [3.880 Bq/kg] x 319.6 kg/a x 2.5E-05 µSv/Bq
= 0.031 µSv/a

Representative persons annual dose due to tritium uptake based on EMP

Based on the EMP results and the coefficients and parameters taken or derived from N288.1-14[23-26], the annual dose (P_{total}) due to tritium uptake from inhalation and skin absorption, consumption of local produce, local milk and well water equates to a conservatively-calculated maximum of **2.630 μSv** in 2024. For comparison, in 2023, this dose was calculated to be 2.251 μSv.

TABLE 32: 2024 REPRESENTATIVE PERSONS ANNUAL DOSE BASED ON EMP

DOSE CONTRIBUTOR		ADULT WORKER ANNUAL DOSE (μSv/A)	ADULT RESIDENT ANNUAL DOSE (μSv/A)	INFANT RESIDENT ANNUAL DOSE (μSv/A)	CHILD RESIDENT ANNUAL DOSE (μSv/A)
DOSE DUE TO INHALATION and ABSORPTION AT WORK	$P_{(I)19}$	0.500			
DOSE DUE TO INHALATION and ABSORPTION AT RESIDENCE	$P_{(I)19}$	0.959	1.257	1.094	1.489
DOSE DUE TO CONSUMPTION OF WELL WATER	P_{29}	0.714	0.714	0.535	0.398
DOSE DUE TO CONSUMPTION OF PRODUCE	P_{49}	0.442	0.442	0.355	0.357
DOSE DUE TO CONSUMPTION OF MILK	P_{59}	0.015	0.015	0.070	0.031
2024 PUBLIC DOSE	P_{TOTAL}	**2.630**	2.428	2.054	2.275

Statement of Uncertainties in Calculation of Public Dose:

All parameters taken from N288.1-14 are at the 95th percentile where available, which is a very conservative assumption. Actual ingestion and inhalation rates are likely to be lower for most of the population. Actual doses to persons are likely to be significantly lower than calculated doses presented here as a result.

Statement of Compliance with Regulatory Limit:

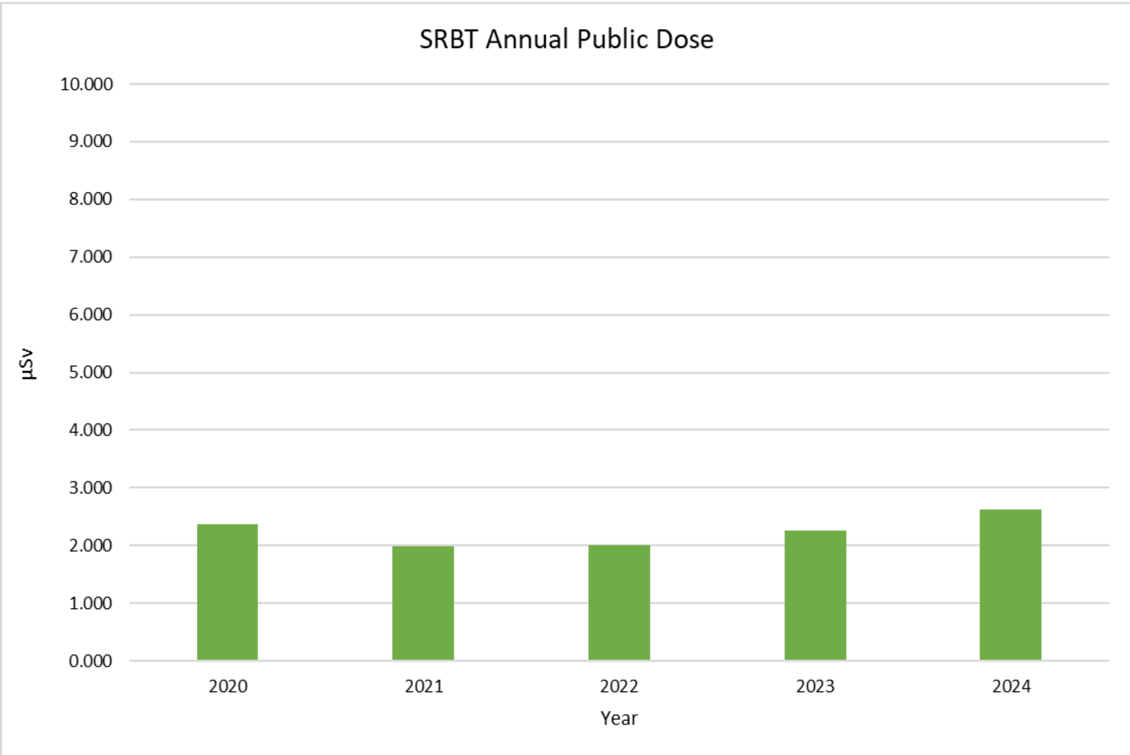
Based upon the analysis of the data from both the environmental and effluent monitoring programs, the maximum effective dose imparted in 2024 by SRBT, to persons who are not categorized as Nuclear Energy Workers (conservatively calculated as 0.003 mSv), falls well below the prescribed limit of 1 mSv. SRBT complies with this regulatory requirement.

Public Dose Trends

The calculated effective dose of **2.630 μSv** to the most-exposed representative person is comparable with the calculated effective doses over the past five years.

The five-year trend for the effective dose to members of the public is illustrated below in Figure 18, with the data compared on an axis with a maximum value of 10 μSv (i.e. 1% of the regulatory limit) to facilitate trending.

FIGURE 18: PUBLIC DOSE FIVE-YEAR TREND (2020-2024)



4.3.6 Program Effectiveness

The suite of SRBT environmental protection programs have continued to be effective in measuring tritium in the environment and at ensuring the prevention of unreasonable risk to the environment.

The Environmental Monitoring Program continues to be effectively implemented and improved over time.

Our passive air sampling array is effective and provides a picture of the full extent of tritium concentrations in air resulting from the emissions from the facility, and in turn providing real data to accurately estimate the dose to representative persons resulting from the emissions from the facility.

Tritium concentrations in residential wells, and in milk and produce that are consumed by residents living near the facility are measured. This data is effective at providing the full extent of tritium concentrations in human food and potable water sources resulting from the emissions from the facility, and in turn providing data to reliably estimate the dose to representative persons resulting from the emissions from the facility.

The Effluent Monitoring Program continues to be implemented very effectively, achieving the defined objectives of the program, including confirming the adequacy of controls on releases from the source, providing high-quality data, and demonstrating adherence to licence limits.

The Groundwater Monitoring Program was highly effective at providing data on the full extent of tritium concentrations in groundwater resulting from the emissions from the facility, and demonstrating the effectiveness of operational changes that have taken place over the last several years.

4.3.7 Program Review and Audit Summary

All major elements of the Environmental Management System (EMS) are scheduled to be audited at least once every three years.

As part of this cycle, the Effluent Monitoring Program was internally audited in December. Two non-conformances and one opportunity for improvement were identified, all of which related to minor errors in record-keeping that were rectified.

All programs under the EMS were subject to a full review, including comprehensive self-assessment and benchmarking, in the first quarter of 2024. The results of these review exercises were included as input into the annual facility management review process, as per SRBT procedure MSP-008, *Management Review*.

4.3.8 Proposed Modifications to EMS Programs

There are no proposed significant major changes to the monitoring programs that comprise SRBT's EMS, including the EMP, EffMP and GMP.

4.4 SCA – Emergency Management and Fire Protection

As most potential hazards associated with the facility would result from fire, emergency management and response for the facility are addressed by an extensive Fire Protection Program supported by an Emergency Plan.

4.4.1 Fire Protection

Various measures were taken at the facility in 2024 to improve and maintain fire safety. These activities included but were not limited to the following:

- A qualified third-party contractor completed a Site Condition Inspection at the facility, and issued a detailed report.
- Fire safety training for all SRBT employees was conducted in December during the annual all-staff safety training sessions.
- The PFD completed an inspection of the SRBT facility,
- A qualified third-party performed an audit of the SRBT Fire Protection Program, and
- Continued enhanced training for one Fire Protection committee member.

4.4.1.1 Fire Protection Committee

In 2024, two formal Fire Protection Committee meetings were held which resulted in the implementation of several improvements for fire protection and life safety at the facility. All Fire Protection Committee meeting minutes are kept on file.

4.4.1.2 Fire Protection Program, Fire Safety Plan and Procedures

In 2024, SRBT committed to updated their Fire Protection Program and Fire Safety Plan to ensure conformance with the National Fire Code of Canada, the National Building Code of Canada and CSA standard N393-22.

Gap analyses for these codes and standards against their prior editions were completed, and a new revision of the Fire Protection Program and Fire Safety Plan will be implemented in early 2025 as a result.

4.4.1.3 Fire Hazards Assessment

SRBT maintains a Fire Hazards Assessment (FHA), in accordance with CSA standard N393-13, *Fire protection for facilities that process, handle, or store nuclear substances*.

The FHA was last completed in 2020, where it was assessed that fire hazards at the SRBT facility are being controlled, that worst-case fire events would not be expected to result in an unacceptable release of radiological or hazardous materials, and that there are adequate fire protection and life-safety features. The FHA concluded that the performance goals, objectives and criteria of CSA N393-13 have been satisfied at the SRBT facility.

The FHA is reviewed and revised on a five-year cycle; it is next due for review in 2025.

4.4.1.4 Independent Audit of the Fire Protection Program

An independent audit of the Fire Protection Program was conducted in 2024, in accordance with the requirements of CSA standard N393-13 (R2018). The audit consisted of a third-party inspection of the facility, as well as, review of SRBT documentation and procedures.

The audit report provided (PLC-SRBT-P1894-005-AUD-0) revealed five opportunities for improvement which were considered minor in nature. The findings mentioned in the report were addressed in a timely manner.

This audit is next due to be completed in 2027.

4.4.1.5 Maintenance of the Sprinkler System

In 2024, quarterly and annual maintenance was performed on the sprinkler system by a third party. In addition, a weekly check of various valves and line pressures were performed by trained SRBT staff.

4.4.1.6 Fire Protection Equipment Inspections

In 2024, in-house routine inspection, testing and maintenance was performed on all fire protection and life safety equipment at the SRBT facility on a daily, weekly, monthly and annual basis by trained staff.

Qualified third-party contractors also performed routine inspection, testing and maintenance of fire protection and life safety equipment at the SRBT facility. Annual inspection, testing and maintenance include fire extinguishers, emergency lighting, the fire panel and sprinkler system.

4.4.1.7 Fire Extinguisher Training

Fire extinguisher training is typically conducted annually for all SRBT employees. The PFD provided this training in December 2024.

4.4.1.8 Fire Protection Committee Member Training

The Fire Protection Specialist continues to serve as a volunteer firefighter for a local fire department, and receives fire protection training from this department. This individual has achieved Firefighter 1 certification.

4.4.1.9 Fire Alarm Drills

A total of six in-house fire alarm drills were conducted in 2024, including a drill that tested fire response and mutual aid activation on November 19, 2024.

Following each fire drill, a member of the Fire Protection Committee visits each department to discuss the drill. If any employee has comments or concerns regarding the drill they are provided with a Fire Alarm Drill Report to complete. Each report was reviewed by the Fire Protection Committee, and actions were taken as required to enhance fire and life safety at the facility.

4.4.1.10 Fire Protection Consultant Inspection

In October, a qualified third party (PLC Fire Safety Solutions) was contracted to complete a Site Condition Inspection, in order to meet the requirements of CSA standard N393, *Fire protection for facilities that process, handle, or store nuclear substances*.

The scope of the inspection was to evaluate the SRBT facility for compliance with the applicable inspection, testing and maintenance requirements of our operating licence. The following codes and standards were reviewed for applicability to the specific systems at SRBT:

- NFCC-2015, *National Fire Code of Canada*
- NBCC-2015, *National Building Code of Canada*
- CSA standard N393, *Fire protection for facilities that process, handle, or store nuclear substances*

Following the inspection, PLC prepared and issued a Site Condition Inspection Report, where five findings were identified. The findings have been addressed.

4.4.1.11 Pembroke Fire Department Inspection

The PFD conducted a facility inspection to confirm compliance with the Ontario Fire Code in September, with one violation being identified and addressed in a timely manner.

4.4.2 Emergency Preparedness

SRBT ensures that we are prepared for an emergency at our facility. Staff, equipment and infrastructure are in place and ready to respond to an emergency in accordance with documented procedures.

4.4.2.1 Emergency Plan

The SRBT Emergency Plan has been developed based on the probability and potential severity of emergency scenarios associated with the operation of the facility.

The plan includes preparing for, responding to, and recovering from the effects of accidental radiological and/or hazardous substance releases from the SRBT facility.

The plan was last revised in 2017, and remains up-to-date for the facility's current state. A revision to the plan is scheduled to be completed in 2025.

4.4.2.2 Emergency Exercises

SRBT did not conduct an emergency exercise in 2024. A full-scale emergency exercise was last conducted on October 26, 2021.

Section 7.10.1.1 of the SRBT Emergency Plan requires that an emergency exercise be conducted at least once every five years. The next full-scale emergency exercise at SRBT is expected to be conducted on or before October 26, 2026, pursuant to the requirements of the Emergency Plan and our operating licence.

4.5 SCA – Waste Management

SRBT implements a Waste Management Program (WMP) that is aligned with the applicable requirements and guidelines in the following CSA Standards:

- CNSC REGDOC-2.11.1, *Waste Management, Volume I: Management of Radioactive Waste*
- CSA N292.0:19, *General principles for the management of radioactive waste and irradiated fuel*
- CSA N292.3-14, *Management of low- and intermediate-level radioactive waste*
- CSA N292.5-11 (R2016), *Guideline for the exemption or clearance from regulatory control of materials that contain, or potentially contain, nuclear substances*
- CSA N292.8:21, *Characterization of radioactive waste and irradiated fuel*

4.5.1 Radioactive Consignments – Waste

Eleven shipments of low-level waste (LLW) were made to Canadian Nuclear Laboratories (CNL) in 2024.

A total of 135 packages of expired gaseous tritium light sources, 6 drums of surface-contaminated materials, and 26 packages of crushed stub glass were generated and safely transferred to CNL for further management in 2024.

Four drums of waste liquid scintillation counting vials were also generated and transferred in two shipments to EnergySolutions for further management in 2024.

A total volume of 5.15 m^3 of LLW in 171 packages was generated and shipped to waste management service providers in 2024.

Table 33 is provided below as a summary of the low-level waste material that was generated and routed to licenced waste management facilities for further management in 2024.

TABLE 33: RADIOACTIVE WASTE CONSIGNMENTS (2024)

	Date of Shipment	Waste Description	Number of Packages	Waste Description	Total Weight (Kgs)	Total Activity H-3 (TBq)
CNL	Jan. 22, 2024	LLW	11	Expired light sources	44	110.990
			2	Crushed stub glass	42	0.018
			1	Drums of LLW	70	0.010
	Feb. 16, 2024	LLW	12	Expired light sources	48	151.210
			2	Crushed stub glass	42	0.018
			0	Drums of LLW	0	0.000
	Mar. 18, 2024	LLW	13	Expired light sources	52	145.900
			3	Crushed stub glass	63	0.027
			0	Drums of LLW	0	0.000
	Apr. 22, 2024	LLW	12	Expired light sources	48	118.990
			3	Crushed stub glass	63	0.027
			1	Drums of LLW	70	0.010
	May 17, 2024	LLW	10	Expired light sources	40	128.470
			2	Crushed stub glass	42	0.018
			0	Drums of LLW	0	0.000
	Jun. 17, 2024	LLW	13	Expired light sources	52	158.150
			2	Crushed stub glass	42	0.018
			1	Drums of LLW	70	0.010
	Jul. 22, 2024	LLW	18	Expired light sources	72	240.840
			2	Crushed stub glass	42	0.018
			0	Drums of LLW	0	0.000
	Aug. 19, 2024	LLW	8	Expired light sources	32	85.580
			3	Crushed stub glass	63	0.027
			1	Drums of LLW	70	0.010
	Sep. 23, 2024	LLW	14	Expired light sources	56	184.380
			2	Crushed stub glass	42	0.018
			0	Drums of LLW	0	0.000
	Oct.21, 2024	LLW	12	Expired light sources	48	140.790
			2	Crushed stub glass	42	0.018
			1	Drums of LLW	70	0.010
	Nov. 18, 2024	LLW	12	Expired light sources	48	159.010
			3	Crushed stub glass	63	0.027
			1	Drums of LLW	70	0.010
ENERGY SOLNS	Apr. 29, 2024	LLW	2	Drums of LLW	209	0.010
	Oct. 9, 2024	LLW	2	Drums of LLW	209	0.010
				TOTALS	**1924**	**1624.624**

4.5.2 Management of Radioactive Waste

Radioactive waste was generated and managed on-site, and inventory records of the waste were maintained throughout the year, as per the WMP.

4.5.2.1 Low-level Waste Interim Storage

Low-level waste is any waste assessed as possessing activity levels that exceeds conditional clearance limits (for tritium), or in excess of the exemption quantities established in the *Nuclear Substances and Radiation Devices Regulations* (for all other radionuclides). Typical examples of such wastes are tritium-contaminated equipment or components, crushed glass, contaminated filters, broken lights, and material used to decontaminate surfaces.

As required by the WMP, LLW was collected in dedicated receptacles, assessed and ultimately placed into approved containers in the Waste Storage Room within Zone 3. Once sufficient material was collected, it was prepared for transfer to a licensed waste handling facility (CNL), using approved processes.

TABLE 34: INTERIM STORAGE OF LOW-LEVEL WASTE

AMOUNT IN STORAGE AT YEAR END 2023	AMOUNT GENERATED THROUGHOUT 2024	TRANSFERRED OFF SITE 2024	AMOUNT IN STORAGE AT YEAR END 2024
1 x 200 L drum	6 x 200 L drums	6 x 200 L drums	1 x 200 L drum
0.01 TBq	0.06 TBq	0.06 TBq	0.01 TBq

As well, six drums of liquid scintillation counting vials were managed and stored in 2024, four of which were transferred to EnergySolutions for further management. One drum remained in interim storage for disposal once filled in early 2025.

4.5.2.2 Clearance-level Waste

Waste materials in Zone 2 and 3 that may be minimally contaminated and are likely to meet accepted clearance criteria are classified as very low-level waste (VLLW). This classification is temporary, as ultimately VLLW is assessed radiologically, and routed through one of three accepted disposal pathways – either as LLW or as clearance-level waste (CLW).

Examples of such materials include paper towels, gloves, disposable lab coats, shoe covers, and other such materials that are collected in dedicated receptacles in the active areas of the facility. These materials are routed to landfill after they have been conditionally cleared.

As well, any metal that can be recycled once conditionally cleared is routed to a local metal recycling depot.

Finally, any cleared items that also have hazardous characteristics are routed via a local hazardous waste depot under an industrial, commercial and institutional small quantity waste generator agreement. Some examples of such materials are batteries, aerosol containers, fluorescent light tubes, paints and solvents, and empty propane cylinders

A total of 81 clearance assessment reports were completed in 2024, representing a total mass of approximately 2,039,470 grams of material, and a total activity of approximately 21,360 MBq.

The approved WMP clearance criteria is set at 0.15 MBq/g, up to a maximum of 5,000,000 g of cleared material per pathway.

All cleared waste met these conditions in 2024, with an average specific activity of 0.01 MBq/gram (average of 7% of CLW specific activity limit).

The mass and activity of CLW assessed in 2024 is tabulated below:

TABLE 35: CLEARANCE-LEVEL WASTE (2024)

TYPE OF MATERIAL	PATHWAY	MASS (g)	ACTIVITY (MBq)	MBq/g
GENERAL WASTE	LANDFILL	1,777,760	21,230	0.012
METAL	RECYCLER	224,080	130	0.001
HAZARDOUS WASTE	HAZARDOUS WASTE DEPOT	37,630	0	0.000
	TOTAL	**2,039,470**	**21,360**	**0.010**

4.5.2.3 Subject Waste

SRBT routinely manages and ships two types of non-radiological ‘subject’ waste at the facility.

Phosphorescent (zinc sulfide) powder (classified as mild environmental contaminant) is collected and shipped to a licenced hazardous waste management contractor. In addition, waste liquids from the 3-D printing process are also collected and shipped when they are generated.

This waste is picked up quarterly, and managed by a qualified service provider in accordance with the requirements of the Ontario Ministry of Environment and Climate Change.

In 2024, 394 kg of zinc sulfide powder, and 61 kg of 3-D printing waste was safely disposed of through this program.

4.5.2.4 Waste Minimization

SRBT continues to minimize the generation of radioactive waste materials as part of our overall approach to waste management.

The Waste Management Committee met twice in 2024 to review and discuss initiatives that could ultimately minimize the amount of radioactive waste routed to licenced waste management facilities. As well, initiatives for the reduction of conventional waste materials and energy usage were also discussed.

Continued segregation of material prior to bringing items into active zones remains effective at reducing waste materials that require management.

The implementation of Conditional Clearance Levels for waste materials has continued to be successful in reducing the amount of waste material that is needlessly disposed of as radioactive waste.

4.5.2.5 Expired Product Management

SRBT continues to offer return and disposal services to customers who possess expired tritium-illuminated devices, such as ‘EXIT’ signs.

In 2024, a total of 12,111 expired (or otherwise removed from service) self-luminous safety ‘EXIT’ type signs were accepted by SRBT from Canadian and American sources, representing a total activity of 1,718.33 TBq of tritium.

For comparison, in 2023, 11,027 signs were processed representing 1,642.40 TBq of tritium.

As well, an additional 194.63 TBq of tritium was accepted from international origins (i.e. other than Canada and the United States) in the form of expired tritium illuminated devices, such as aircraft signs, dials, gauges and other smaller equipment. These were also processed for shipment to a licenced waste management facility.

Expired signs are disassembled safely and the light sources removed, in order to ensure that the volume of low-level radioactive waste that is generated is minimized.

The expired lights are then packaged and shipped to a licenced radioactive waste management service provider.

A small number of these signs were evaluated as being fit for service in other applications, or having light sources that could be reused in other self-luminous devices.

This practice is the only re-use of the lights and the tritium associated with these lights, and would represent a very small fraction of the total light sources managed.

4.6 SCA – Security

SRBT implements an accepted Facility Security Program for the facility, in accordance with CNSC regulatory requirements and expectations.

SRBT did not experience any security-related events in 2024.

New staff members are required to qualify for a Facility Access Security Clearance (FASC), even if they are not expected to handle nuclear substances as part of their responsibilities.

Individuals and contractors that visit the facility are required to also have an FASC or be escorted at all times by a staff member with a valid FASC.

All staff receive both initial and annual refresher training in SRBT’s Supervisory Awareness Program, for the purposes of ensuring compliance with section 48 of the *Nuclear Security Regulations.*

Maintenance of the physical facility security system is performed by a qualified, independent third party at least every 6 months.

4.7 SCA – Safeguards and Non-proliferation

SRBT possesses, uses, stores and manages a small quantity of depleted uranium under International Atomic Energy Agency (IAEA) exemption approval certificate EU\01\CN-2\D\ZZ00211.

This material is used as storage media for tritium gas on our processing equipment, a well-understood and widely-used strategy for manipulating and storing tritium in its gaseous, elemental state.

By using depleted uranium in this fashion, we can ensure that the quantity of gaseous tritium being used during any given processing operation is restricted. This helps to ensure that the consequences of any unplanned event are minimized with respect to radiation and environmental protection, by ensuring that any release of tritium is limited.

A limit of 10 kg of this material in inventory is applied as part of the operating limits and conditions in the SAR.

SRBT possessed a reported 8.743 kg of depleted uranium in metallic form at the beginning of 2024. A physical inventory in July 2024 confirmed that this inventory of material did not change nor require adjustment. The mass of depleted uranium on site remains as 8.743 kg.

4.8 SCA – Packaging and Transport of Nuclear Substances

SRBT prepared, packaged and shipped all manufactured products containing nuclear substances in accordance with the *Packaging and Transport of Nuclear Substances Regulations.*

For the purpose of packaging and offering for transport, shipments of product designated as dangerous goods, SRBT must comply with the requirements of:

- CNSC
- International Atomic Energy Agency (IAEA)
- International Air Transport Association (IATA)
- Transport Canada

The procedures used at SRBT are based on regulations and practices found in the following publications:

- Packaging and Transport of Nuclear Substances Regulations
- IAEA Safety Standards Series - No. SSR-6
- IATA Dangerous Goods Regulations
- The TDG Compliance Manual: Clear Language Edition (Carswell)

Staff members involved with the packaging, offering for transport and receipt of dangerous goods are given TDG training in accordance with the applicable regulations and are issued certificates by the employer.

4.8.1 Outgoing Shipments

In total, 670 consignments were safely shipped to various customers located in 19 countries around the world, including Canada.

Table 36 compares the number of outgoing shipments of our products over the past five years.

TABLE 36: OUTGOING SHIPMENTS OF PRODUCT: FIVE-YEAR TREND

YEAR	2020	2021	2022	2023	2024
NUMBER OF SHIPMENTS*	827	811	761	739	670
NUMBER OF COUNTRIES	19	28	21	15	19

*Note – SRBT often ships single palletized shipments of safety signs to the US which subsequently get broken down into multiple sub-consignments. These types of shipments are counted as a single consignment for the purposes of this table.

All outgoing shipments were conducted in compliance with all regulatory requirements pertaining to the transport of dangerous goods and / or nuclear substances. Packages were assessed for surface contamination prior to being offered for transport as required by SRBT procedures.

Information pertaining to the number of monthly outgoing shipments containing radioactive material for 2024 can be found in **Appendix S** of this report.

4.8.2 Incoming Shipments

In total, 212 consignments of radioactive shipments were received from various customers located in 8 countries around the world, including Canada. These returns held a total activity of 1,913 TBq of tritium.

The vast majority of the returned, expired devices were in the form of expired ‘EXIT’ signs that are to have the expired lights removed and sent for future management at a licenced waste management facility.

Table 37 compares the number of incoming shipments of radioactive products that have been made over the past five years.

TABLE 37: INCOMING SHIPMENTS OF PRODUCT: FIVE-YEAR TREND

YEAR	2020	2021	2022	2023	2024
NUMBER OF SHIPMENTS	272	165	161	187	212
NUMBER OF COUNTRIES	8	10	9	12	8

All incoming shipments were received safely and in acceptable condition. Incoming packages containing nuclear substances are assessed for tritium leakage upon receipt.

Information pertaining to the number of monthly received shipments containing radioactive material for 2024 can be found in **Appendix T** of this report.

4.8.3 Reportable Events

No packaging and transport-related reportable events or dangerous occurrences occurred in 2024.

5. Other Matters of Regulatory Interest

5.1 Public Information and Disclosure

This section of the report will provide public information initiatives taken in 2024.

5.1.1 Direct Interaction with the Public

Historically, almost all public inquiries occur during re-licensing. In 2024, there were no public local or non-local inquiries received.

In 2024, water was sampled from a number of wells belonging to the public, in line with our Environmental Monitoring Program. Sampling for tritium concentrations were performed twice in 2024, in March and September.

Participating members of the public are provided with a report of their sample results, along with the anticipated radioactive exposure due to tritium from consuming either the water or produce. We provide members of the public a comparison of this exposure against the CNSC limit and against radioactive exposure from other known sources, such as cosmic radiation, x-rays, etc. No questions or comments were received in 2024.

Plant tours have proven to be a useful tool for SRBT to reach the public. In 2024, we provided plant tours to 20 members of the general public (compared to 19 in 2023, and 7 in 2022) who had expressed interest in our facility.

In 2024 we provided plant tours to local representatives of:

- Algonquins of Pikwakanagan First Nation,
- Canadian Nuclear Laboratories, and
- Pembroke Fire Department.

In 2024 as part of conducting our business in Pembroke we have also provided plant tours to local employee representatives of our existing and prospective suppliers of goods and/or services, including:

- Baker Tilly
- Diamond Coating,
- TD Bank, and
- Professional Loss Control (PLC)

TABLE 38: FACILITY TOURS (2024)

	2024
GENERAL PUBLIC	20
LOCAL INSTITUTIONS	3
LOCAL SUPPLIERS	4
TOTAL	**27**

A public meeting has been scheduled by the CNSC on February 26, 2025 regarding the 2023 annual regulatory oversight report.

In 2024, SRBT made presentations to members of the public:

- The President of SRBT is a member and chair of the Community Improvement Plan, attending meetings and discussing SRBT on occasion. The Mayor of Pembroke is also on the Committee.
- The President of SRBT is also a member and chair of the Ontario River Energy Solutions, attending meetings and discussing SRBT on occasion. Pembroke's Deputy Mayor is also a member of this committee.
- The President of SRBT is a member and vice chair of the Ottawa River Power Corporation, attending meetings and discussing SRBT on occasion. Two Pembroke City Councillors are also members of this committee.

5.1.2 Program Revision

Revision A, dated September 15, 2021 of SRBT's Public Information Program (PIP) continues to demonstrate SRBT's commitment to openness and transparency.

5.1.3 Program Audit

There were no internal audits conducted on the Public Information Program in 2024. The next internal audit is scheduled to take place in August 2025.

5.1.4 Public Information Committee

The Public Information Committee held two formal meetings in 2024, focused on the 2024 Special Annual Sampling Campaign with the Algonquins of Pikwakanagan First Nation community, and on the CNSC Preliminary Inspection Facts and Findings Report which noted only one Public Information Committee meeting took place in 2023.

5.1.5 Website and Social Media

SRBT continues to operate a website at www.srbt.com, which continues to provide current environmental monitoring data, information about tritium, content on emergency preparedness, the safe transport of tritium to the facility and products from the facility, how to safely dispose of products, and both our Operating Licence and LCH.

The main page provides a number of possible information sources for the public on tritium and radiation exposure.

The following information and documentation were added to our website in 2024:

- CNSC Compliance Inspection Report 2024-01,
- Updated pamphlet and brochures,
- SRBT Annual Compliance Report, 2023
- Updated environmental and groundwater monitoring results,
- CNSC staff's Regulatory Oversight Report, 2023, and
- Action Level Exceedance – Initial and Final Reports

With respect to social media, SRBT also maintains Facebook, Instagram, Twitter, LinkedIn, Reddit and TikTok accounts, all of which are updated periodically.

Our Facebook account has a total of 1,124 followers, with a total of 15 posts in 2024 for a total of 238 likes. The account has received no reviews and 0 page likes in 2024.

SRBT's Instagram account has a total of 370 followers, with a total of 8 posts in 2024. The account received an average of 18 likes per post in 2024.

SRBT's X (Twitter) account has a total of 90 followers. A total of 7 posts has been made in 2024, receiving 7 likes and 202 views.

SRBT's LinkedIn account has a total of 79 followers and has posted a total of 7 posts in 2024 receiving a total of 494 impressions.

SRBT's Reddit account has two followers and has 6 posts with 3,441 views in 2024.

SRBT's TikTok account has 38 followers and has 6 posts in 2024 with a total of 87 likes.

5.1.6 Community Support

SRBT continues to support the local community by providing support to various organizations and causes.

During the Christmas season, SRBT once again supported the Christmas Angels gift collection for children in the area, aimed at supporting families who couldn't afford gifts at Christmas.

SRBT is a member of the Upper Ottawa Valley Chamber of Commerce and the Canadian Nuclear Association. The Assistant Manager – Health Physics is a member of the Advisory Committee for the Applied Nuclear Science and Radiation Safety program at Algonquin College.

SRBT also sponsors a local softball team, a local baseball team, a local hockey team and a local youth basketball team. SRBT was a gold sponsor for a local memorial softball tournament.

SRBT supports the Pembroke Fire Department Chili Fest which raises money to support local charities, two local fishing derbies and the Alice and Fraser Horse Association.

SRBT also supports Festival Hall (Pembroke's local community theater), the Renfrew County Regional Science and Technology Fair, and The Robbie Dean Family Counselling Center.

SRBT supports the St. Joseph's food bank, a local ball hockey league and the Pembroke Horticultural Society.

SRBT is a member of the Canadian Council for Indigenous Business.

5.1.7 Indigenous Engagement

In 2024, SRBT had several engagement opportunities with the AOPFN community. Specifically:

- A virtual meeting between SRBT and AOPFN took place on June 19, 2024, which discussed the preliminary sample planning for the 2024 Special Annual Sampling Campaign.

- AOPFN also requested a compilation of AOPFN-related environmental sampling results for the past three years (2020-2023). This was provided to AOPFN by e-mail on June 26, 2024.
- A CNSC and AOPFN site walkdown and meeting for the CNSC's Independent Environmental Monitoring Program (IEMP) took place at SRBT on July 18, 2024. SRBT hosted both the CNSC and AOPFN in preparation for the 2024 IEMP, as well as providing a facility tour and use of the conference room for the quarterly meeting between CNSC and AOPFN. This engagement event included nine members of the AOPFN.
- Cultural Awareness Training for SRBT's new employees (5) took place on August 15, 2024. All current SRBT employees have now received this training.
- Throughout 2024, several communications took place between SRBT and AOPFN pertaining to the Special Annual Sampling Campaign:
    - On May 27, 2024 a quote was provided by AOPFN and accepted by SRBT on June 3, 2024.
    - As noted above, SRBT provided a compilation of AOPFN-related environmental sampling results for the past three years on June 26, 2024.
    - AOPFN reviewed the data and forwarded on August 12, 2024 a list of short-term and long-term engagement expectations related to the sampling.
    - On September 6, 2024 SRBT sent a proposal letter with a sampling plan which recognizes and addresses each of the recommended short-term actions.
    - Between September 20, 2024 and October 21, 2024 several correspondences took place in order to agree upon a sampling date.
    - The campaign sampling took place in the Pikwakanagan community on November 1, 2024.

5.1.8 Media Coverage

SRBT is not aware of any significant media coverage received in 2024.

5.1.9 Public Opinion Analysis

No public feedback was received in 2024 through polling, surveys, or by direct communication from individuals or groups.

5.2 Preliminary Decommissioning Plan and Financial Guarantee

The SRBT Preliminary Decommissioning Plan (PDP) last underwent a significant revision in 2019, and was accepted by CNSC staff on February 3, 2020[27], while the Commission accepted SRBT's revised Financial Guarantee (FG) amount of $727,327.00 on December 8, 2020[28].

The SRBT FG is a fully-funded cash fund held in escrow, and does not rely on any letters of credit, bonds, insurance or other expressed commitments.

Interest accrued on the funds deposited remain held in escrow over time; as a result, at the end of 2024 the FG is over-funded to $785,412.80, a level that exceeds the required amount by $58,085.80.

Details on our current PDP and FG, and the CNSC's hearing and decision on these aspects of our licensing basis are available on our website.

On November 29, 2024, the 2024 revision of the SRBT PDP was submitted to CNSC staff[15].

The PDP was revised to update all cost estimates, and to align with applicable requirements and guidance from CSA standard N294:19, *Decommissioning of Facilities Containing Nuclear Substances*, and CNSC Regulatory Document 2.11.2, *Decommissioning.*

At the conclusion of 2024, CNSC staff have yet to provide feedback or comment on the revised PDP. Upon acceptance of the PDP and its associated cost estimate, SRBT will work to ensure that the FG is updated as required, and seek Commission approval of the updated FG, in compliance with all regulatory requirements.

6. Improvement Plans and Forecast

6.1 Emission Reduction Initiatives

SRBT continues to explore ways toward reducing tritium emissions from the facility in all forms, as per our continuing commitment to environmental protection and the ‘as low as reasonably achievable’ philosophy. The Mitigation Committee is primarily focused on these goals.

During 2024, SRBT researched new vacuum pump technologies in partnership with our supplier, in order to determine if there may be improvement opportunities with other pump designs. Improved quality of vacuum on processing rigs is one of several factors that impact operating emissions from the facility.

Preliminary results suggest that there may be opportunities to procure alternative models of pumps which may result in process improvements over time. Additional work in this area continues into 2025.

In late 2024, operational resources were allocated to building new tritium traps, as many of the traps used throughout 2024 were approaching cycle limits. In general, newer tritium traps result in lower levels of emissions during processing; as such, gaseous tritium emissions associated with routine processing operations are expected to be marginally lower, in particular during the first half of 2025.

Continued, systematically developed training of employees who process tritium and handle light sources will continue to impact our gaseous and liquid emissions in a positive way. Improvements in the on-the-job training requirements for processing operations are expected to decrease the potential for, and significance of, human performance errors in these areas.

6.2 Safety Performance Targets for 2025

For the coming year, our safety committees, in consultation with SRBT Senior Management, have approved a set of performance targets which will be tracked and reported on as part of the 2025 ACR.

The following table documents the safety performance targets for SRBT in 2025:

TABLE 39: SAFETY AND PERFORMANCE TARGETS FOR 2025

PARAMETER	2025 TARGET
MAXIMUM WORKER DOSE	≤ 0.50 mSv
AVERAGE WORKER DOSE	≤ 0.050 mSv
COLLECTIVE WORKER DOSE	≤ 2.50 p-mSv
CALCULATED DOSE TO MEMBER OF THE PUBLIC	≤ 0.0040 mSv
TOTAL TRITIUM EMISSIONS TO ATMOSPHERE (PER WEEK AVERAGE)	≤ 600 GBq / week
RATIO – TRITIUM EMISSIONS VS. PROCESSED	≤ 0.11
TOTAL TRITIUM EMISSIONS – LIQUID EFFLUENT PATHWAY	≤ 5 GBq
ACTION LEVEL EXCEEDANCES – ENVIRONMENTAL	≤ 1
ACTION LEVEL EXCEEDANCES – RADIATION PROTECTION	≤ 1
CONTAMINATION CONTROL – FACILITY-WIDE PASS / FAIL RATE	≥ 95.5%
LOST TIME INJURIES	0
MINOR INJURIES REPORTABLE TO WSIB	≤ 5
MINOR INCIDENTS / FIRST AID INJURIES (NON-REPORTABLE)	≤ 15

6.3 Planned Modifications and Foreseen Changes

The upcoming year of operation is not expected to involve significant modifications to the facility or our licensed activities, and production levels are expected to remain stable.

SRBT will be continuing to pursue and explore opportunities to improve our operations and our safety performance, and remain committed to ensuring that our environmental impacts are as low as reasonably achievable.

7. Concluding Remarks

Throughout the year, the management and staff of SRBT complied with all regulatory requirements and the conditions of our operating licence.

Our management system remains effective at achieving our operational and safety-related goals, and ensuring effective control of our operations. We continue to adjust and improve our processes in support of the safe and effective operation of our facility, and we continue to use operating experience to continuously improve the system.

Our facility remains within its designed safety basis, and continues to be fit for service. Key structures, systems and components have continued to be maintained diligently and effectively throughout 2024 through the implementation of our Maintenance Program.

Exposures to ionizing radiation to both workers and members of the public continue to remain low, and are far less than the regulatory limits prescribed.

The local environment has remained protected, and the already low level of impact of our operations continues to be reduced over time, as we continue to implement best practices each and every day. Licence limits for our nuclear substance effluent streams continue to be respected with significant margin.

Our conventional health and safety program has continued to ensure our workers are safe, and the security of the facility and all nuclear substances was maintained at all times.

The facility remains well protected from fire hazards, and we have maintained an accepted plan should an emergency condition arise.

Our Public Information Program fully satisfies the requirements of the CNSC. We continue to look for new ways to reach out into our local community in a positive and constructive fashion, and to provide information and data that is of interest to stakeholders and Indigenous communities.

Our website continues to provide the public with a wealth of easy-to-access information on our operations and our safety programs, including a very wide variety of environmental data and safety analyses.

We continue to effectively manage all forms of waste generated by our operations, and continue to look to minimize the amount of waste that must be managed and controlled.

Our decommissioning responsibilities are documented and accepted, and our financial guarantee is fully funded. Although we plan on operating the facility for at least the next two decades, if not longer, having a complete, self-funded financial guarantee is an important consideration with respect to our regulatory standing, as well as our commitment of being a good community partner.

Safety and excellence in operations shall always remain as the number one overall priority in everything we do, and 2024 was a direct reflection of the success at achieving these goals.

We will always continue to improve our operations and minimize our impact on people and the environment as our company continues to sustainably grow over the coming years.

8. References

[1] Nuclear Substance Processing Facility Licence NSPFL-13.00/2034, valid from July 1, 2022 to June 30, 2034. Link

[2] Licence Conditions Handbook – SRB Technologies (Canada) Inc. Nuclear Substance Processing Facility Licence NSPFL-13.00/2034 (CNSC e-Doc 6668496 (Rev. 0)). Link

[3] CNSC REGDOC-3.1.2, Version 1.1, *Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills*. Link

[4] CNSC Compliance Inspection Report SRBT-2024-01, September 5, 2024. Link

[5] CNSC Compliance Inspection Report SRBT-2024-02, January 5, 2025. Link

[6] Letter from J. MacDonald (SRBT) to A. O'Connor (CNSC), *Action Level Exceedance,* dated November 29, 2024. Link

[7] Letter from J. MacDonald (SRBT) to A. O'Connor (CNSC), *Action Level Exceedance of November 28, 2024 – Final Written Report,* dated December 19, 2024. Link

[8] SRBT Safety Analysis Report – Revision 5. Link

[9] Letter from J. MacDonald (SRBT) to L. Posada (CNSC), *Response to Inspection Report SRBT-2024-01*, dated November 1, 2024.

[10] Letter from J. MacDonald (SRBT) to A. O'Connor (CNSC), *Response to Inspection Report SRBT-2024-02*, dated March 7, 2025.

[11] Letter from J. MacDonald (SRBT) to A. O'Connor (CNSC), *Revised Action Levels and Administrative Limits*, dated June 13, 2024.

[12] Letter from J. MacDonald (SRBT) to A. O'Connor (CNSC), *Revised Health and Safety Policy*, dated July 12, 2024.

[13] Letter from J. MacDonald (SRBT) to A. O'Connor (CNSC), *Revised Hazard Prevention Program*, dated September 25, 2024.

[14] Email from J. MacDonald (SRBT) to A. O'Connor (CNSC), *SRBT Submission of Revised Procedure (LCH Appendix B)*, dated October 2, 2024.

[15] Letter from J. MacDonald (SRBT) to A. O'Connor (CNSC), *Submission of SRBT Preliminary Decommissioning Plan - 2024*, dated November 29, 2024.

[16] CNSC REGDOC-2.7.2, Volume II, *Dosimetry, Volume II: Technical and Management System Requirements for Dosimetry Services.* Link

[17] CNSC Dosimetry Service Licence 11341-3-28.5 (expiry May 31, 2028).

[18] Letter from M. Tremblay (Health Canada) to J. MacDonald (SRBT), *Certificate of Achievement,* dated June 21, 2024.

[19] Email and attached report from J. MacDonald (SRBT) to cnsc.acr-rac.ccsn@canada.ca, *2024 Annual Compliance Report – 11341-3-28.5,* dated January 31, 2025.

[20] Letter from L. Posada (CNSC) to S. Levesque (SRBT), *CNSC Staff Follow-up Review of SRB Technologies (Canada) Inc.'s Environmental Risk Assessment,* dated April 22, 2021 (e-Doc 6539968).

[21] Letter from S. Levesque (SRBT) to L. Posada (CNSC), *SRBT Response to CNSC Staff Comments on ERA,* dated April 12, 2021.

[22] CSA standard N288.1-14, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*

[23] CSA standard N288.1-14, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*, Tables C.1, C.2.

[24] CSA standard N288.1-14, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*, Table 19.

[25] CSA standard N288.1-14, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*, Table 21.

[26] CSA standard N288.1-14, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*, Table G.9c.

[27] Letter from L. Posada (CNSC) to S. Levesque (SRBT), *CNSC Staff Review of SRB Technologies (Canada) Inc.'s Revised Preliminary Decommissioning Plan – 2019,* dated February 3, 2020 (CNSC e-Doc 6111181).

[28] CNSC Record of Decision DEC 20-H105. Link

9. Appendices

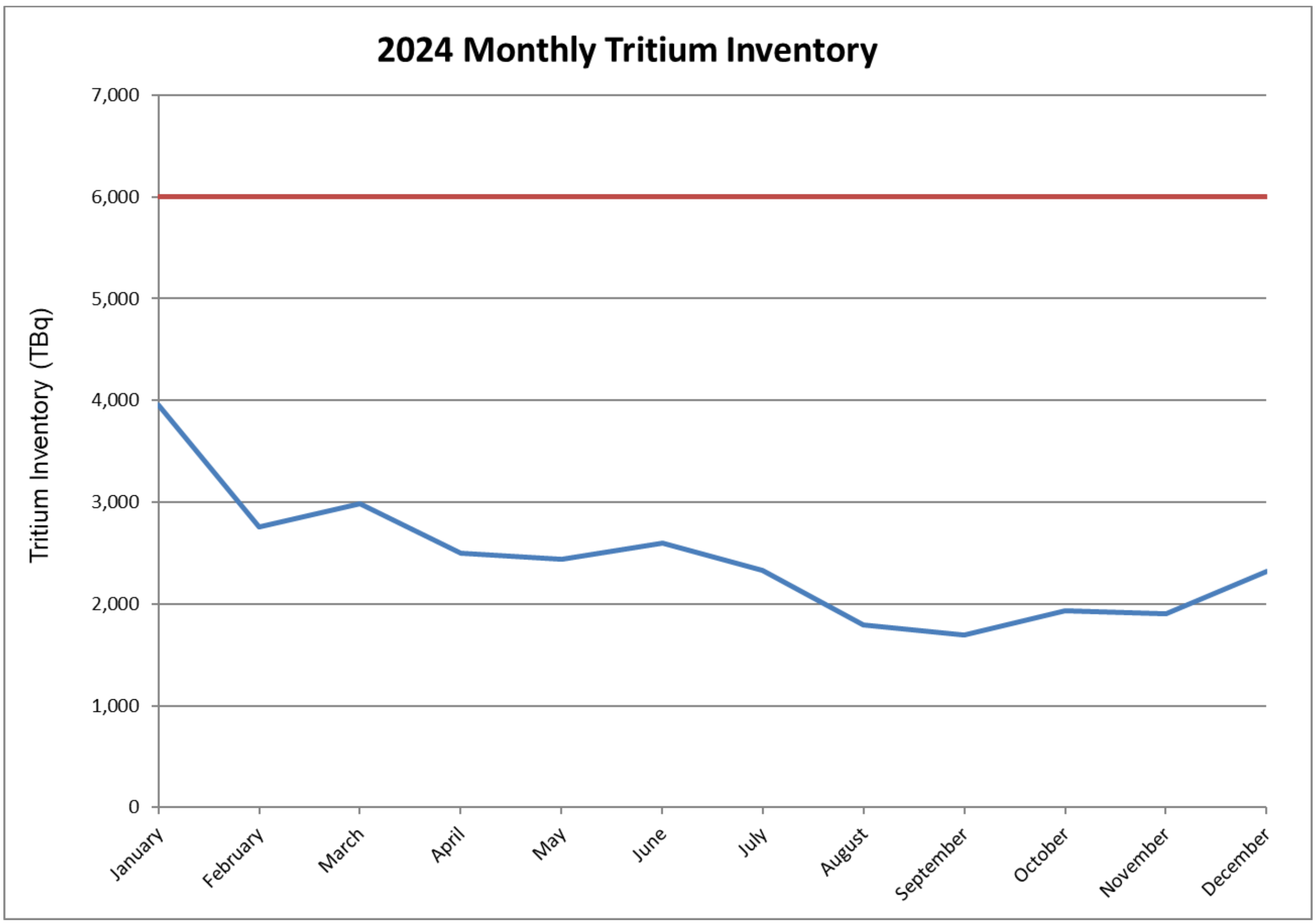
APPENDIX A

Tritium Inventory / Possession

Tritium Inventory / Possession

Month	Month-end H-3 Activity On-Site (TBq)	Percent of Licence Limit (%)
January	3,959	66.0
February	2,758	46.0
March	2,984	49.7
April	2,497	41.6
May	2,436	40.6
June	2,597	43.3
July	2,329	38.8
August	1,793	29.9
September	1,698	28.3
October	1,938	32.3
November	1,908	31.8
December	2,317	38.6
2024 Monthly Average	**2,434**	**40.6**

Note: Tritium possession limit = 6,000 TBq.



APPENDIX B

Equipment Maintenance Information

Equipment Maintenance Information for 2024

Semi-Annual maintenance on HVAC equipment: **Contract:** Black and McDonald	April 23, 2024 September 13, 2024
Quarterly maintenance on Rig & Bulk stack units: **Contract:** Black and McDonald	March 28, 2024 June 13, 2024 September 12, 2024 December 23, 2024
Annual stack verification by a third party on Rig & Bulk stack units: **Contract:** Tab Inspection	September 13, 2024
Sprinkler System quarterly maintenance by a third party: **Contract:** Drapeau Automatic Sprinkler Corp	March 21, 2024 June 20, 2024 September 19, 2024 December 18, 2024
Emergency Lighting & Fire Extinguisher annual inspection by a third party: **Contract:** Layman Fire and Safety	March 21, 2024
Fire panel annual inspection by a third party: **Contract: Layman Fire and Safety**	January 25, 2024
Sprinkler System inspection by SRBT:	Weekly
Fire Alarm Components inspection by SRBT:	Weekly
Fire Separation doors inspection by SRBT:	Weekly
Fire Extinguisher inspection by SRBT:	Monthly
Emergency Lights inspection by SRBT:	Monthly
Exit Doors inspected by SRBT:	Weekly
Quarterly maintenance carried out on the compressor: **Contract:** Valley Compressor	March 08, 2024 June 13, 2024 September 10, 2024 December 12, 2024
Fume Hood Inspections by SRBT:	Monthly
Tritium-in-Air Sample Collector Bubblers maintenance:	Bi-monthly

Equipment Maintenance Information for 2024 (continued)

Tritium-in-Air Sample Collector Bubblers third party annual verification: **Contract:** Canadian Nuclear Laboratories	February 13-27, 2024 March 5-19, 2024
Liquid Scintillation Counters third party annual maintenance: **Contract:** PerkinElmer	June 12, 2024
Real-time Stack Monitoring system verification by SRBT:	March 18, 2024 June 5, 2024 September 23, 2024 December 5, 2024
Monitoring well inspection by SRBT:	March 21, 2024 June 12, 2024 September 10, 2024 December 9, 2024
Annual IT maintenance inspection by SRBT:	September 26, 2024
Non-active air filter inspection by SRBT:	Monthly
Annual Zone Differential Pressure Test by SRBT:	December 17, 2024
UV printer maintenance by SRBT:	Monthly
Molding machine maintenance by SRBT:	March 27, 2024 June 27, 2024 September 27, 2024 December 19, 2024
3D printer maintenance by SRBT:	March 26, 2024 June 27, 2024 September 26, 2024 December 16, 2024
Fork-crane maintenance by SRBT:	August 26, 2024
Forklift maintenance by a third party: **Contract: Hyster**	April 29, 2024
Report of any weakening or possible major failure of any components:	None

All ventilation systems were maintained at a high fitness for service. Corrective maintenance was performed as required. Ventilation equipment maintenance was performed under contract with a fully licensed maintenance and TSSA certified local HVAC contract provider.

All process equipment is serviced and maintained by qualified staff and through contract with companies that specialize in process control systems. All process equipment has been maintained in fully operational condition.

Corrective maintenance is performed on equipment as required, and recorded and tracked over time.

APPENDIX C

Ventilation Maintenance Information

Ventilation Equipment Maintained In 2024

#	TYPE	ZONE SERVICED	LOCATION OF UNIT
1	Gas Furnace	1	Front office / server hallway
1	Mid efficient gas furnace	1	Receiving area
1	Mid efficient gas furnace & central air	1	Stores
1	Mid efficient gas furnace	1	Back bay
1	Heat Recovery unit	1	Receiving area
1	HRV with reheat	2	Coating
2	Makeup air units	1 & 2	Coating room
3	Unit heaters	1 & 3	Rig room, Glass shop, Receiving area
2	A/C wall unit	1	Glass shop, Receiving area
4	Exhaust fans	1 & 2	Coating, Assembly, Glass room, Paint Booth
1	Electric furnace with central air	1	Front office
1	Bulk stack air handling unit	3	Compound
1	Rig stack air handling unit	3	Compound
2	Rig and Bulk stack air handling units pitot tubes	3	Compound
1	Gas furnace with central air	1	Milling / molding

APPENDIX D

Radiological Dose Data

Radiological Dose Data

Rolling five-year effective dose data (2020 - 2024)

ANNUAL DOSE (mSv)	2020	2021	2022	2023	2024	FIVE YEAR AVERAGE
Maximum Dose	0.43	0.36	0.46	0.39	0.52	**0.43**
Average Dose (all records)	0.077	0.056	0.048	0.038	0.067	**0.0572**
Average Dose (excluding <0.01))	0.09	0.09	0.08	0.08	0.12	**0.09**
Collective Dose	3.30	2.35	2.01	1.56	2.83	**2.41**

EFFECTIVE DOSE RANGE (mSv)	2020	2021	2022	2023	2024	FIVE YEAR AVERAGE
< 0.01 (‘zero dose’)	8	16	18	23	18	**17**
0.01 – 0.05	18	16	16	11	14	**15**
0.05 – 0.10	7	3	2	2	3	**3**
0.10 – 0.25	6	3	3	3	3	**4**
0.25 – 0.50	4	4	3	2	3	**3**
0.50 – 1.00	0	0	0	0	1	**0**
>1.00	0	0	0	0	0	**0**
Number of Workers Monitored	43	42	42	41	42	**42**

APPENDIX E

Contamination Assessment Data

Contamination Assessment Data

Q1 2024 Routine Contamination Assessment Summary - Zone 3

Zone 3 Areas	Assessments	Pass	Pass Rate
Rig 7 Floor	63	54	85.71%
Rig 7	63	63	100.00%
Rig 1 Floor	63	60	95.24%
Rig 1	63	63	100.00%
Flr @ Rig 6	63	61	96.83%
Rig 6	63	62	98.41%
Floor @ Rig 8	63	61	96.83%
Rig 8	63	61	96.83%
Floor @ Rig 5	63	60	95.24%
Rig 5	63	63	100.00%
Waste Room Floor	60	58	96.67%
Comp. Area Floor	60	53	88.33%
Flr @ Barrier	63	59	93.65%
Cart	60	55	91.67%
Key Holder Storage Room	60	60	100.00%
Laser Room Desk	63	59	93.65%
Laser Room Floor	63	61	96.83%
EIP Area	63	55	87.30%
Laser Rm F/H	63	56	88.89%
Trit Lab Flr random	63	55	87.30%
Disassembly Fumehood	63	52	82.54%
Bulk Fume hood	63	59	93.65%
Trit Lab desk	63	57	90.48%
Storage Room Floor	63	55	87.30%
Waste Room Door	3	3	100.00%
Waste Room Exit Door	3	3	100.00%
Scint Table	3	3	100.00%
Scint Cup Storage	3	3	100.00%
TOTAL	**1,512**	**1,414**	**93.52%**

Q1 2024 Routine Contamination Assessment Summary - Zone 2

Zone 2 Areas	Assessments	Pass	Pass Rate
Floor at Barrier	36	35	97.22%
Work Area Floors	36	35	97.22%
Work Counters	36	36	100.00%
Light Stock Cabinet	35	35	100.00%
Silk Screening Floor	36	36	100.00%
Insp. Prep. Floor	36	34	94.44%
UV Room Floor	35	33	94.29%
Paint Booth Floor	35	33	94.29%
Bubbler Fume hood	36	35	97.22%
Inspection Room Table	36	36	100.00%
Inspection Room Floor	36	36	100.00%
Insp. Prep. Counter	36	35	97.22%
Work Counter 2	1	1	100.00%
Sonic Welding Area 1	1	1	100.00%
Sonic Welding Area 2	1	1	100.00%
TOTAL	**432**	**422**	**97.69%**

Q1 2024 Routine Contamination Assessment Summary - Zone 1

Zone 1 Areas	Assessments	Pass	Pass Rate
Lunch Room	13	13	100.00%
Cleaning Cart	12	12	100.00%
Main Hallway	12	12	100.00%
LSC Room	13	13	100.00%
RR Ante Rm	13	12	92.31%
RR Barrier	13	12	92.31%
Assy Barrier	13	13	100.00%
Disassembly Table	13	12	92.31%
Disassembly Cabinet	13	11	84.62%
Disassembly PPE	13	12	92.31%
RMA Shipping Storage Area	12	12	100.00%
Shipping Floor	13	13	100.00%
Carts	1	1	100.00%
Shipping Countertops	1	1	100.00%
Scint Fluid Pumps	1	1	100.00%
TOTAL	**156**	**149**	**95.51%**

Q2 2024 Routine Contamination Assessment Summary - Zone 3

Zone 3 Areas	Assessments	Pass	Pass Rate
Rig 7 Floor	59	58	98.31%
Rig 7	59	57	96.61%
Rig 1 Floor	59	58	98.31%
Rig 1	59	58	98.31%
Flr @ Rig 6	59	59	100.00%
Rig 6	59	59	100.00%
Floor @ Rig 8	59	59	100.00%
Rig 8	59	59	100.00%
Floor @ Rig 5	59	58	98.31%
Rig 5	59	58	98.31%
Waste Room Floor	59	57	96.61%
Comp. Area Floor	59	59	100.00%
Flr @ Barrier	59	58	98.31%
Cart	59	56	94.92%
Transition Table	54	54	100.00%
Laser Room Desk	59	57	96.61%
Laser Room Floor	59	54	91.53%
EIP Area	59	49	83.05%
Laser Rm F/H	59	36	61.02%
Trit Lab Flr random	59	56	94.92%
Disassembly Fumehood	59	40	67.80%
Bulk Fume hood	59	51	86.44%
Trit Lab desk	59	56	94.92%
Storage Room Floor	59	54	91.53%
Key Holder Storage Room	5	5	100.00%
TOTAL	**1,416**	**1,325**	**93.57%**

Q2 2024 Routine Contamination Assessment Summary - Zone 2

Zone 2 Areas	Assessments	Pass	Pass Rate
Floor at Barrier	34	33	97.06%
Work Area Floors	34	30	88.24%
Work Counters	34	33	97.06%
Microscope Counter	31	29	93.55%
UV Printer	31	31	100.00%
Insp. Prep. Floor	34	34	100.00%
UV Room Floor	34	33	97.06%
Paint Booth Floor	34	33	97.06%
Bubbler Fume hood	34	30	88.24%
Exterior of Chemical Storage	31	30	96.77%
Inspection Room Floor	34	33	97.06%
Insp. Prep. Counter	34	34	100.00%
Light Stock Cabinet	3	3	100.00%
Inspection Room Table	3	3	100.00%
Silk Screening Floor	3	3	100.00%
TOTAL	**408**	**392**	**96.08%**

Q2 2024 Routine Contamination Assessment Summary - Zone 1

Zone 1 Areas	Assessments	Pass	Pass Rate
Lunch Room	13	13	100.00%
QA Hold	12	12	100.00%
Cleaning Cabinet	12	12	100.00%
LSC Room	13	13	100.00%
RR Ante Rm	13	13	100.00%
RR Barrier	13	10	76.92%
Assy Barrier	13	12	92.31%
Disassembly Table	13	10	76.92%
Disassembly Cabinet	13	13	100.00%
Disassembly PPE	13	10	76.92%
Rig Door	12	11	91.67%
Shipping Floor	13	13	100.00%
Cleaning Cart	1	1	100.00%
Main Hallway	1	1	100.00%
RMA Shipping Storage Area	1	1	100.00%
TOTAL	**156**	**145**	**92.95%**

Q3 2024 Routine Contamination Assessment Summary - Zone 3

Zone 3 Areas	Assessments	Pass	Pass Rate
Rig 7 Floor	62	61	98.39%
Rig 7	62	62	100.00%
Rig 1 Floor	62	61	98.39%
Rig 1	62	62	100.00%
Flr @ Rig 6	62	62	100.00%
Rig 6	62	62	100.00%
Floor @ Rig 8	62	61	98.39%
Rig 8	62	61	98.39%
Floor @ Rig 5	62	61	98.39%
Rig 5	62	62	100.00%
Waste Room Floor	62	62	100.00%
Table @ Porthole	55	54	98.18%
Flr @ Barrier	62	62	100.00%
VLLW Receptacle @ Barrier	55	55	100.00%
Wash Fumehood	55	55	100.00%
Door Handles	55	53	96.36%
Laser Room Floor	62	62	100.00%
EIP Area	62	57	91.94%
Laser Rm F/H	62	59	95.16%
Trit Lab Flr random	62	62	100.00%
Disassembly Fumehood	62	51	82.26%
Bulk Fume hood	62	59	95.16%
Chairs	55	54	98.18%
Storage Room Floor	62	62	100.00%
Comp. Area Floor	7	7	100.00%
Cart	7	7	100.00%
Transition Table	7	7	100.00%
Laser Room Desk	7	6	85.71%
Trit Lab desk	7	7	100.00%
TOTAL	**1,488**	**1456**	**97.85%**

Q3 2024 Routine Contamination Assessment Summary - Zone 2

Zone 2 Areas	Assessments	Pass	Pass Rate
Floor at Barrier	35	35	100.00%
Work Area Floors	35	35	100.00%
Work Counters	35	35	100.00%
Microscope Counter	35	33	94.29%
Photometer Room	31	31	100.00%
WIP Cabinet	31	31	100.00%
UV Room Floor	35	35	100.00%
Welding Table	31	31	100.00%
Bubbler Fume hood	35	31	88.57%
Exterior of Chemical Storage	35	30	85.71%
Inspection Room Floor	35	35	100.00%
Insp. Prep. Counter	35	34	97.14%
UV Printer	4	4	100.00%
Insp. Prep. Floor	4	4	100.00%
Paint Booth Floor	4	4	100.00%
TOTAL	**420**	**408**	**97.14%**

Q3 2024 Routine Contamination Assessment Summary - Zone 1

Zone 1 Areas	Assessments	Pass	Pass Rate
Lunch Room	13	13	100.00%
Office Door Handles	11	11	100.00%
Shipping Counter	11	11	100.00%
LSC Room	13	13	100.00%
RR Ante Rm	13	13	100.00%
RR Barrier	13	13	100.00%
Assy Barrier	13	13	100.00%
Disassembly Table	13	12	92.31%
Disassembly PPE	13	10	76.92%
Main Hallway Floor	11	10	90.91%
Rig Door	13	12	92.31%
Shipping Floor	13	13	100.00%
QA Hold	2	2	100.00%
Cleaning Cabinet	2	2	100.00%
Disassembly Cabinet	2	1	50.00%
TOTAL	**156**	**149**	**95.51%**

Q4 2024 Routine Contamination Assessment Summary - Zone 3

Zone 3 Areas	Assessments	Pass	Pass Rate
Rig 7 Floor	58	53	91.38%
Rig 7	58	58	100.00%
Rig 1 Floor	58	54	93.10%
Rig 1	58	58	100.00%
Flr @ Rig 6	58	54	93.10%
Rig 6	58	58	100.00%
Floor @ Rig 8	58	55	94.83%
Rig 8	58	58	100.00%
Floor @ Rig 5	58	56	96.55%
Rig 5	58	58	100.00%
Waste Room Floor	58	58	100.00%
Table @ Porthole	58	58	100.00%
Flr @ Barrier	58	57	98.28%
VLLW Receptacle @ Barrier	58	58	100.00%
Wash Fumehood	58	58	100.00%
Door Handles	58	58	100.00%
Laser Room Floor	58	56	96.55%
EIP Area	58	58	100.00%
Laser Rm F/H	58	58	100.00%
Trit Lab Flr random	58	57	98.28%
Disassembly Fumehood	58	56	96.55%
Bulk Fume hood	58	51	87.93%
Chairs	58	57	98.28%
Storage Room Floor	58	56	96.55%
TOTAL	**1,392**	**1,358**	**97.56%**

Q4 2024 Routine Contamination Assessment Summary - Zone 2

Zone 2 Areas	Assessments	Pass	Pass Rate
Floor at Barrier	34	28	82.35%
Work Area Floors	34	32	94.12%
Work Counters	34	33	97.06%
Microscope Counter	34	29	85.29%
Photometer Room	34	33	97.06%
WIP Cabinet	34	33	97.06%
UV Room Floor	34	33	97.06%
Welding Table	34	33	97.06%
Bubbler Fume hood	34	30	88.24%
Exterior of Chemical Storage	34	32	94.12%
Inspection Room Floor	34	30	88.24%
Insp. Prep. Counter	34	32	94.12%
TOTAL	**408**	**378**	**92.65%**

Q4 2024 Routine Contamination Assessment Summary - Zone 1

Zone 1 Areas	Assessments	Pass	Pass Rate
Lunch Room	12	12	100.00%
Office Door Handles	12	12	100.00%
Shipping Counter	12	12	100.00%
LSC Room	12	12	100.00%
RR Ante Rm	12	12	100.00%
RR Barrier	12	12	100.00%
Assy Barrier	12	12	100.00%
Disassembly Table	12	11	91.67%
Disassembly PPE	12	10	83.33%
Main Hallway Floor	12	12	100.00%
Rig Door	12	12	100.00%
Shipping Floor	12	12	100.00%
TOTAL	**144**	**141**	**97.92%**

Overall Facility Summary

Facility Zone	Assessments	Pass	Pass Rate
ZONE 3	5,808	5,553	95.6%
ZONE 2	1,668	1,600	95.9%
ZONE 1	612	584	95.4%
2024 ALL ZONES	**8,088**	**7,737**	**95.7%**

APPENDIX F

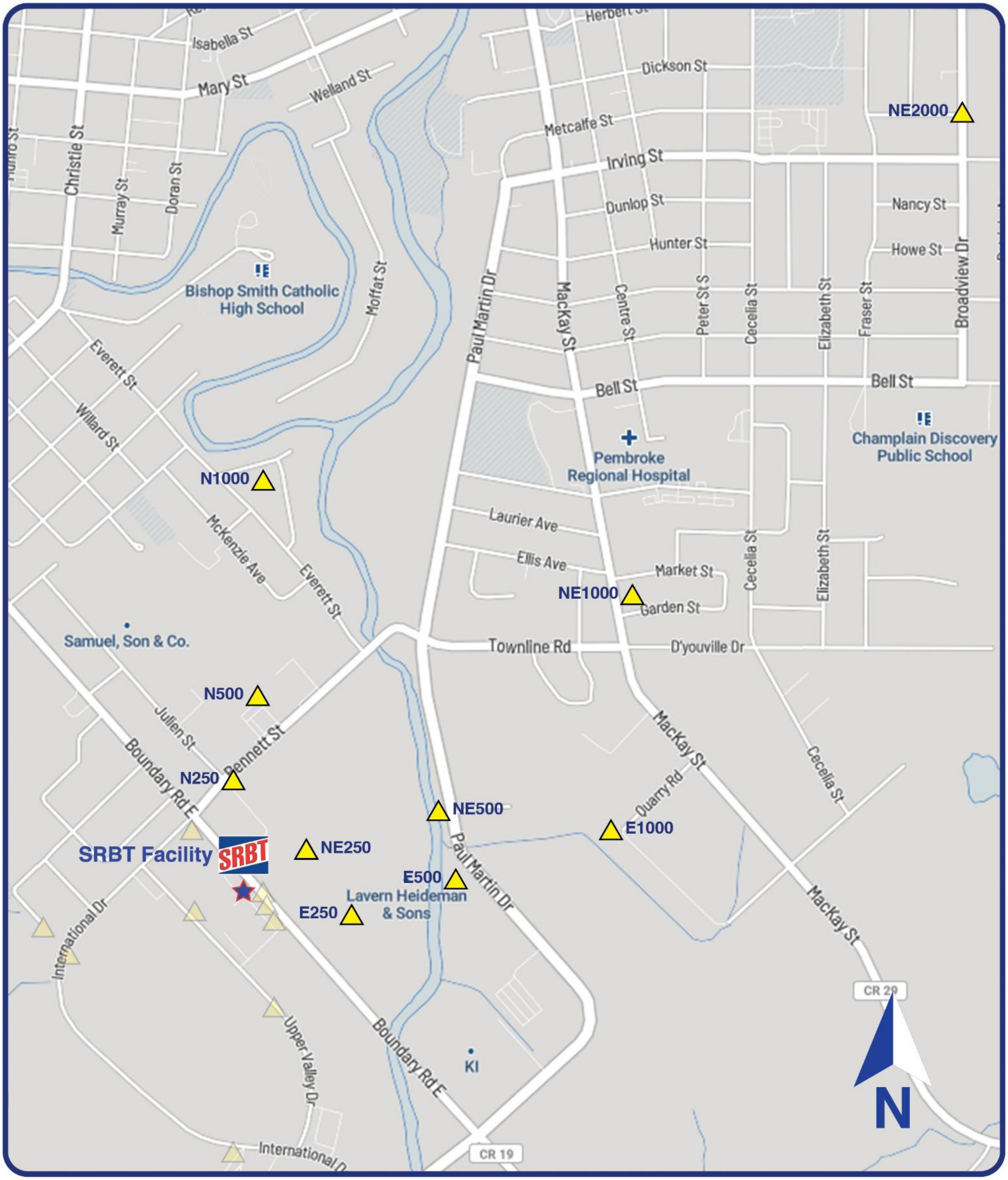
Monthly Average Concentrations of Tritium in Air in Environment

2024 Environment Monitoring Program
Passive Air Sampling System

(Bq/m³)

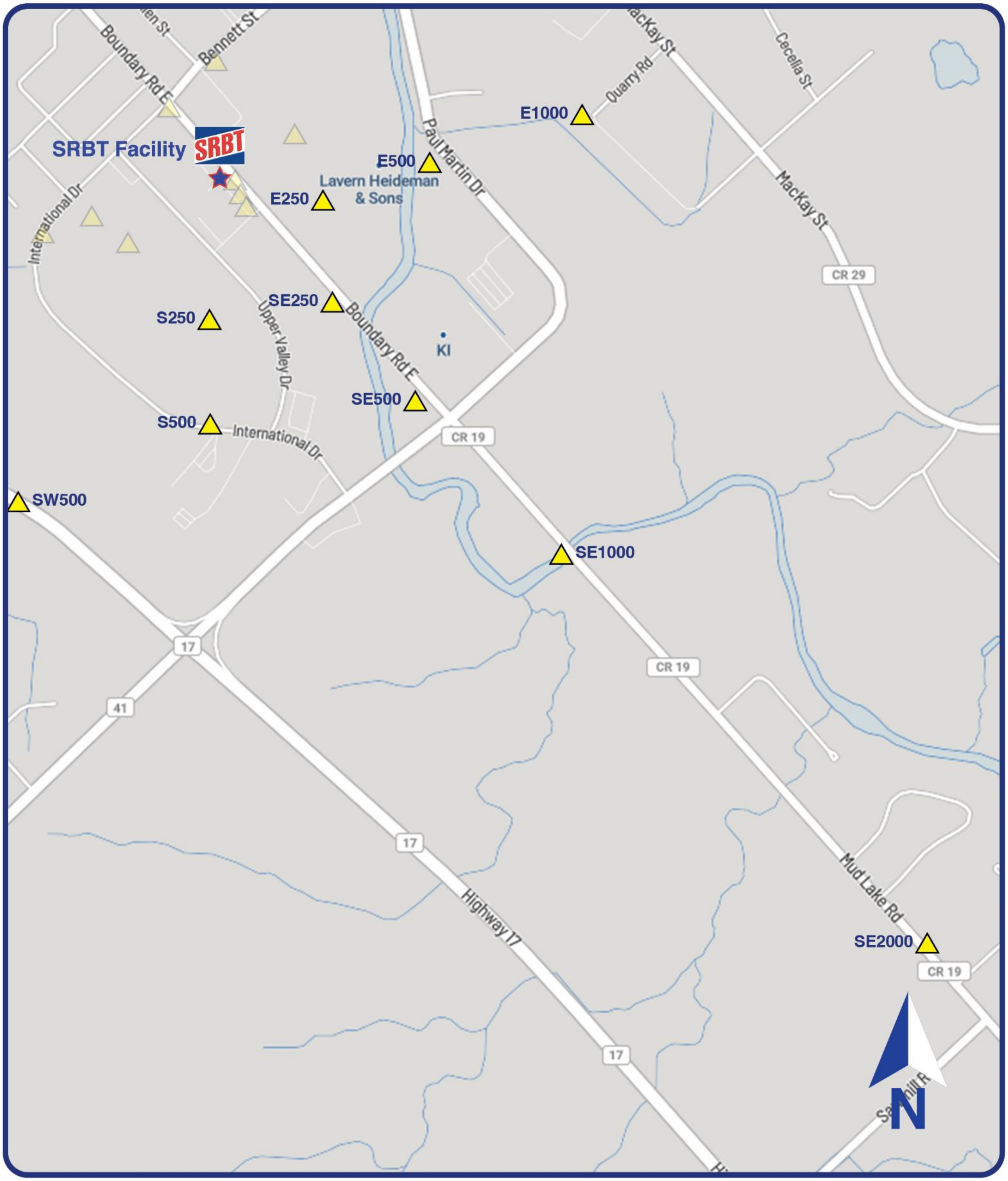
Sampler No.	Sampler ID	Location	Dist. to SRBT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
				Jan. 3 - Jan. 31	Jan 31. - Mar 6	Mar 6 - Apr 3	Apr. 3 - May 1	May 1 - Jun 5	Jun 5 - Jul 3	Jul 3 - Jul 31	Jul 31 - Sep 4	Sep 4 - Oct 2	Oct 2 - Nov 6	Nov 6 - Dec 4	Dec 4 - Jan 8/Jan 9	
			Minimum Detectable Activity (Bq/m³)	*0.68*	*0.65*	*0.67*	*0.67*	*0.63*	*0.69*	*0.82*	*0.63*	*0.66*	*0.54*	*0.73*	*0.57*	*0.66*
1	N250	N 45º 48.486' W 077º 07.092' Elev. 137m	322m	1.25	1.11	1.04	1.07	1.34	2.86	2.71	7.74	3.79	7.06	2.64	6.81	**3.29**
2	N500	N 45º 48.572' W 077º 07.008' Elev. 134m	493m	0.89	0.65	0.67	0.67	1.06	1.25	1.75	1.23	1.61	3.60	1.07	0.67	**1.26**
3	N1000	N 45º 48.869' W 077º 06.997' Elev. 135m	1040m	0.68	0.65	0.67	0.67	1.03	0.69	1.71	0.86	0.66	0.89	0.73	0.57	**0.82**
4 (PAS #4)	NW250	N 45º 48.412' W 077º 07.189' Elev. 137m	222m	6.82	6.26	3.32	2.43	5.89	6.18	7.14	3.29	4.11	7.06	3.75	3.64	**4.99**
5	NW500	N 45º 48.577' W 077º 07.382' Elev. 134m	615m	1.18	2.23	0.67	0.71	1.34	1.89	2.86	1.43	1.61	2.77	0.73	0.83	**1.52**
6 (PAS # 8)	NW1000	N 45º 48.754' W 077º 07.599' Elev. 130m	1050m	0.68	1.74	0.67	0.67	0.83	0.93	1.29	0.97	0.86	1.11	0.73	0.57	**0.92**
7	NW2000	N 45º 49.141' W 077º 08.090' Elev. 139m	2000m	0.68	0.65	0.67	0.67	0.89	0.69	1.29	0.63	0.75	0.54	1.96	0.57	**0.83**
8	W250	N 45º 48.300' W 077º 07.323' Elev. 138m	297m	0.86	4.71	3.14	5.04	2.46	0.86	2.25	1.49	0.71	1.66	7.82	0.89	**2.66**
9	W500	N 45º 48.288' W 077º 07.393' Elev. 137m	389m	0.79	1.26	1.04	1.86	1.69	1.29	1.68	0.83	0.66	0.77	1.21	0.67	**1.15**
10	W1000	N 45º 48.306' W 077º 07.630' Elev. 134m	691m	0.68	*2.80*	1.61	2.21	1.11	8.25	1.00	5.40	1.04	0.60	5.36	0.83	**2.57**
11	SW250	N 45º 48.247' W 077º 07.206' Elev. 140m	183m	1.82	2.00	0.82	2.00	1.26	0.69	1.93	1.43	1.68	0.54	0.75	0.57	**1.29**
12	SW500	N 45º 47.896' W 077º 07.307' Elev. 148m	839m	0.68	0.66	0.67	0.67	0.63	0.69	0.82	0.63	3.50	0.54	0.73	0.57	**0.90**
13	SW1000	N 45º 47.599' W 077º 07.543' Elev. 149m	1470m	0.68	0.65	0.67	0.67	0.63	0.69	0.82	0.63	0.96	*0.54*	5.89	0.57	**1.12**
14	SW2000	N 45º 47.408' W 077º 07.866' Elev. 155m	2110m	0.68	0.65	0.67	0.67	0.63	0.69	0.82	0.63	0.66	0.54	0.73	0.57	**0.66**
15	S250	N 45º 48.129' W 077º 07.014' Elev. 131m	356m	3.43	2.37	0.75	3.25	2.20	1.93	0.86	2.29	0.66	2.89	2.04	0.57	**1.94**
16	S500	N 45º 48.029' W 077º 07.110' Elev. 143m	532m	0.96	0.83	0.67	1.25	0.74	0.69	0.82	0.63	0.66	0.80	0.73	3.14	**0.99**
17 (PAS # 12)	S1000	N 45º 46.466' W 077º 07.441' Elev. 158m	1450m	0.68	0.65	0.67	0.67	0.63	0.69	0.82	0.63	3.96	0.54	0.73	0.57	**0.94**
18	SE250	N 45º 48.189' W 077º 06.874' Elev. 132m	365m	4.54	5.20	2.64	1.39	3.17	4.82	6.36	3.71	5.71	4.23	6.71	5.44	**4.49**
19	SE500	N 45º 48.108' W 077º 06.783' Elev. 123m	554m	1.68	1.83	1.64	0.89	1.91	2.57	3.89	2.26	4.71	2.57	7.32	1.78	**2.75**
20	SE1000	N 45º 47.894' W 077º 06.501' Elev. 120m	1090m	0.68	0.65	0.67	0.67	0.74	0.75	1.29	0.74	2.36	1.74	4.43	3.06	**1.48**
21	SE2000	N 45º 47.505' W 077º 05.978' Elev. 137m	2080m	0.79	0.65	0.67	0.67	0.91	0.69	0.93	0.89	0.79	0.54	0.73	1.20	**0.79**
22	E250	N 45º 80.564' W 077º 11.556' Elev. 131m	220m	1.93	1.00	2.61	1.36	2.06	6.18	5.96	9.43	1.79	7.74	6.86	0.57	**3.96**
23	E500	N 45º 48.333' W 077º 06.693' Elev. 132m	520m	0.68	0.65	0.93	0.67	0.63	1.57	2.25	1.29	3.14	2.17	2.89	0.72	**1.47**
24	E1000	N 45º 48.303' W 077º 06.260' Elev. 143m	1080m	0.75	0.65	0.67	0.67	0.63	0.69	0.82	0.69	1.82	0.57	1.36	0.57	**0.82**
25	NE250	N 45º 48.371' W 077º 06.964' Elev. 124m	198m	3.32	0.89	2.04	1.54	4.23	8.93	6.75	3.34	5.64	3.94	4.89	6.22	**4.31**
26	NE500	N 45º 48.421' W 077º 06.732' Elev. 131m	508m	1.29	0.65	0.79	0.67	0.69	1.96	2.29	0.97	1.43	1.31	2.04	3.92	**1.50**
27	NE1000	N 45º 48.683' W 077º 06.441' Elev. 148m	1100m	0.68	0.65	0.67	0.67	0.63	0.69	1.18	0.63	0.66	0.54	1.82	0.83	**0.80**
28	NE2000	N 45º 49.116' W 077º 05.843' Elev. 156m	2200m	0.68	0.65	0.67	0.67	0.63	0.69	0.82	0.63	0.66	0.54	0.73	1.14	**0.71**
(PAS #1)		N 45º 48.287' W 077º 07.123' Elev. 129m	94.1m	5.14	5.97	6.82	13.46	14.89	6.21	9.04	12.43	5.61	13.03	6.32	1.33	**8.35**
(PAS #2)		N 45º 48.325' W 077º 07.132' Elev. 132m	52.8m	1.96	6.97	7.54	8.64	7.71	5.79	10.04	9.31	13.04	5.34	19.46	0.83	**8.05**
(PAS #13)		N 45º 48.262' W 077º 07.093' Elev. 132m	61.5m	1.61	1.71	4.50	4.79	5.11	1.25	9.39	4.03	5.79	4.14	7.79	0.57	**4.22**
4-2	NW250	N 45º 48.412' W 077º 07.189' Elev. 137m	222m	2.61	6.20	3.11	2.39	5.77	5.25	6.18	2.83	3.93	5.91	2.86	1.28	**4.03**
11-2	SW250	N 45º 48.247' W 077º 07.206' Elev. 140m	183m	1.75	2.57	Sample Spoiled	1.82	1.26	0.69	1.89	1.14	1.46	0.54	0.73	0.57	**1.31**
18-2	SE250	N 45º 48.189' W 077º 06.874' Elev. 132m	365m	3.25	3.23	2.29	1.11	2.97	3.89	6.18	3.34	5.46	4.00	5.89	3.22	**3.74**
25-2	NE250	N 45º 48.371' W 077º 06.964' Elev. 124m	198m	2.61	0.69	1.54	1.07	2.71	5.93	5.18	2.71	4.25	3.83	4.68	5.25	**3.37**
Maika (PAS # 10)	SW	N 45º 46.367' W 077º 11.447' Elev. 149m	6690m	0.68	0.65	0.67	0.67	0.63	0.69	0.82	0.63	0.66	0.60	0.73	0.57	**0.67**
Maika	Duplicate	Same as above	6690m	0.68	0.65	0.67	0.67	0.63	0.69	0.82	0.66	0.66	0.54	0.73	0.57	**0.66**
Fitzpatrick	SE	N 45º 44.818' W 076º 59.822' Elev. 159m	11400m	0.71	0.65	0.67	0.67	0.63	0.69	0.82	0.63	0.66	0.54	0.73	0.57	**0.66**
Petawawa	NW	N 45º 51.497' W 077º 12.828' Elev. 149m	9480m	0.68	0.65	0.67	0.67	0.63	0.69	0.82	0.69	0.66	0.54	0.73	0.57	**0.67**
Farm	NE	N 45º 53.071' W 076º 56.768' Elev. 142m	16000m	0.68	0.65	0.67	0.67	0.63	0.69	0.82	1.06	0.66	0.54	0.73	0.57	**0.70**
Results shaded in blue are below minimum detectable activity			Sum	62.82	73.93	61.57	71.68	84.16	92.96	115.11	94.78	99.43	97.89	128.76	63.96	87.36

MAPS OF PAS STATIONS



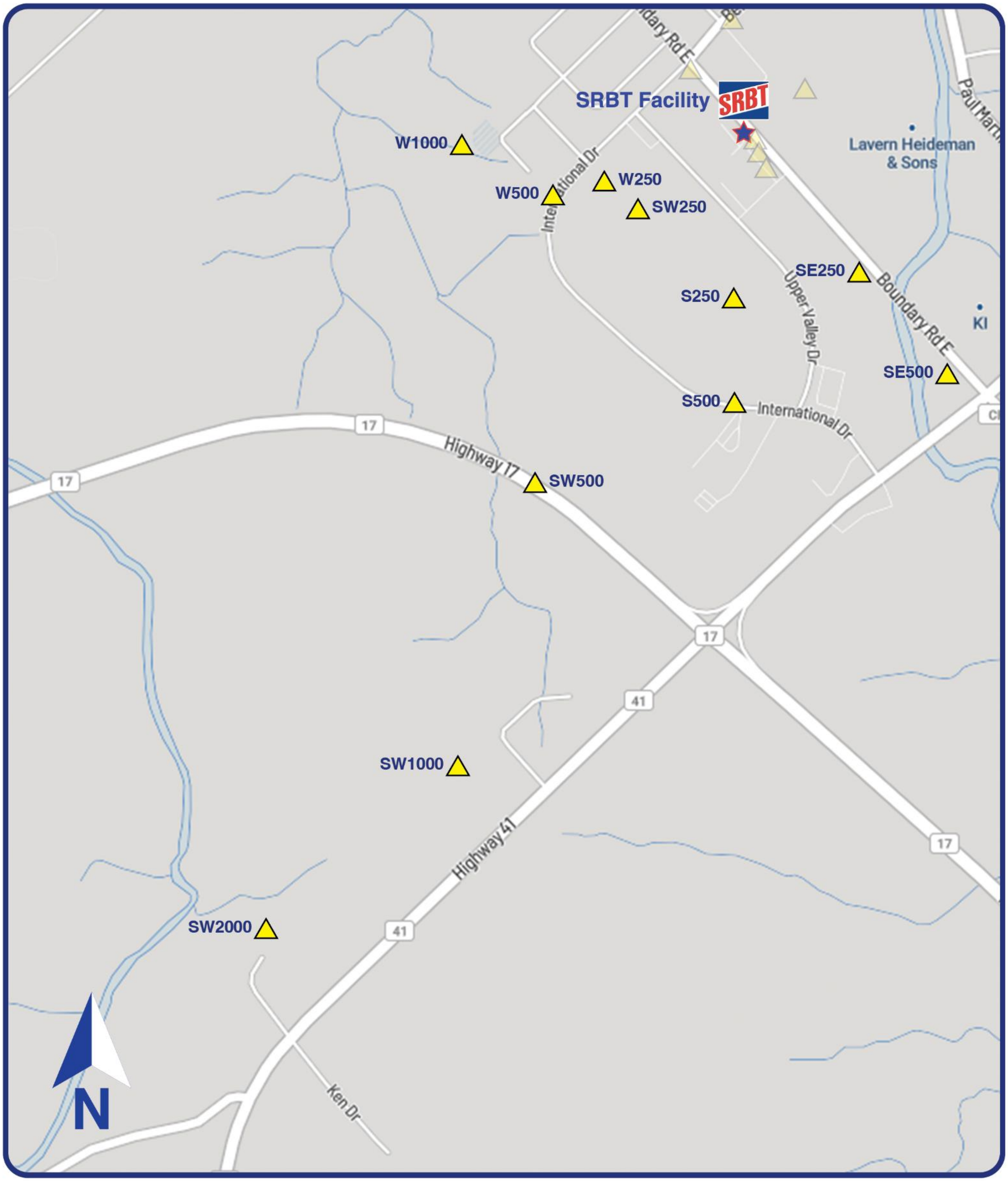
PAS Stations N / NE / E △

MAPS OF PAS STATIONS



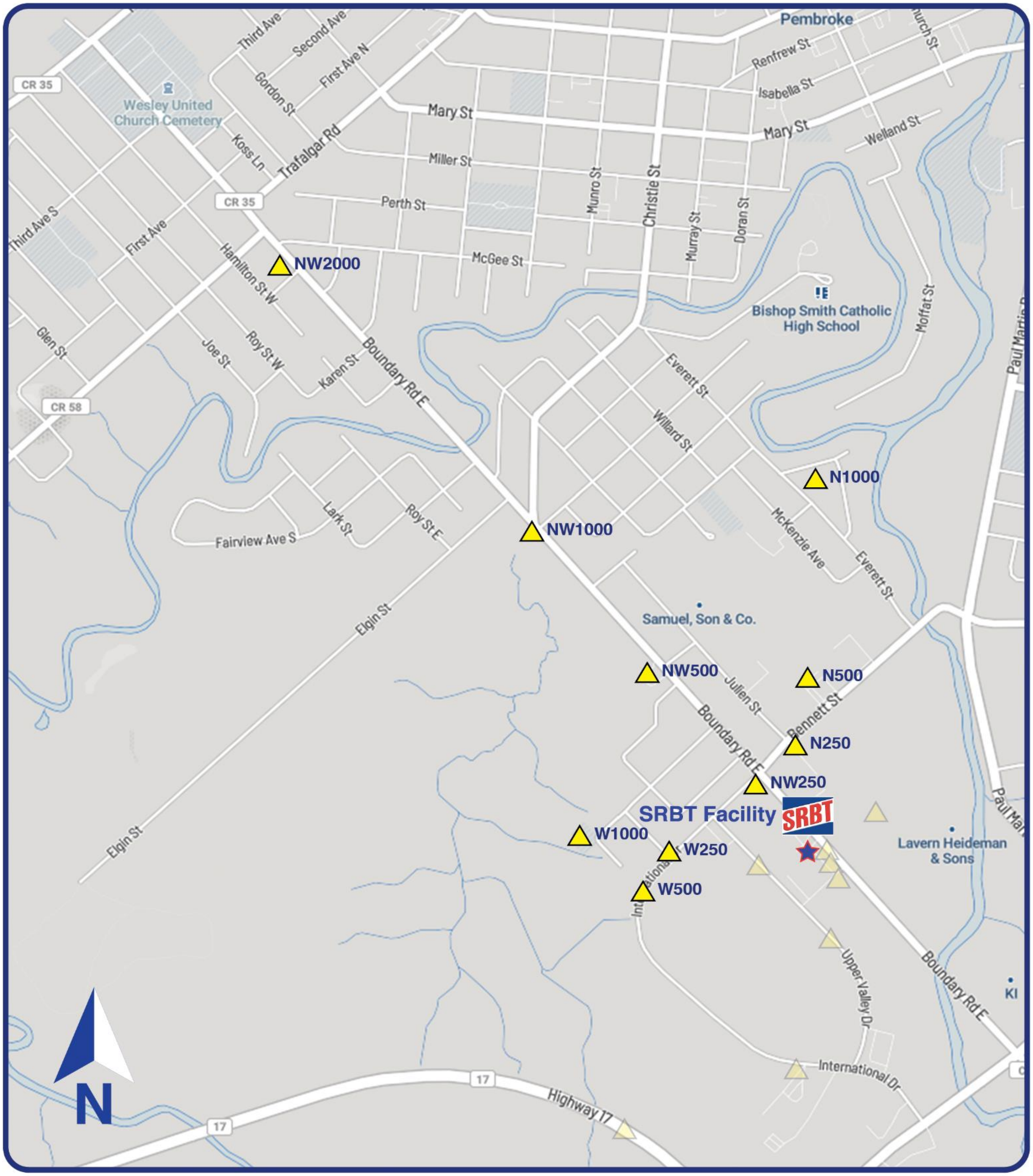
PAS Stations S / SE / E

MAPS OF PAS STATIONS



PAS Stations W / SW / S △

MAPS OF PAS STATIONS



PAS Stations W / NW / N △

APPENDIX G

Wind Direction Information

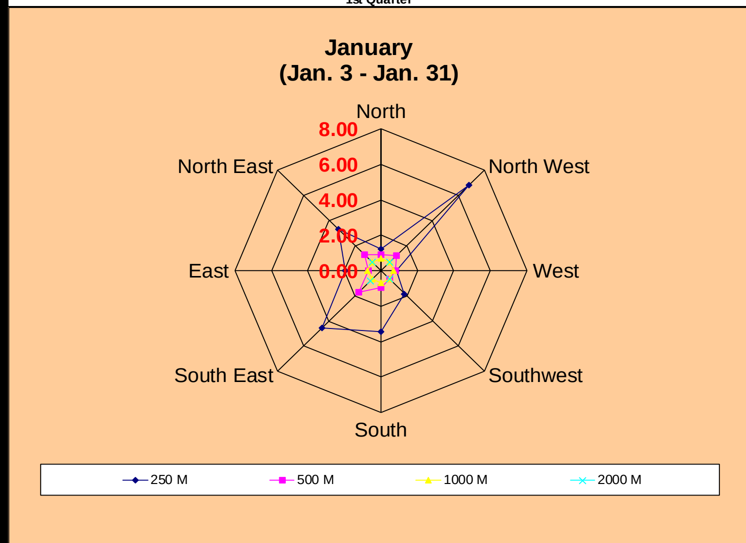
Wind Direction Information

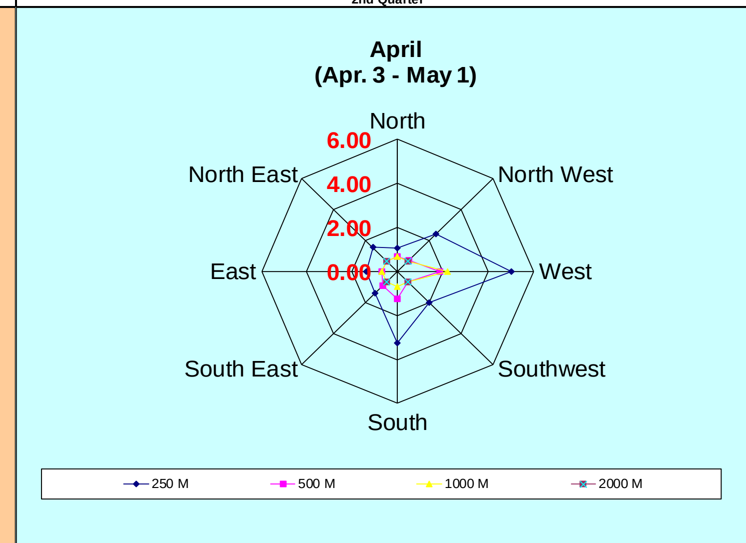
Direction	January				February				March			
	250 M	500 M	1000 M	2000 M	250 M	500 M	1000 M	2000 M	250 M	500 M	1000 M	2000 M
North	1.25	0.89	0.68		1.11	0.65	0.65		1.04	0.67	0.67	
North West	6.82	1.18	0.68	0.68	6.26	2.23	1.74	0.65	3.32	0.67	0.67	0.67
West	0.86	0.79	0.68		4.71	1.26	2.80		3.14	1.04	1.61	
Southwest	1.82	0.68	0.68	0.68	2.00	0.66	0.65	0.65	0.82	0.67	0.67	0.67
South	3.43	0.96	0.68		2.37	0.83	0.65		0.75	0.67	0.67	
South East	4.54	1.68	0.68	0.79	5.20	1.83	0.65	0.65	2.64	1.64	0.67	0.67
East	1.93	0.68	0.75		1.00	0.65	0.65		2.61	0.93	0.67	
North East	3.32	1.29	0.68	0.68	0.89	0.65	0.65	0.65	2.04	0.79	0.67	0.67
	1st Quarter											

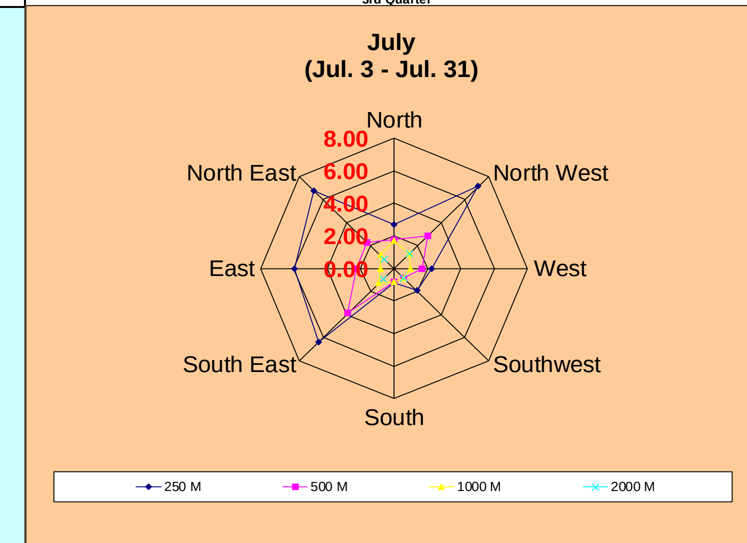
Direction	April				May				June			
	250 M	500 M	1000 M	2000 M	250 M	500 M	1000 M	2000 M	250 M	500 M	1000 M	2000 M
North	1.07	0.67	0.67		1.34	1.06	1.03		2.86	1.25	0.69	
North West	2.43	0.71	0.67	0.67	5.89	1.34	0.83	0.89	6.18	1.89	0.93	0.69
West	5.04	1.86	2.21		2.46	1.69	1.11		0.86	1.29	8.25	
Southwest	2.00	0.67	0.67	0.67	1.26	0.63	0.63	0.63	0.69	0.69	0.69	0.69
South	3.25	1.25	0.67		2.20	2.20	0.63		1.93	0.69	0.69	
South East	1.39	0.89	0.67	0.67	3.17	1.91	0.74	0.91	4.82	2.57	0.75	0.69
East	1.36	0.67	0.67		2.06	0.63	0.63		6.18	1.57	0.69	
North East	1.54	0.67	0.67	0.67	4.23	0.69	0.63	0.63	8.93	1.96	0.69	0.69
	2nd Quarter											

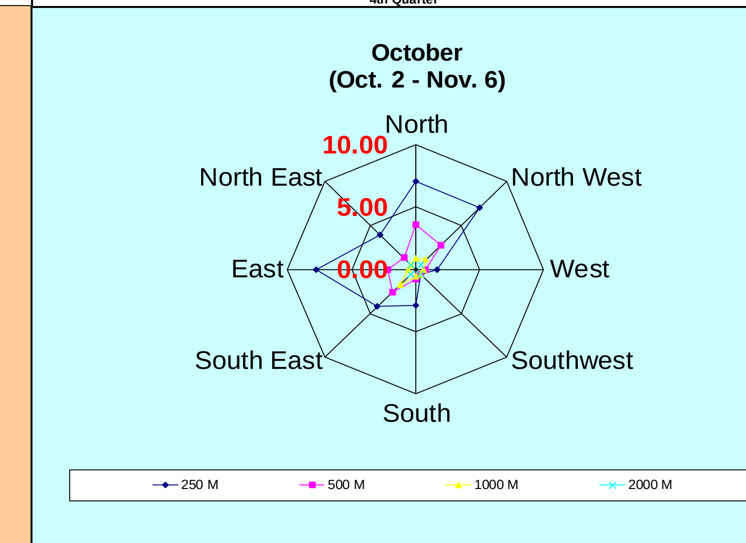
Direction	July				August				September			
	250 M	500 M	1000 M	2000 M	250 M	500 M	1000 M	2000 M	250 M	500 M	1000 M	2000 M
North	2.71	1.75	1.71		7.74	1.23	0.86		3.79	1.61	0.66	
North West	7.14	2.86	1.29	1.29	3.29	1.43	0.97	0.63	4.11	1.61	0.86	0.75
West	2.25	1.68	1.00		1.49	0.83	5.40		0.71	0.66	1.04	
Southwest	1.93	0.82	0.82	0.82	1.43	0.63	0.63	0.63	1.68	3.50	0.96	0.66
South	0.86	0.82	0.82		2.29	0.63	0.63		0.66	0.66	3.96	
South East	6.36	3.89	1.29	0.93	3.71	2.26	0.74	0.89	5.71	4.71	2.36	0.79
East	5.96	2.25	0.82		9.43	1.29	0.69		1.79	3.14	1.82	
North East	6.75	2.29	1.18	0.82	3.34	0.97	0.63	0.63	5.64	1.43	0.66	0.66
	3rd Quarter											

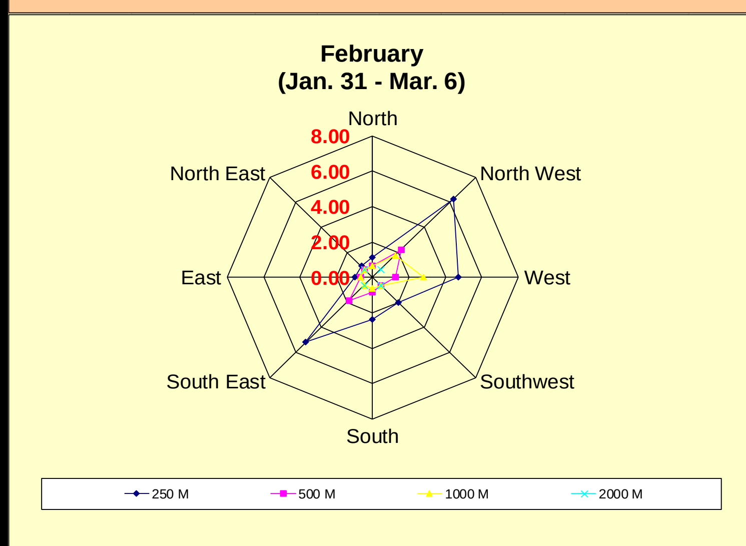
Direction	October				November				December			
	250 M	500 M	1000 M	2000 M	250 M	500 M	1000 M	2000 M	250 M	500 M	1000 M	2000 M
North	7.06	3.60	0.89		2.64	1.07	0.73		6.81	0.67	0.57	
North West	7.06	2.77	1.11	0.54	3.75	0.73	0.73	1.96	3.64	0.83	0.57	0.57
West	1.66	0.77	0.60		7.82	1.21	5.36		0.89	0.67	0.83	
Southwest	0.54	0.54	0.54	0.54	0.75	0.73	5.89	0.73	0.57	0.57	0.57	0.57
South	2.89	0.80	0.54		2.04	0.73	0.73		0.57	3.14	0.57	
South East	4.23	2.57	1.74	0.54	6.71	7.32	4.43	0.73	5.44	1.78	3.06	1.20
East	7.74	2.17	0.57		6.86	2.89	1.36		0.57	0.72	0.57	
North East	3.94	1.31	0.54	0.54	4.89	2.04	1.82	0.73	6.22	3.92	0.83	1.14
	4th Quarter											

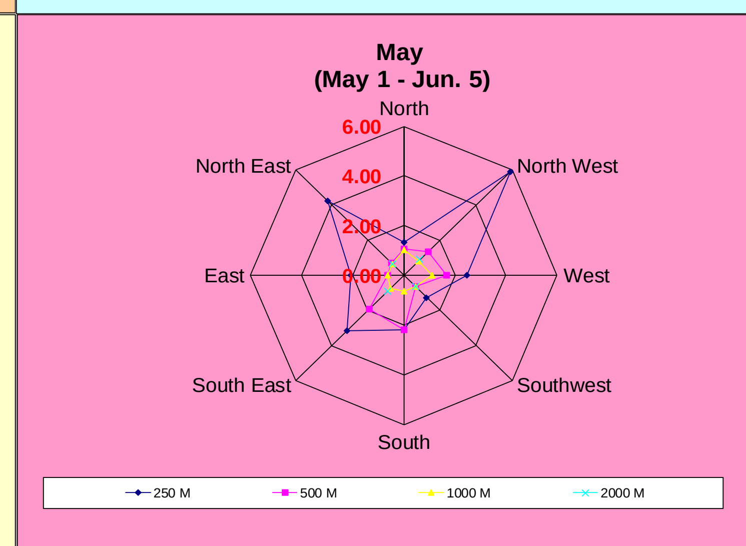


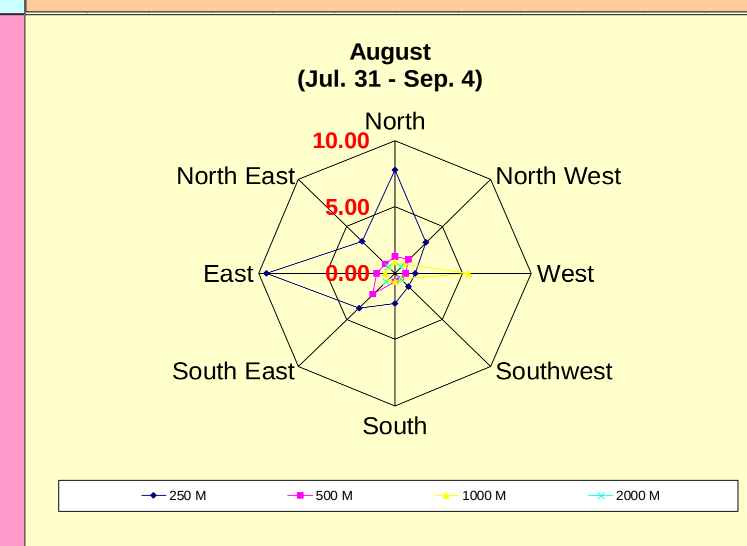


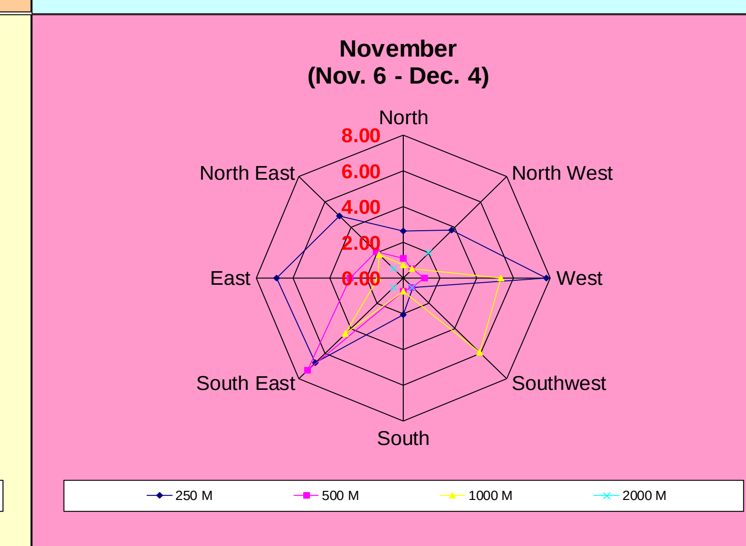


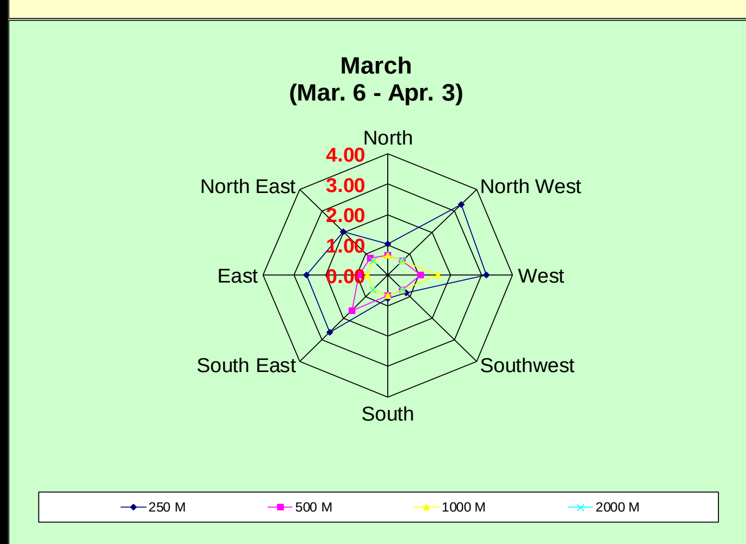


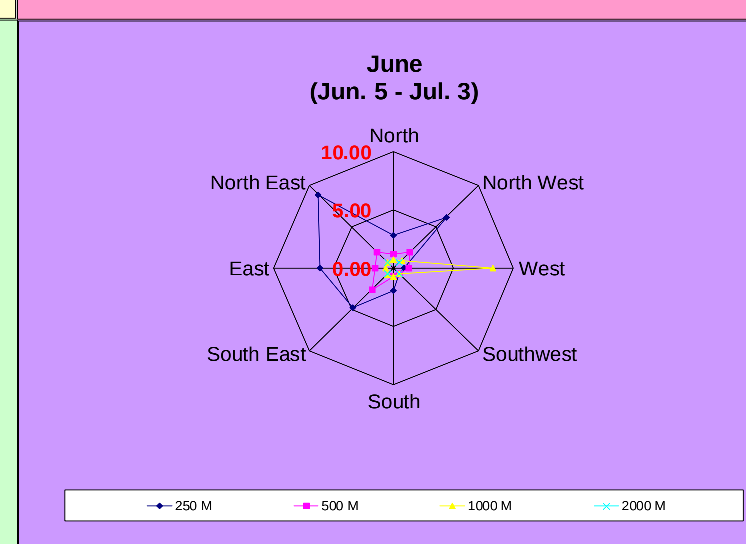


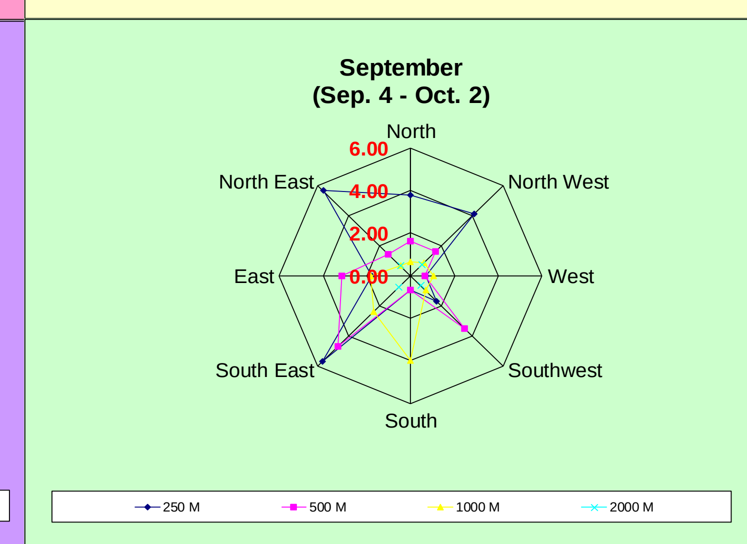


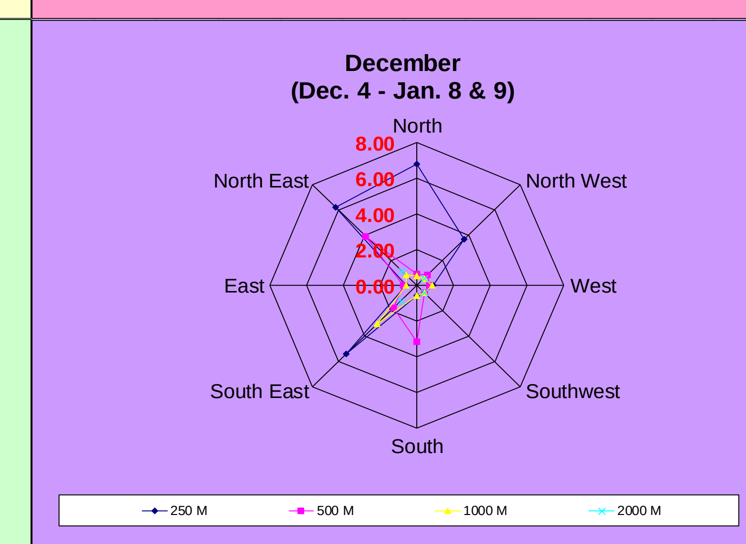












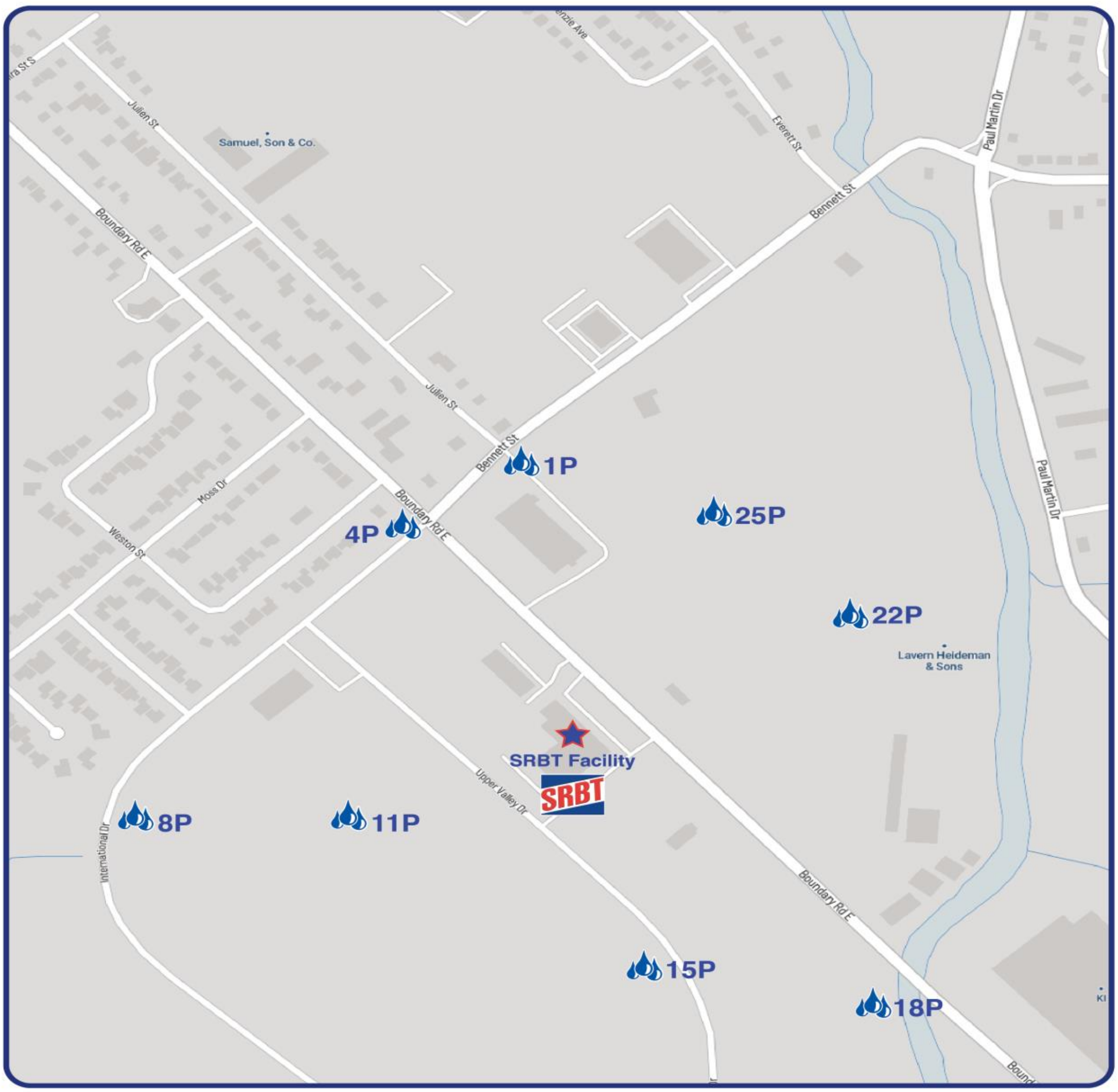
APPENDIX H

Precipitation Monitoring Data

Precipitation Monitoring Data

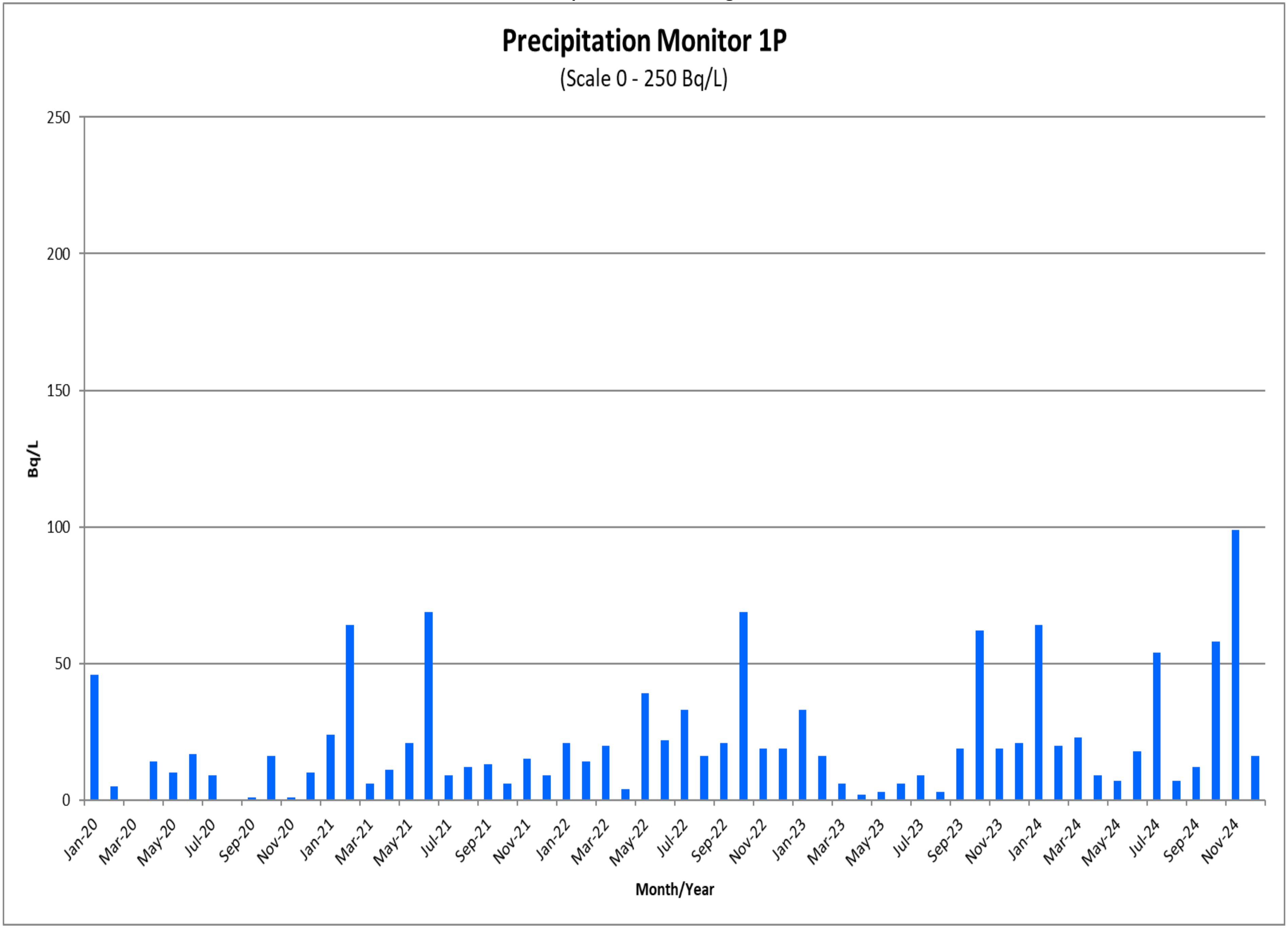
PRECIPITATION SAMPLERS									
	1P	4P	8P	11P	15P	18P	22P	25P	AVG
Sample Collection - Date Range	Bq/L								
Jan. 3 - 31, 2024	64	349	42	85	63	110	75	76	108
Jan. 31 - Mar. 6, 2024	20	27	104	104	40	82	178	18	72
Mar. 6 - Apr. 3, 2024	23	363	64	3	0	41	142	69	88
Apr. 3 - May 1, 2024	9	156	292	19	6	23	0	0	63
May 1 - Jun. 5, 2024	7	66	34	32	17	19	28	29	29
Jun. 5 - Jul. 3, 2024	18	192	15	21	20	29	26	51	47
Jul. 3 - 31, 2024	54	93	67	54	29	24	71	21	52
Jul. 31 - Sep. 4, 2024	7	22	60	12	4	16	243	14	47
Sep. 4 - Oct. 2, 2024	12	52	14	11	13	90	111	17	40
Oct. 2 - Nov. 6, 2024	58	93	35	0	0	84	57	26	44
Nov. 6 - Dec. 4, 2024	99	370	8	57	25	74	96	99	104
Dec. 4, 2024 - Jan. 8, 2025	16	61	79	10	13	131	56	81	56
AVERAGE	32	154	68	34	19	60	90	42	62

Results shaded in blue are <minimum detectable activity (MDA)

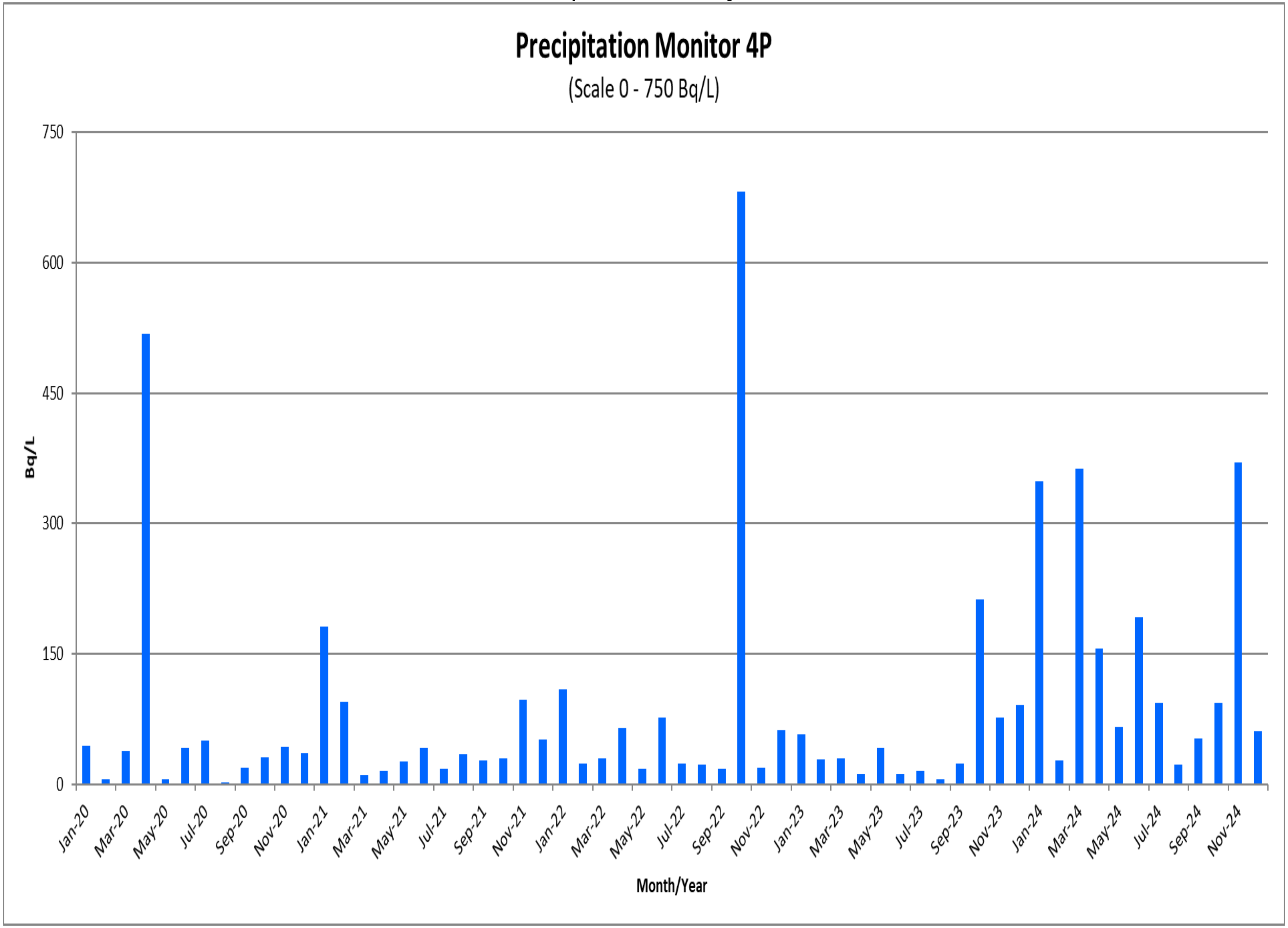


Precipitation Sampling Stations

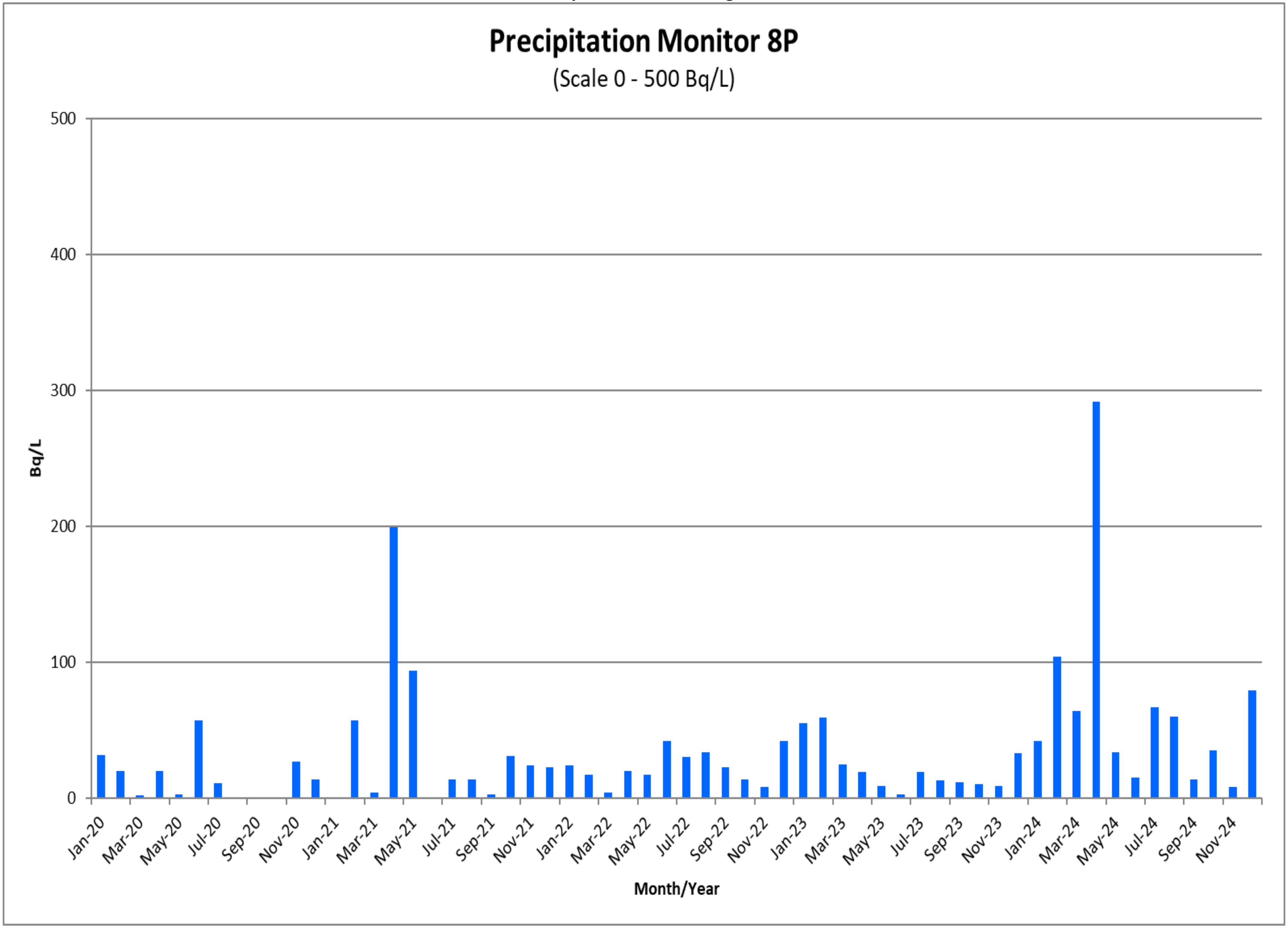
Precipitation Monitoring Data



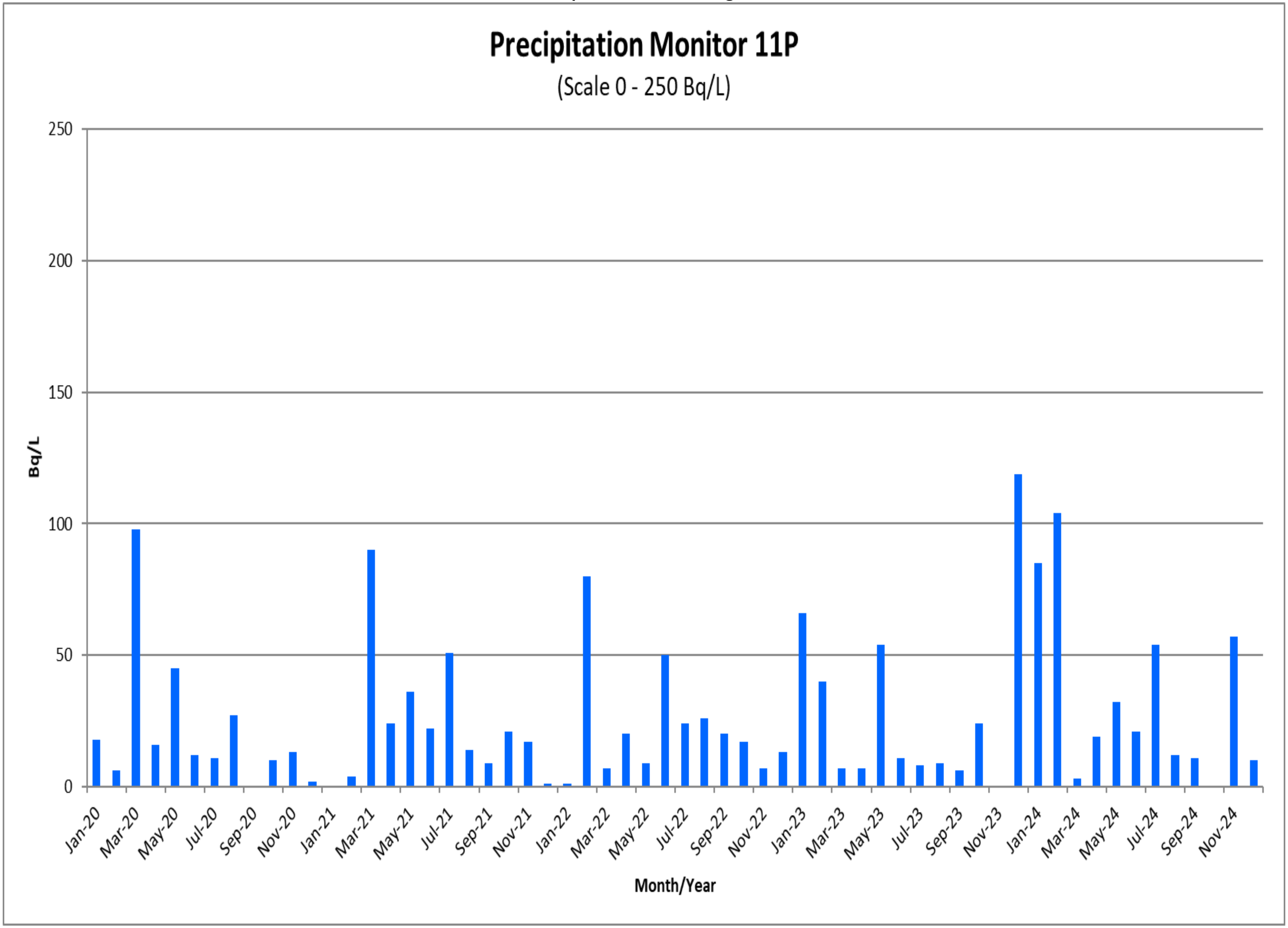
Precipitation Monitoring Data



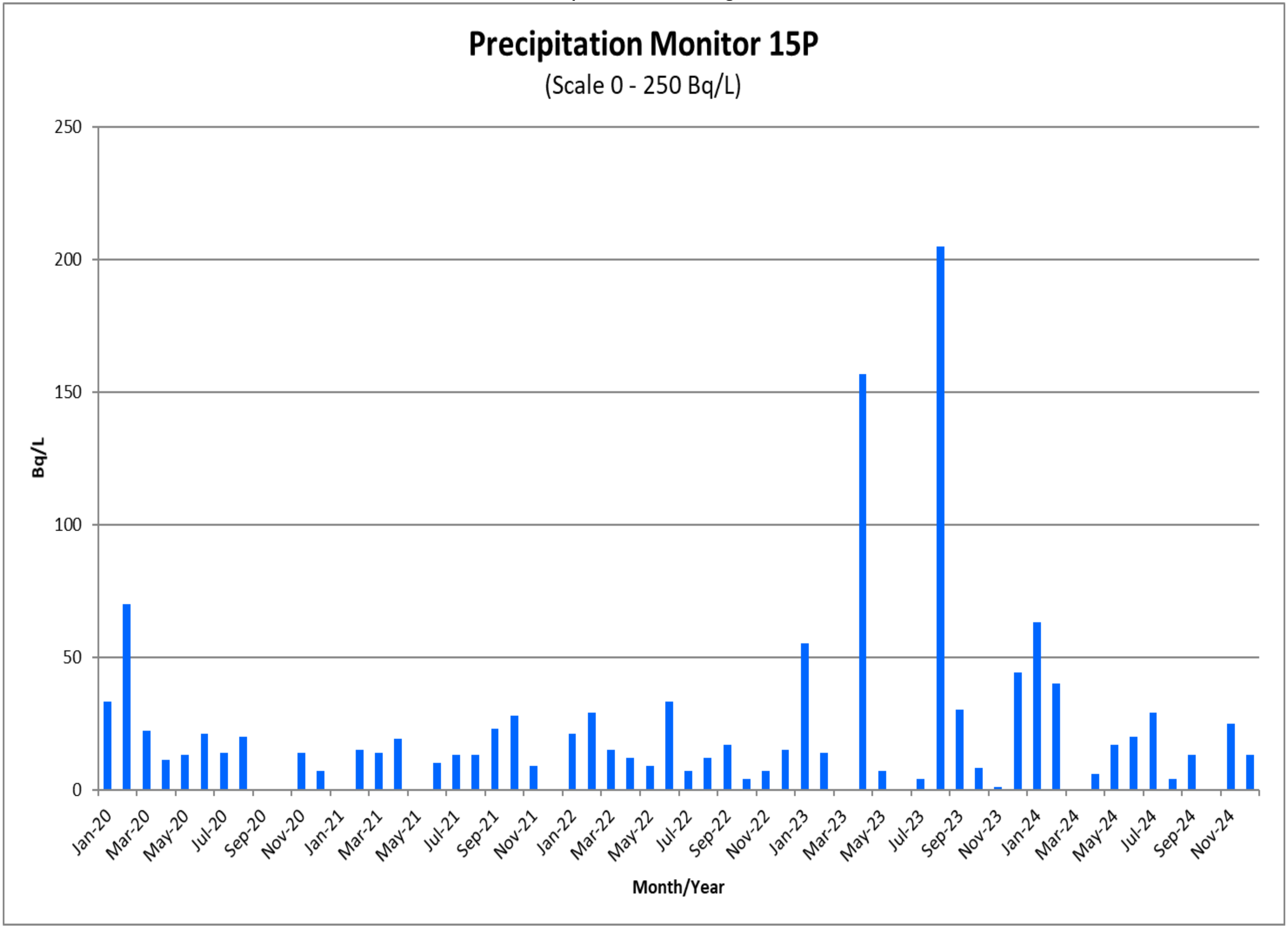
Precipitation Monitoring Data



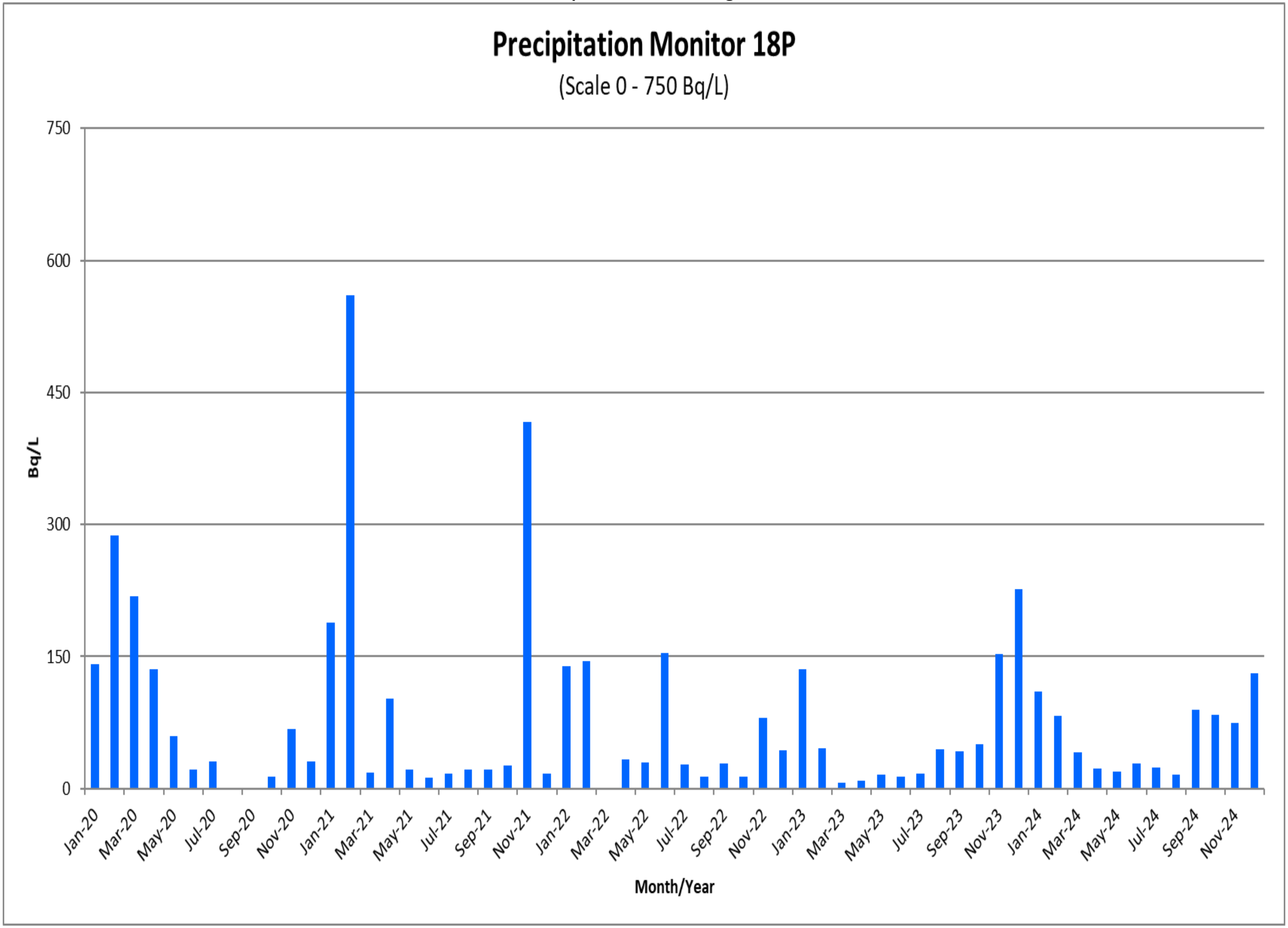
Precipitation Monitoring Data



Precipitation Monitoring Data

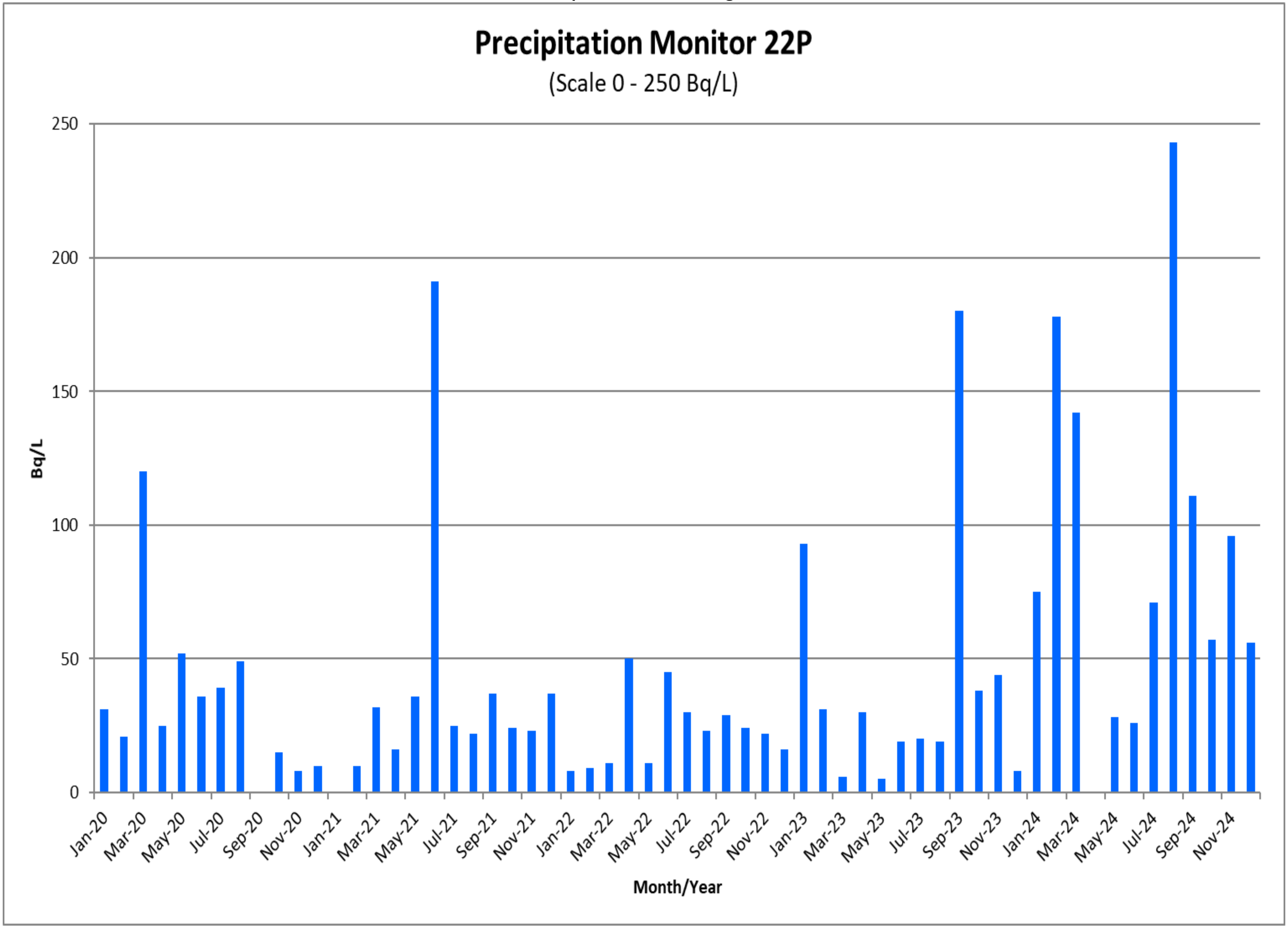


Precipitation Monitoring Data

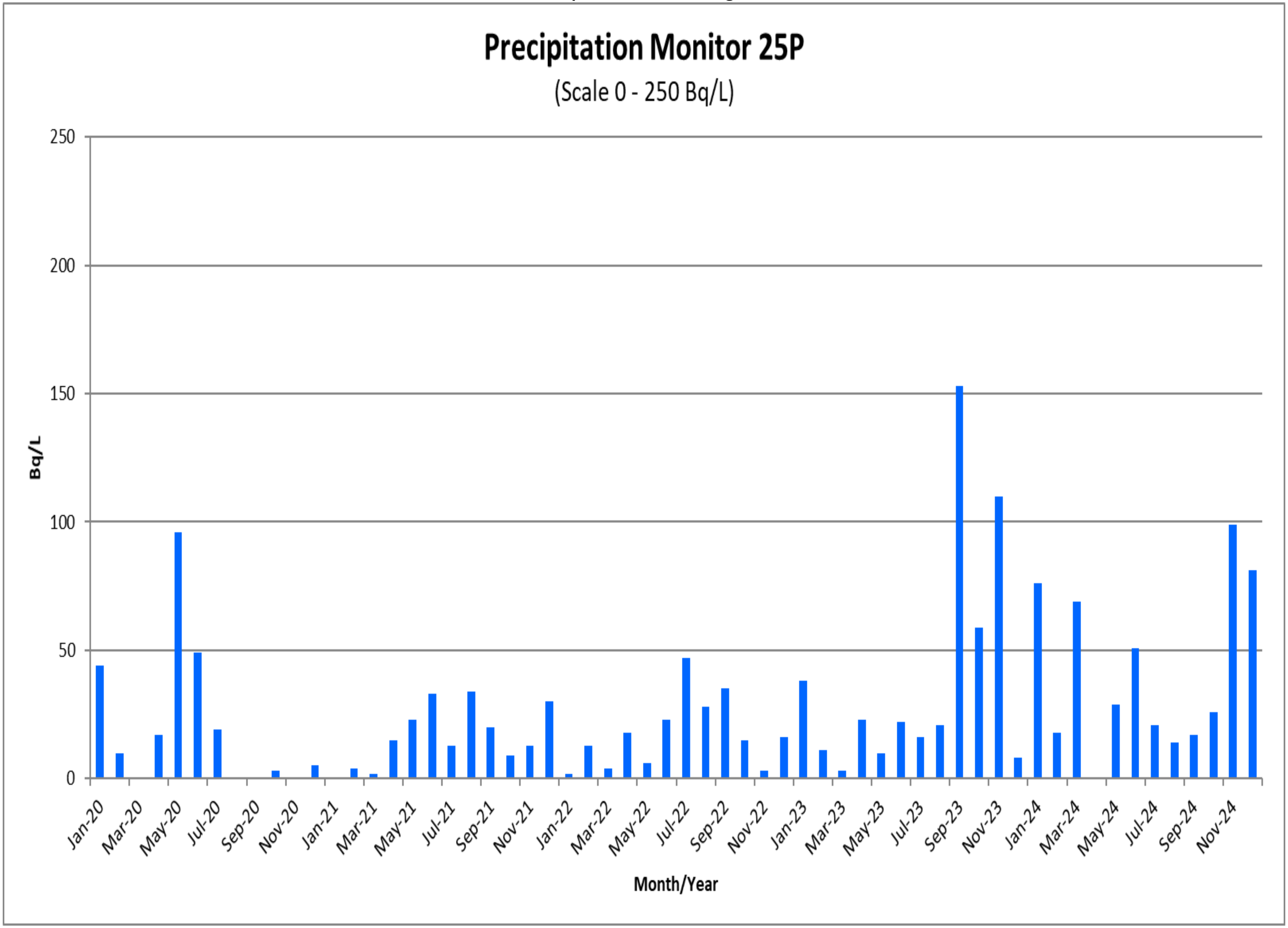


APPENDIX H

Precipitation Monitoring Data



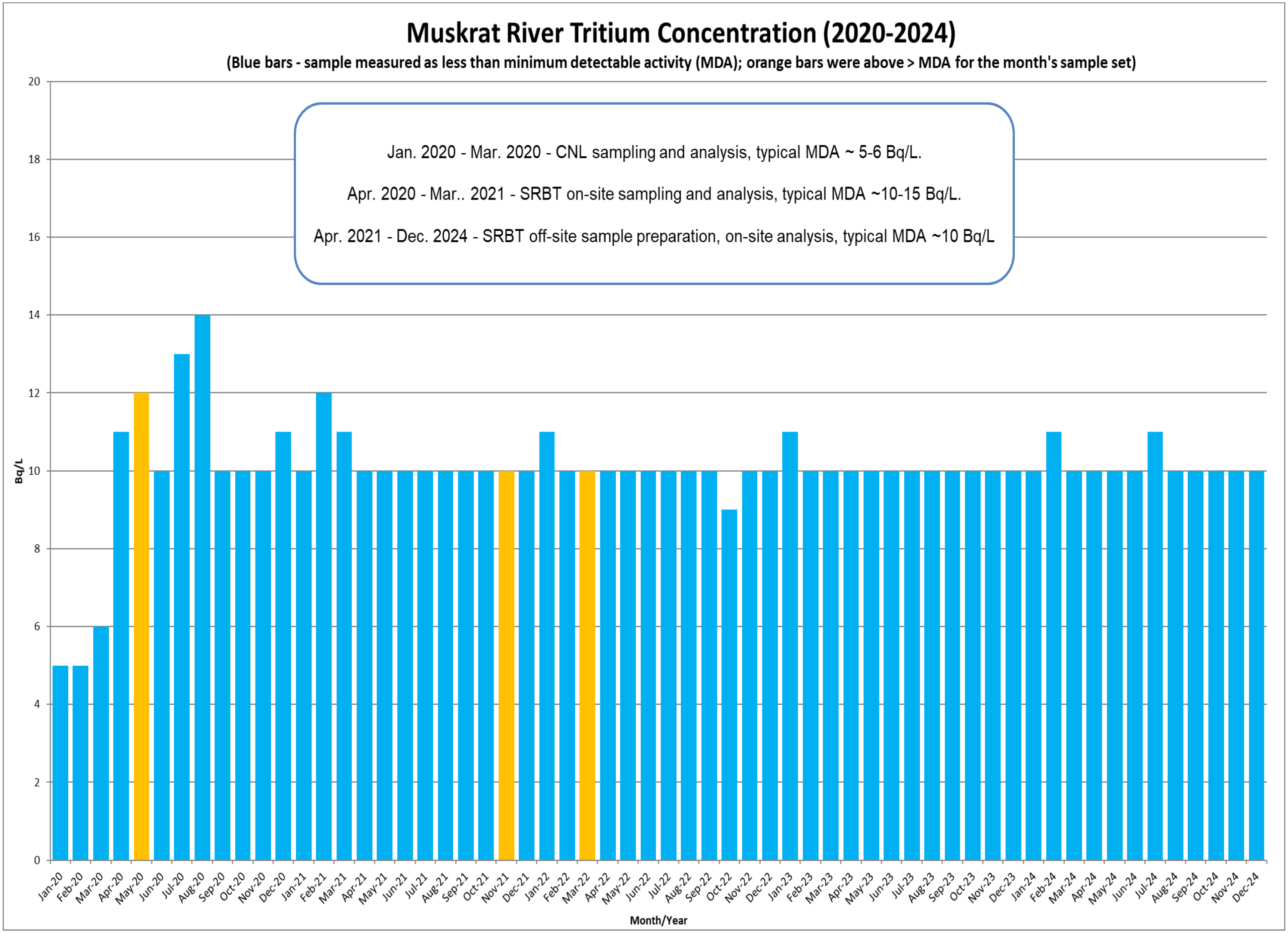
Precipitation Monitoring Data



APPENDIX I

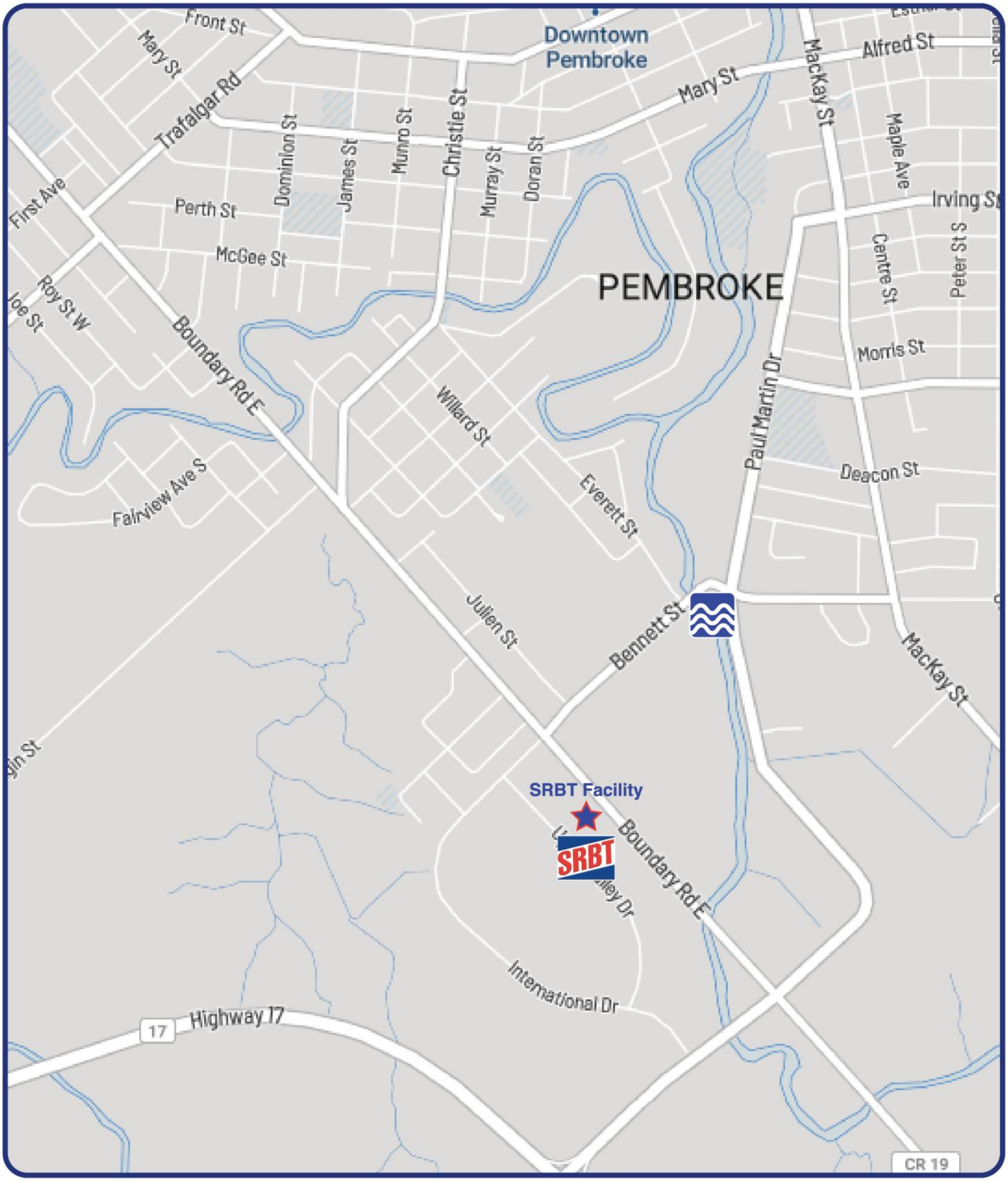
River Water Monitoring Data

River Water Monitoring Data



APPENDIX I

River Water Monitoring Data



River Water Sampling Point

APPENDIX J

Downspout / Facility Runoff Monitoring Data

Downspout / Facility Runoff Monitoring Data

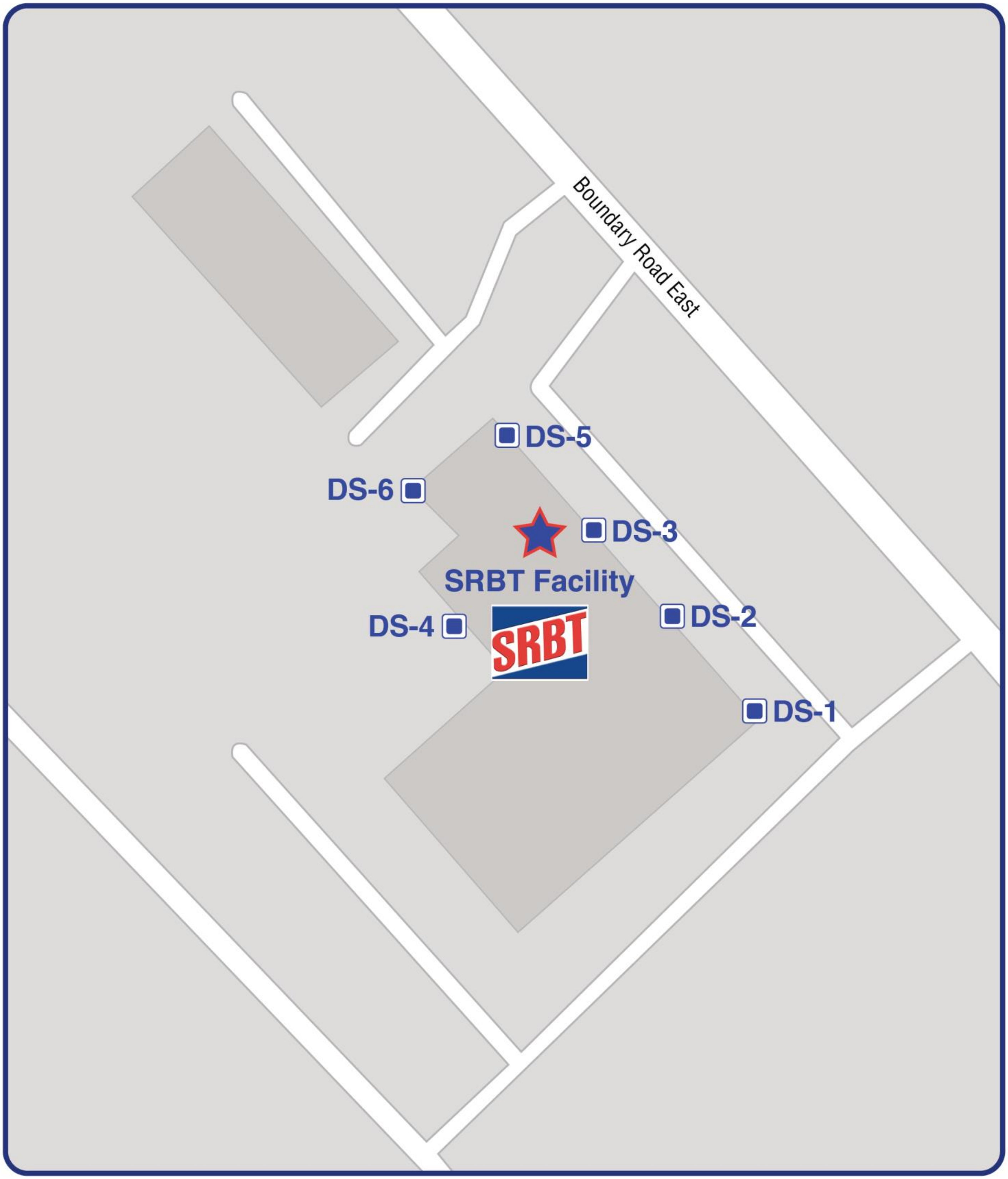
2024 - Tritium Concentration in Facility Downspout / Runoff Water (Bq/L)

Date	Time	DS-1	DS-2	DS-3	DS-4	DS-5	DS-6	MDA
Apr. 18 (light rain)	1000h	No sample	<MDA	<MDA	<MDA	142	136	41
	1115h	No sample	<MDA	<MDA	<MDA	137	237	
	1230h	No sample	<MDA	<MDA	<MDA	<MDA	<MDA	
May 27 (light to moderate rain)	0700h	No sample	<MDA	<MDA	<MDA	<MDA	<MDA	40
	1300h	No sample	<MDA	<MDA	<MDA	<MDA	44	
Jul. 10 (light to moderate rain)	1300h	No sample	181	<MDA	214	129	<MDA	47
	1500h	No sample	294	298	411	291	396	
Aug. 9 (moderate to heavy rain)	0930h	No sample	290	308	208	247	278	48
	1030h	No sample	271	253	196	204	233	
Average (Bq/L) (<MDA taken to be 0)		N/A	115	95	114	128	147	44

Average of all samples obtained (<MDA taken to be 0)	120 Bq/L
Average of all samples obtained (<MDA taken to be MDA value)	140 Bq/L
Average of samples exceeding MDA	235 Bq/L

**MDA = Minimum Detectable Activity*
NOTE: DS-1 sample point blocked and no longer draining runoff.

Downspout / Facility Runoff Monitoring Data



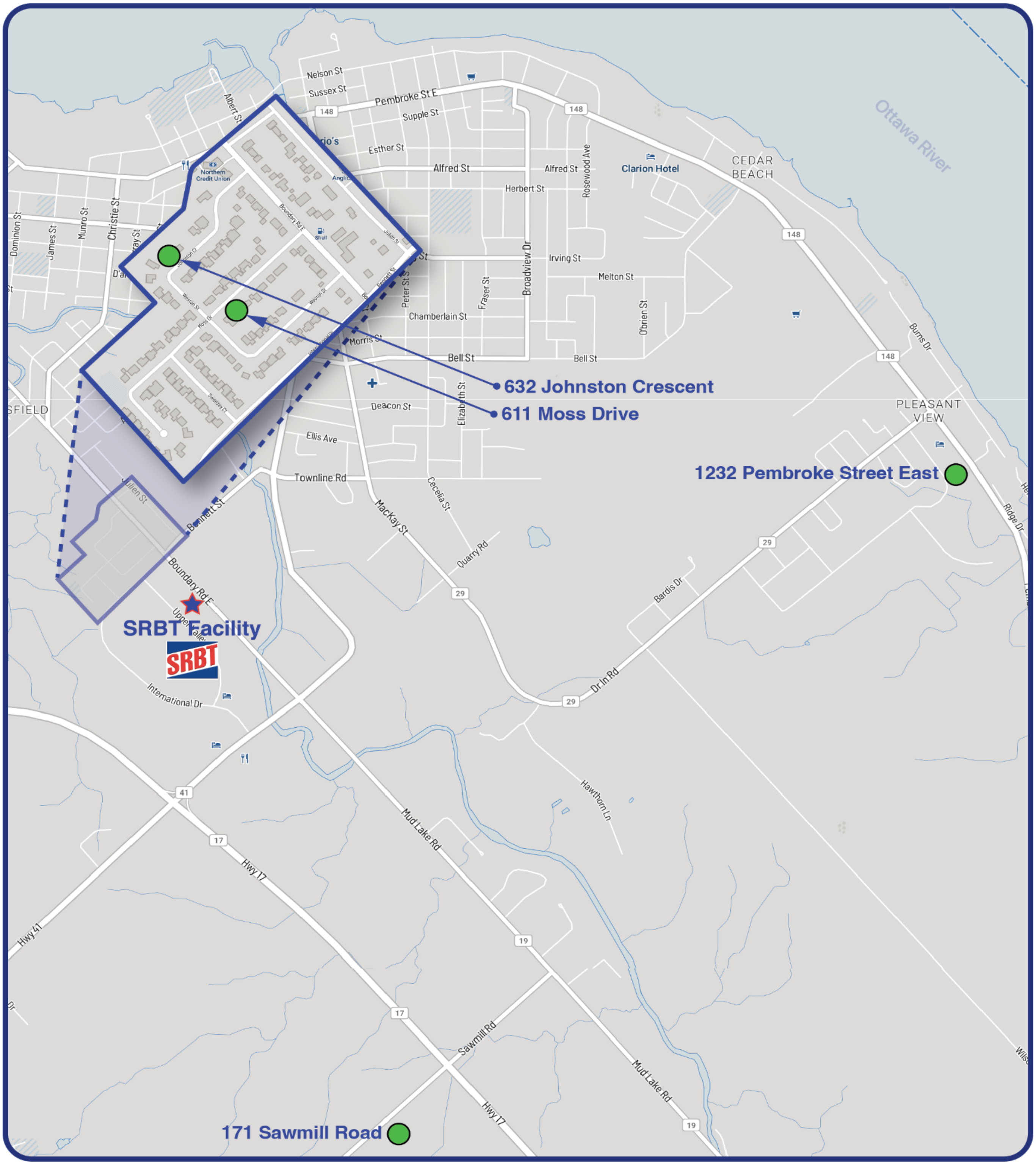
Facility Downspout Runoff Sampling Points

APPENDIX J

APPENDIX K

Produce Monitoring Data

Map – SRBT Produce Sampling 2024



Produce Sample Points

Produce Monitoring Data

2024 Residential Produce Sampling – Free-water Tritium Concentration

Sample	Units	Result
Cucumber 611 Moss Drive	Bq/kg Fresh weight	171
Tomatoes 611 Moss Drive	Bq/kg Fresh weight	189
Carrots 611 Moss Drive	Bq/kg Fresh weight	113
Beans 171 Sawmill Road	Bq/kg Fresh weight	34
Tomatoes 171 Sawmill Road	Bq/kg Fresh weight	12
Cucumber 171 Sawmill Road	Bq/kg Fresh weight	15
Carrots 171 Sawmill Road	Bq/kg Fresh weight	12
Rhubarb 632 Johnston Crescent	Bq/kg Fresh weight	80

2024 Residential Produce Sampling – Organically-bound Tritium (OBT) Concentration

Sample	Units	Result
Tomatoes 611 Moss Drive	OBT Bq/kg Fresh weight	6
Cucumber 611 Moss Drive	OBT Bq/kg Fresh weight	4
Tomatoes 171 Sawmill Road	OBT Bq/kg Fresh weight	0.2
Cucumber 171 Sawmill Road	OBT Bq/kg Fresh weight	0.2

2024 Commercial Produce Sampling – Free-water Tritium Concentration

Sample	Units	Result
Rhubarb - Pembroke 1232 Pembroke St. E	Bq/kg Fresh weight	2

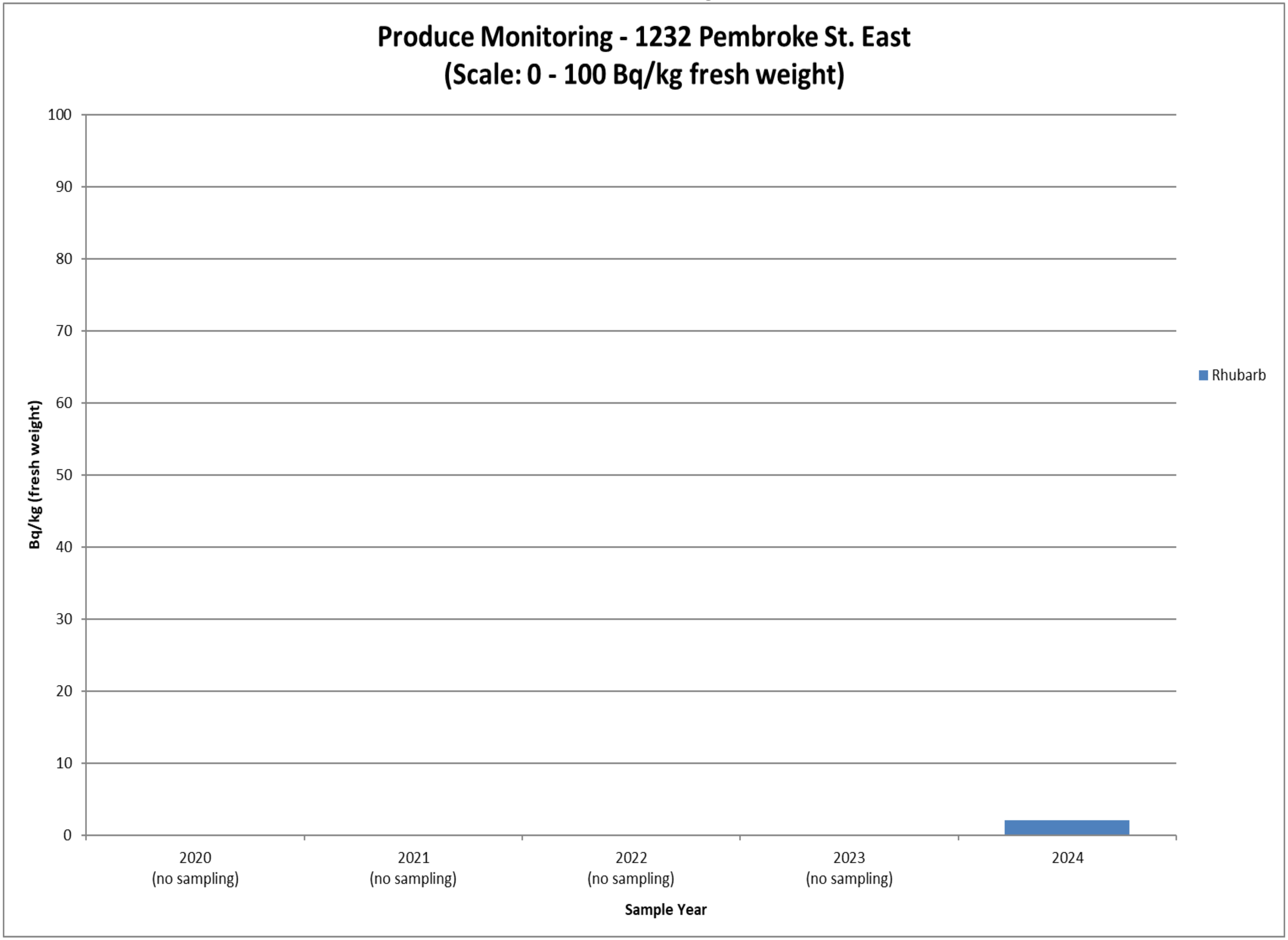
2024 Commercial Produce Sampling – Organically-bound Tritium (OBT) Concentration

Sample	Units	Result
Rhubarb - Pembroke 1232 Pembroke St. E	OBT Bq/kg Fresh weight	0.8

Produce Sampling Data Trends

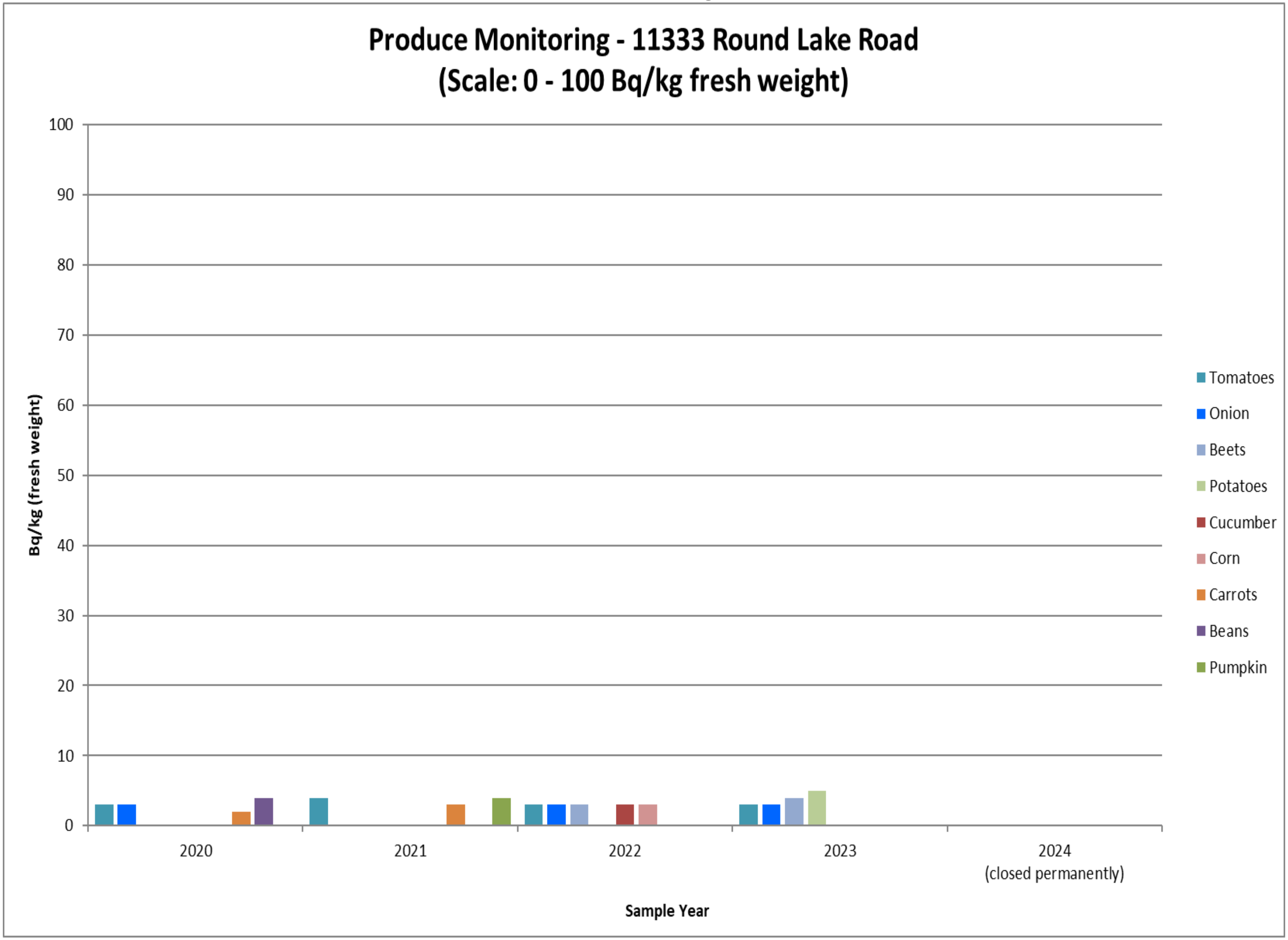
2020-2024

Produce Monitoring Data



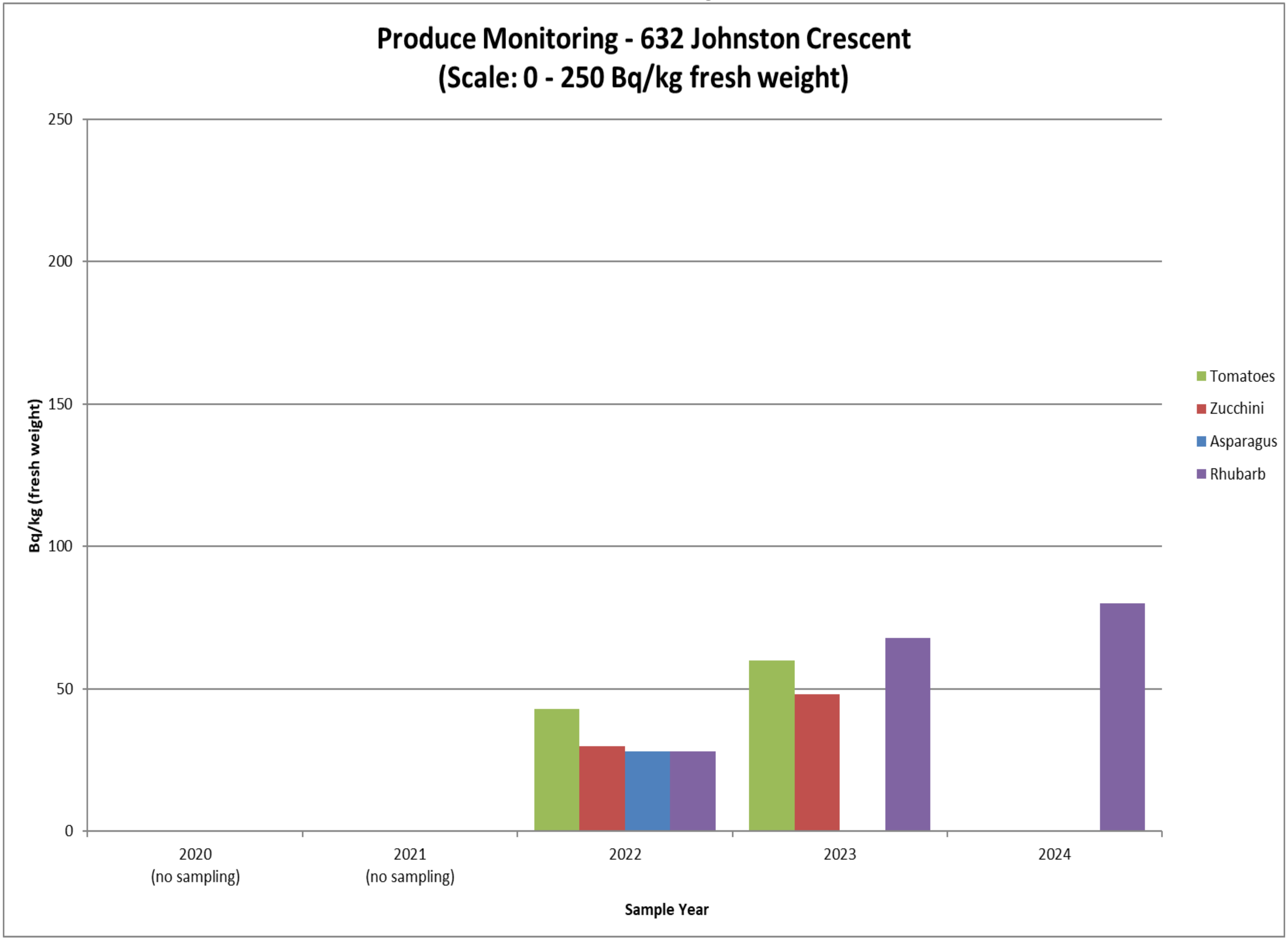
APPENDIX K

Produce Monitoring Data



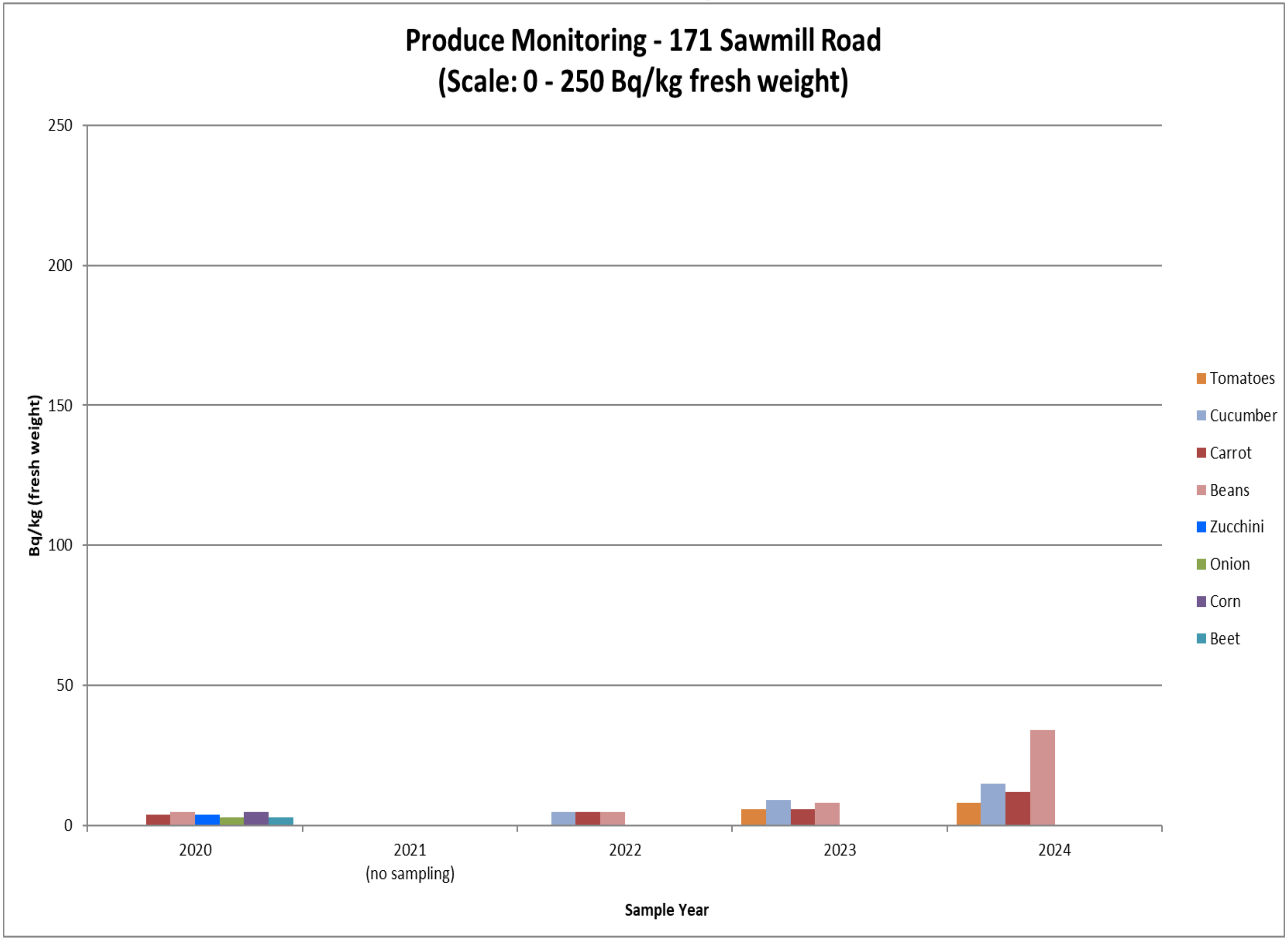
APPENDIX K

Produce Monitoring Data



APPENDIX K

Produce Monitoring Data



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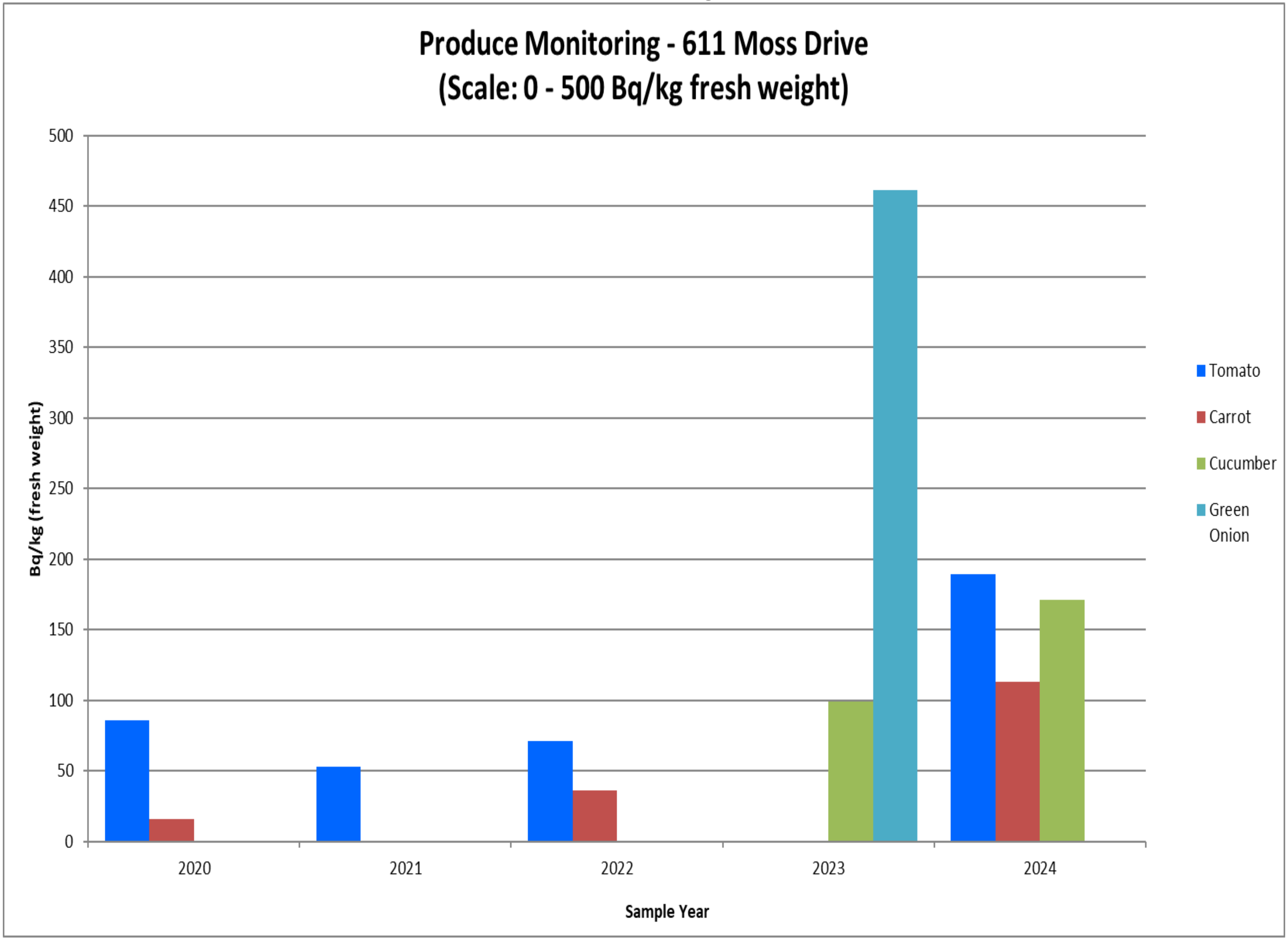

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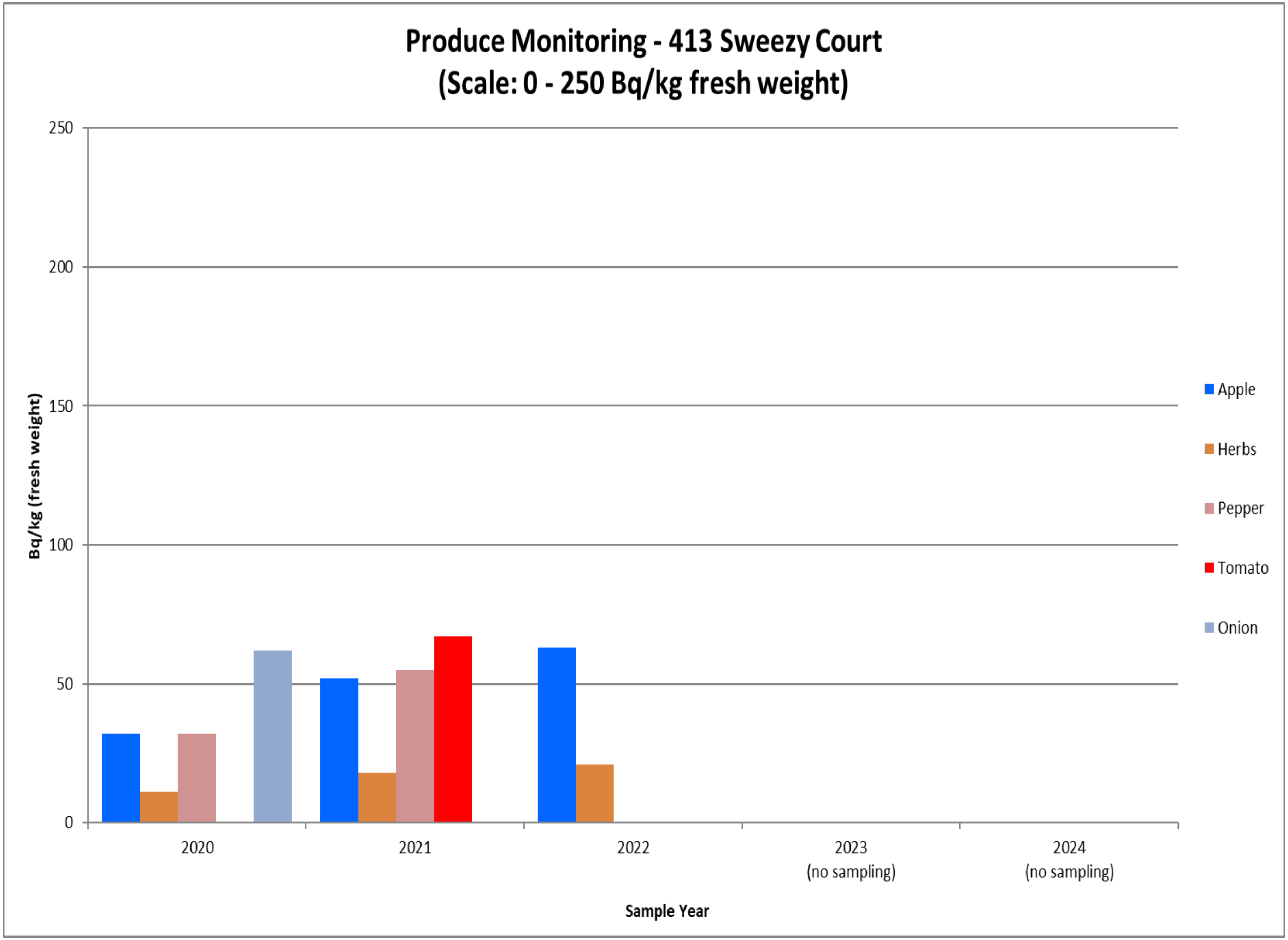
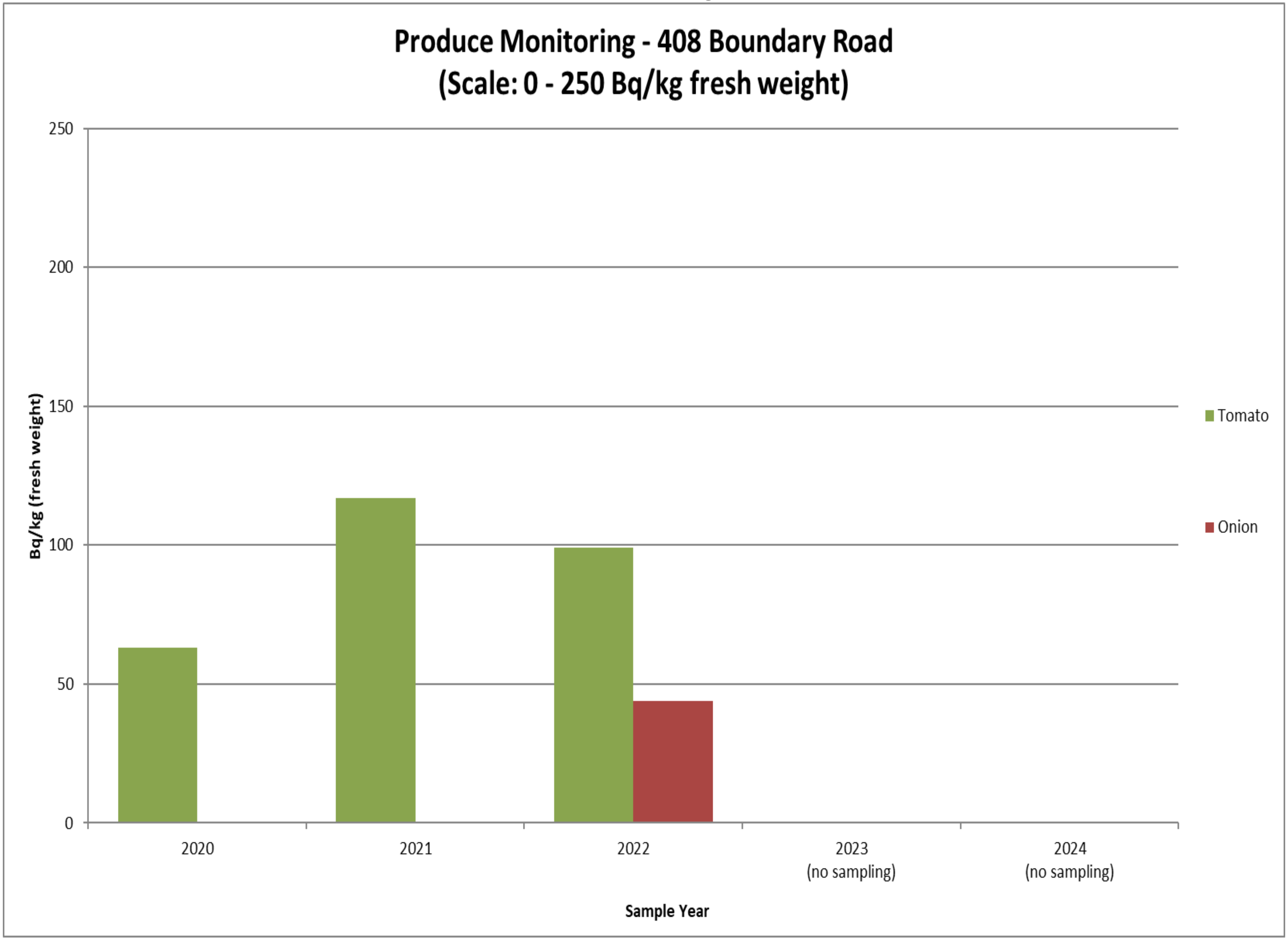


APPENDIX K

Produce Monitoring Data



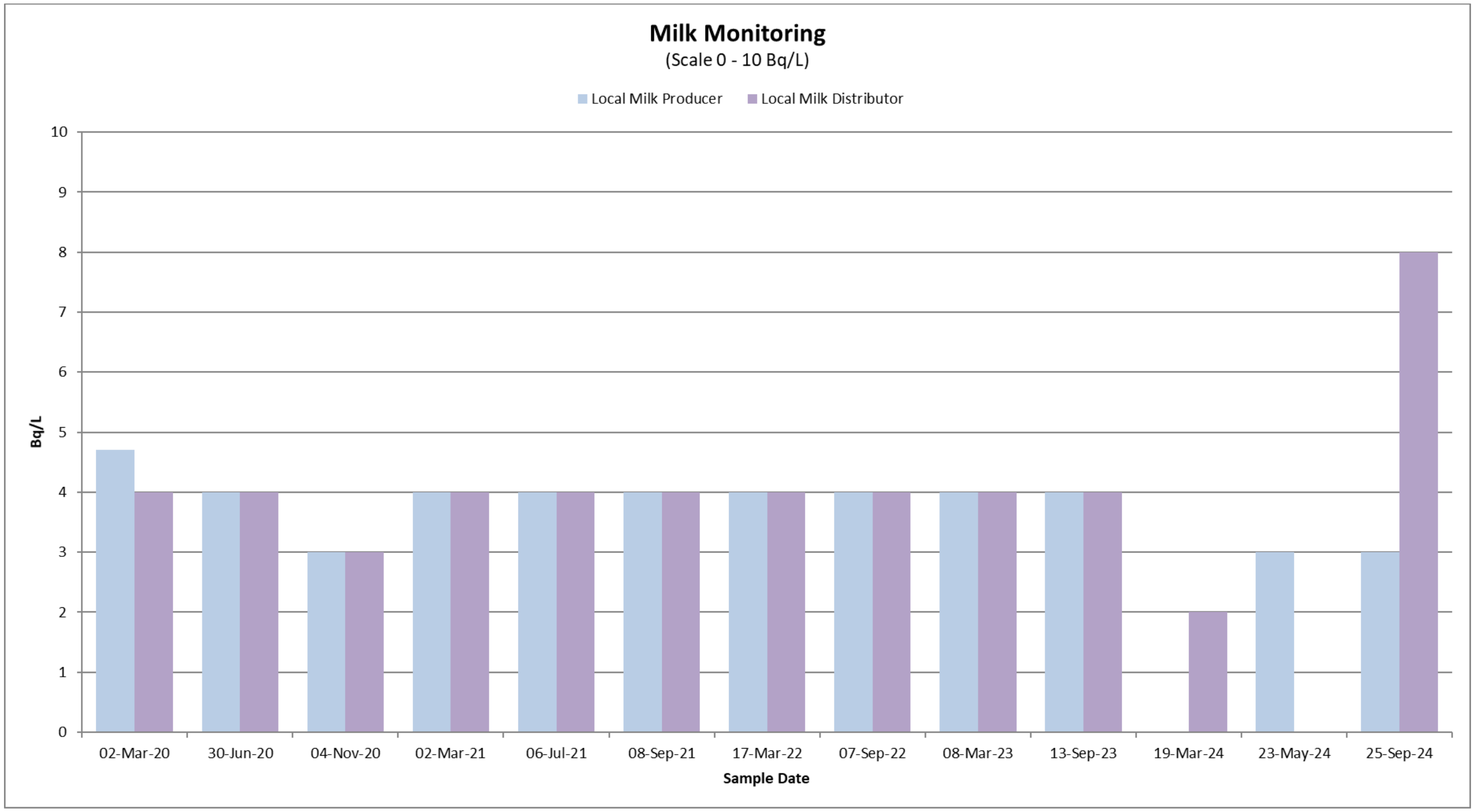
APPENDIX K

APPENDIX L

Milk Monitoring Data

Milk Monitoring Data

MILK MONITORING		
Results shaded in blue are <MDA (minimum detectable activity)		
	LOCAL MILK PRODUCER	LOCAL MILK DISTRIBUTOR
	Bq/L	Bq/L
02-Mar-20	4.7	4
30-Jun-20	4	4
04-Nov-20	3	3
02-Mar-21	4	4
06-Jul-21	4	4
08-Sep-21	4	4
17-Mar-22	4	4
07-Sep-22	4	4
08-Mar-23	4	4
13-Sep-23	4	4
19-Mar-24		2
23-May-24	3	
25-Sep-24	3	8



APPENDIX L

APPENDIX M

Weather Data

WEATHER DATA SUMMARY (2020-24)									
Month	**Precip Counts, # (TOTAL)**	**Wind Speed, m/s (AVG)**	**Gust Speed, m/s (AVG)**	**Wind Direction, ø (AVG)**	**Temp, °C (AVG)**	**RH, % (AVG)**	**DewPt, °C (AVG)**	**Average wind sector (NSEW)**	**Total precipitation (rain eq. mm)**
January-2020	246	1.6	2.7	245.3	-7.4	84.1	-9.7	WSW	49
February-2020	165	1.9	3.4	251.2	-7.4	73.2	-11.6	WSW	33
March-2020	374	1.8	3.2	232.0	0.2	71.3	-4.9	SW	75
April-2020	261	2.0	3.8	Wind Measurement Malfunction	4.6	61.4	-3.1	Wind Measurement Malfunction	52
May-2020	375	1.2	2.8		12.1	59.4	3.2		75
June-2020	297	1.3	2.7		19.0	70.2	12.9		59
July-2020	358	1.0	2.2		23.2	72.5	17.4		72
August-2020	1131	0.6	1.3		18.6	82.1	15.1		226
September-2020	344	-6.9	-6.7		13.5	79.3	9.7		69
October-2020	296	0.0	0.2		5.9	78.1	2.2		59
November-2020	259	0.0	1.5		3.7	78.7	-0.9		52
December-2020	192	0.0	1.1		-4.6	84.9	-6.8		38
January-2021	66	0.1	0.9		-7.2	83.1	-9.6		13
February-2021	121	0.3	1.2		-8.1	75.6	-11.8		24
March-2021	Weather Station taken offline for investigation, corrective maintenance and component replacement.								
April-2021									
May-2021									
June-2021									
July-2021									
August-2021									
September-2021									
October-2021	271	2.7	4.2	201.9	10.9	83.8	8.1	SSW	54
November-2021	102	3.1	4.7	225.2	0.9	79.4	-2.5	SW	20
December-2021	253	4.0	6.1	209.2	-4.5	79.4	-7.6	SSW	51
January-2022	80	3.4	5.0	223.1	-13.8	77.7	-17.0	SW	16
February-2022	36	3.5	5.3	222.7	-13.6	78.4	-16.6	SW	7
March-2022	198	3.8	5.8	186.9	-1.1	72.0	-5.8	SSW	40
April-2022	401	4.3	6.6	192.0	6.2	66.3	-0.5	SSW	80
May-2022	116	3.5	5.5	48.9	17.7	75.1	12.7	NE	23
June-2022	100	3.2	5.1	151.8	16.0	63.0	7.6	SSE	20
July-2022	Precipitation counting malfunction	2.8	4.8	153.6	20.6	71.0	14.7	SSE	Precipitation counting malfunction
August-2022		2.6	4.3	214.0	19.9	77.4	15.4	SW	
September-2022		2.7	4.4	210.6	14.8	83.6	11.8	SSW	
October-2022		2.6	4.1	189.7	8.6	79.5	4.9	SSW	
November-2022		3.9	6.0	218.9	3.0	73.2	-1.7	SW	
December-2022	359	3.4	5.1	200.2	-2.4	84.2	-4.8	SSW	72
January-2023	89	2.9	4.4	224.2	-7.1	84.7	-9.3	SW	18
February-2023	134	3.3	5.1	203.2	-7.2	76.8	-10.7	SSW	27
March-2023	348	3.8	6.0	227.4	-1.2	71.7	-5.9	SW	70
April-2023	509	3.3	5.2	197.7	8.2	67.6	1.8	SSW	102
May-2023	184	3.1	5.2	228.0	13.7	56.1	3.9	SW	37
June-2023	596	2.7	4.3	207.3	18.4	73.3	13.0	SSW	119
July-2023	598	2.4	4.0	221.4	20.5	78.4	16.2	SW	120
August-2023	244	2.8	4.5	238.4	18.2	81.0	14.6	SW	49
September-2023	149	2.0	3.3	228.5	16.3	80.1	12.4	SW	30
October-2023	430	3.2	5.0	230.6	8.9	84.9	6.4	SW	86
November-2023	91	3.4	5.3	229.2	0.0	80.6	-3.1	SW	18
December-2023	181	2.6	4.0	202.8	-2.6	85.9	-4.7	SSW	36
January-2024	86	3.0	4.6	206.4	-6.8	83.3	-9.2	SSW	17
February-2024	49	3.2	4.8	208.7	-2.8	77.1	-6.4	SSW	10
March-2024	142	4.5	6.9	232.8	1.2	64.3	-5.4	SW	28
April-2024	234	3.8	6.0	199.2	7.0	71.7	1.6	SSW	47
May-2024	200	3.1	5.0	202.7	16.3	69.4	10.1	SSW	40
June-2024	604	3.2	5.3	231.0	18.5	76.3	13.9	SW	121
July-2024	237	2.5	4.1	226.0	21.5	76.9	16.9	SW	47
August-2024	839	2.8	4.5	239.2	19.0	78.4	14.8	SW	168
September-2024	577	2.5	4.0	202.4	16.6	82.7	13.3	SSW	115
October-2024	270	3.1	4.9	223.9	8.5	77.3	4.4	SW	54
November-2024	200	3.3	5.1	233.2	2.0	80.5	-1.3	SW	40
December-2024	274	3.6	5.5	223.6	-6.6	84.3	-8.8	SW	55

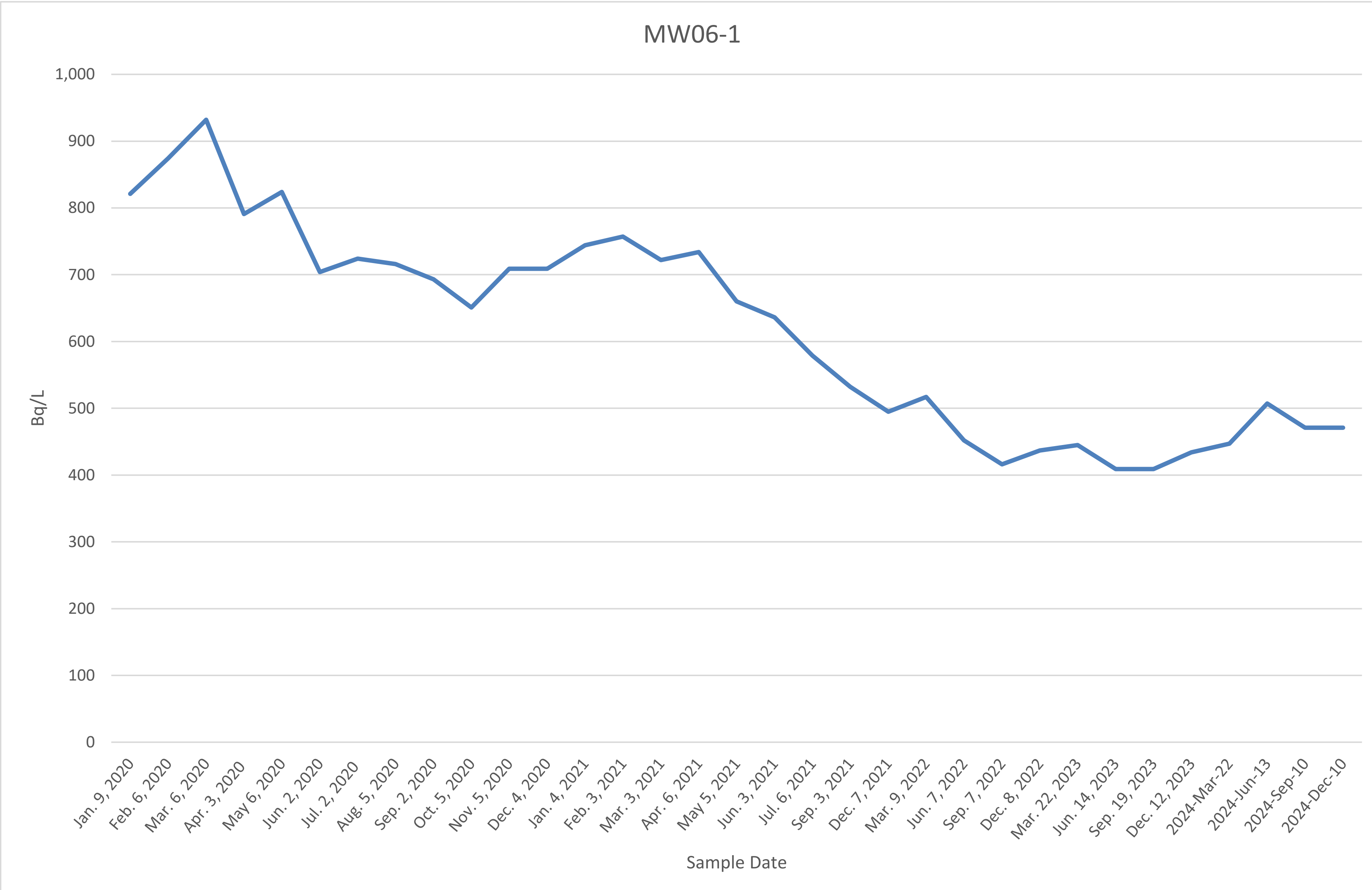
APPENDIX N

Groundwater Monitoring Data

Groundwater Monitoring Data - 2024

Well I.D.	Description (location, profile)		Distance from Stacks (m)	2024-03-22 (Bq/L)	2024-06-13 (Bq/L)	2024-09-10 (Bq/L)	2024-12-10 (Bq/L)	2024 Avg. (Bq/L)
Engineered Sampling Wells								
MW06-1	SRB SITE	IN SOIL	50	447	507	471	471	**474**
MW06-2	SRB SITE	IN SOIL	75	487	499	450	441	**469**
MW06-3	SRB SITE	IN SOIL	50	*125*	175	139	119	**140**
MW06-8	SRB SITE	IN SOIL	55	454	507	436	422	**455**
MW06-9	SRB SITE	IN SOIL	25	965	1,015	913	867	**940**
MW06-10	SRB SITE	SURFACE OF BEDROCK	0	22,470	29,081	21,047	22,204	**23,701**
MW07-11	SRB SITE	SURFACE OF BEDROCK	75	776	867	661	492	**699**
MW07-12	SRB SITE	SURFACE OF BEDROCK	55	418	462	388	408	**419**
MW07-13	SRB SITE	SURFACE OF BEDROCK	50	1,817	1,739	1,535	1,212	**1,576**
MW07-15	SRB SITE	SURFACE OF BEDROCK	25	942	996	871	884	**923**
MW07-16	SRB SITE	SURFACE OF BEDROCK	15	548	637	540	510	**559**
MW07-17	SRB SITE	DEEPER BEDROCK	15	253	240	222	201	**229**
MW07-18	SRB SITE	SURFACE OF BEDROCK	10	477	608	461	412	**490**
MW07-19	SRB SITE	SURFACE OF BEDROCK	20	635	655	569	442	**575**
MW07-20	SUPERIOR PROPANE PROPERTY	SURFACE OF BEDROCK	90	211	230	202	184	**207**
MW07-21	SUPERIOR PROPANE PROPERTY	SURFACE OF BEDROCK	110	257	320	246	227	**263**
MW07-22	SRB SITE	SURFACE OF BEDROCK	70	588	557	525	512	**546**
MW07-23	SRB SITE	SURFACE OF BEDROCK	90	851	847	773	775	**812**
MW07-24	HARRINGTON PROPERTY	SURFACE OF BEDROCK	115	1,159	1,182	1,070	1,016	**1,107**
MW07-26	SRB SITE	SURFACE OF BEDROCK	50	247	228	184	176	**209**
MW07-27	CITY PROPERTY	SURFACE OF BEDROCK	55	1,143	1,105	1,019	840	**1,027**
MW07-28	CITY PROPERTY	DEEPER BEDROCK	55	436	356	395	324	**378**
MW07-29	SRB SITE	DEEPER BEDROCK	10	598	521	490	514	**531**
MW07-31	SRB SITE	DEEPER BEDROCK	70	248	324	238	44	**214**
MW07-32	HARRINGTON PROPERTY	DEEPER BEDROCK	115	42	90	51	70	**63**
MW07-34	SRB SITE	SHALLOW BEDROCK	10	603	666	574	627	**618**
MW07-35	CITY PROPERTY	SHALLOW BEDROCK	55	963	988	868	827	**912**
MW07-36	CITY PROPERTY	SHALLOW BEDROCK	80	1,048	1,142	953	963	**1,027**
MW07-37	SRB SITE	SHALLOW BEDROCK	60	693	663	628	648	**658**
Residential and Business Wells								
RW-2	185 MUD LAKE ROAD		1,100	22		21		**22**
RW-3	183 MUD LAKE ROAD		1,100	33		***No sample***		**33**
RW-5	171 SAWMILL ROAD		2,300	10		5		**8**
RW-6	40987 HWY 41		1,400	4		5		**5**
RW-7	40925 HWY 41		1,600	5		5		**5**
B-1	VALLEY POOL SERVICE OFFICE		160	763		672		**718**
B-2	SUPERIOR PROPANE TRUCK WASH		250	300		283		**292**

Groundwater Monitoring Data



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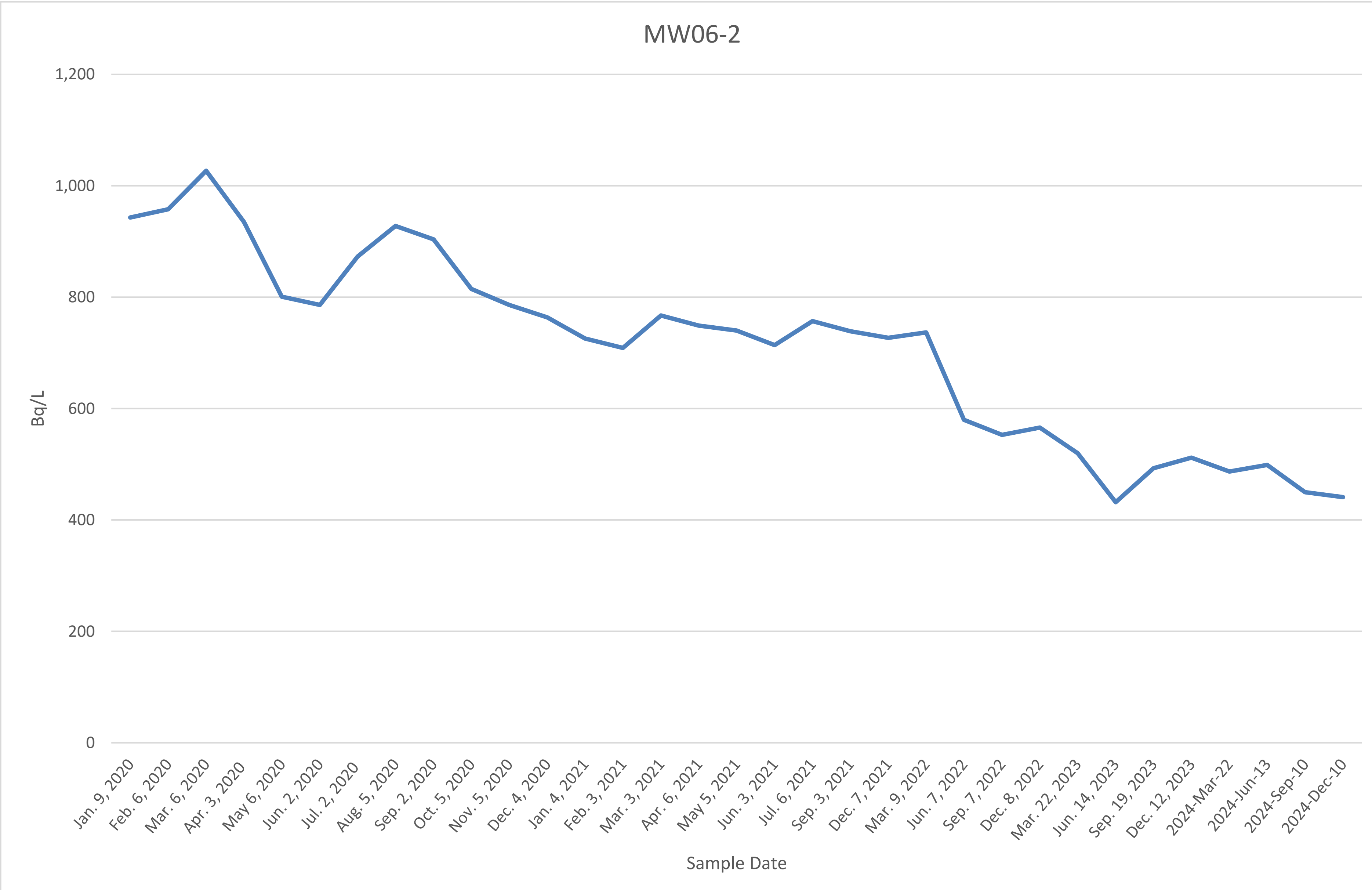
Groundwater Monitoring Data



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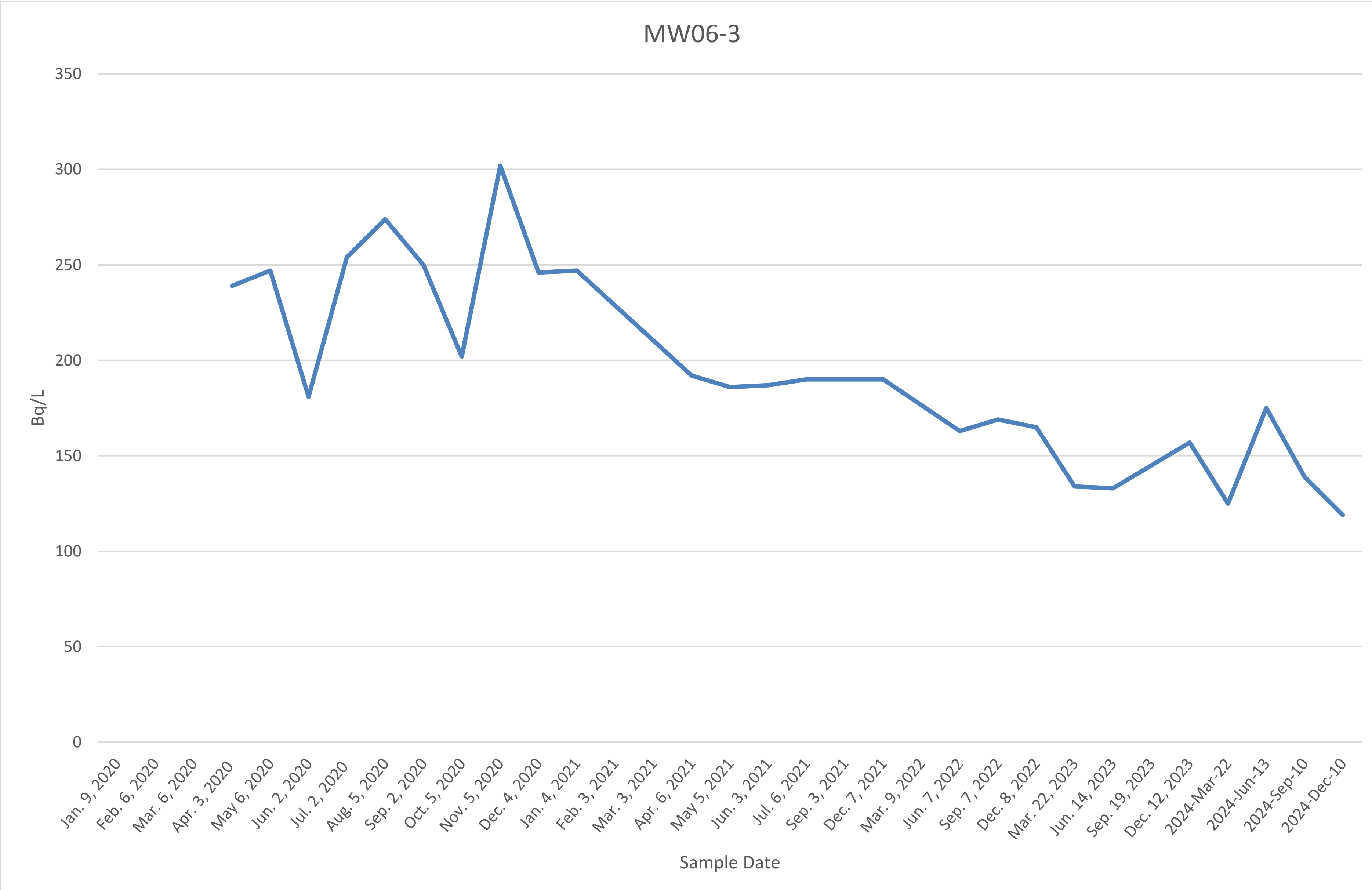

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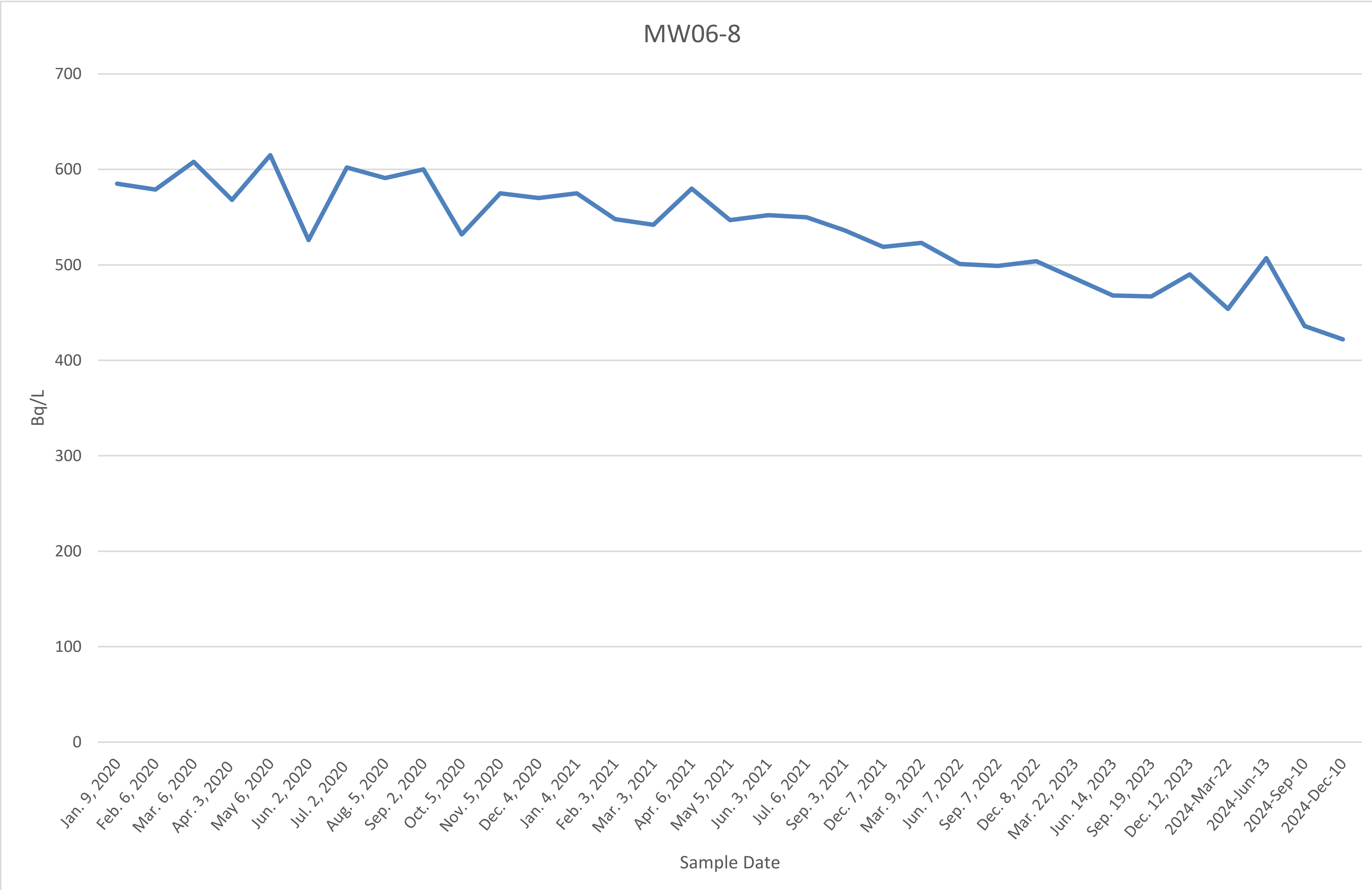

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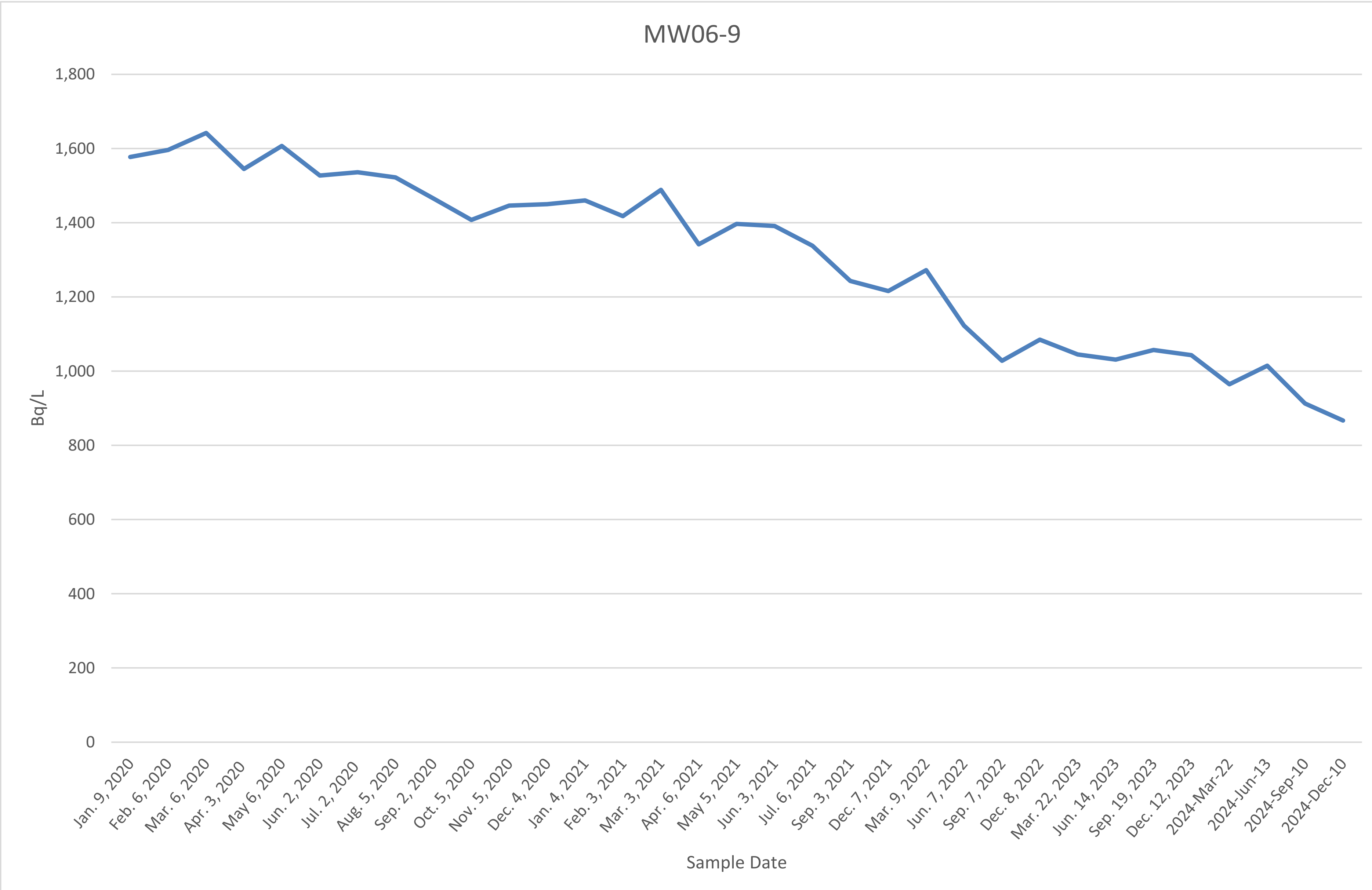

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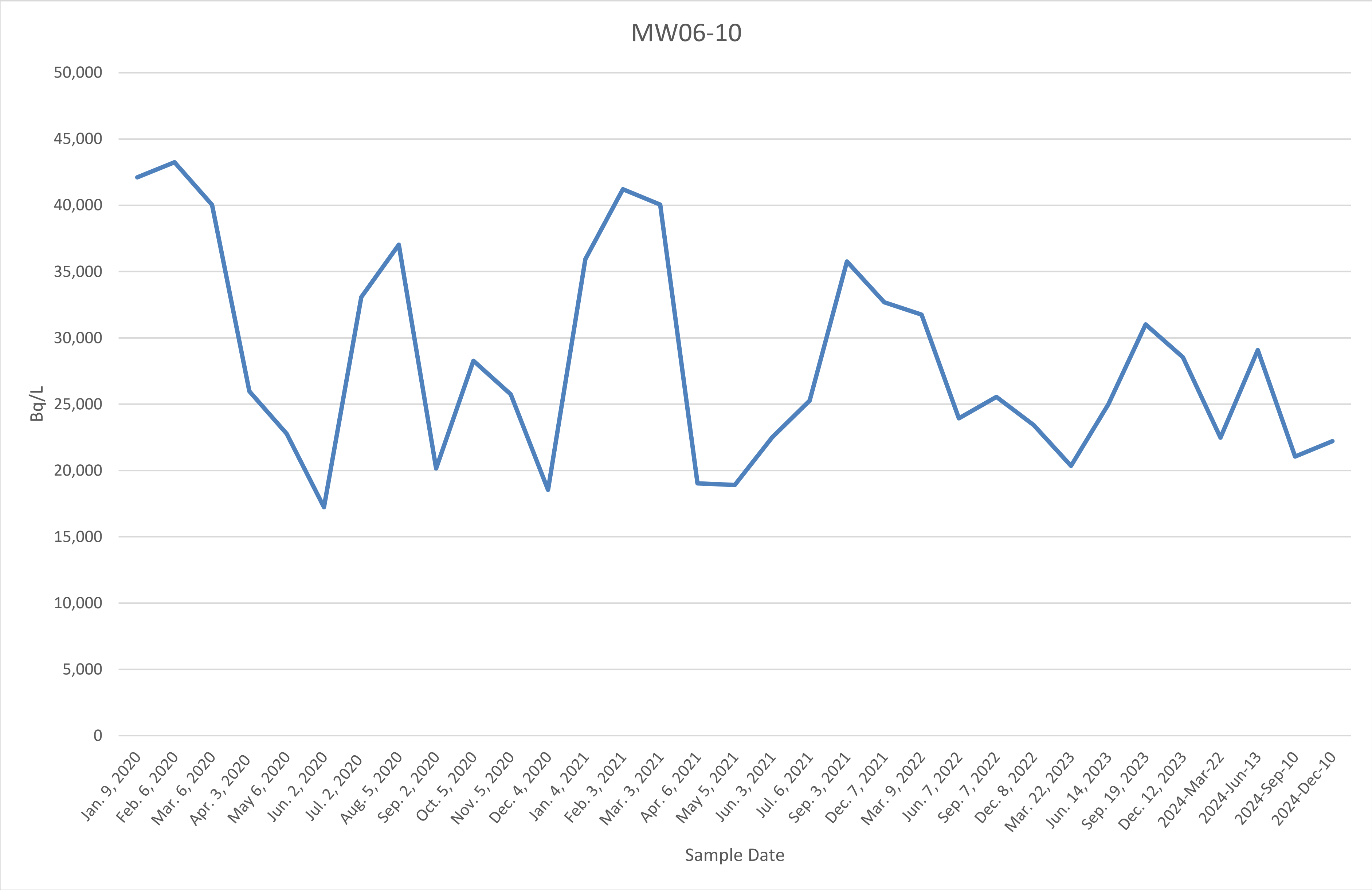

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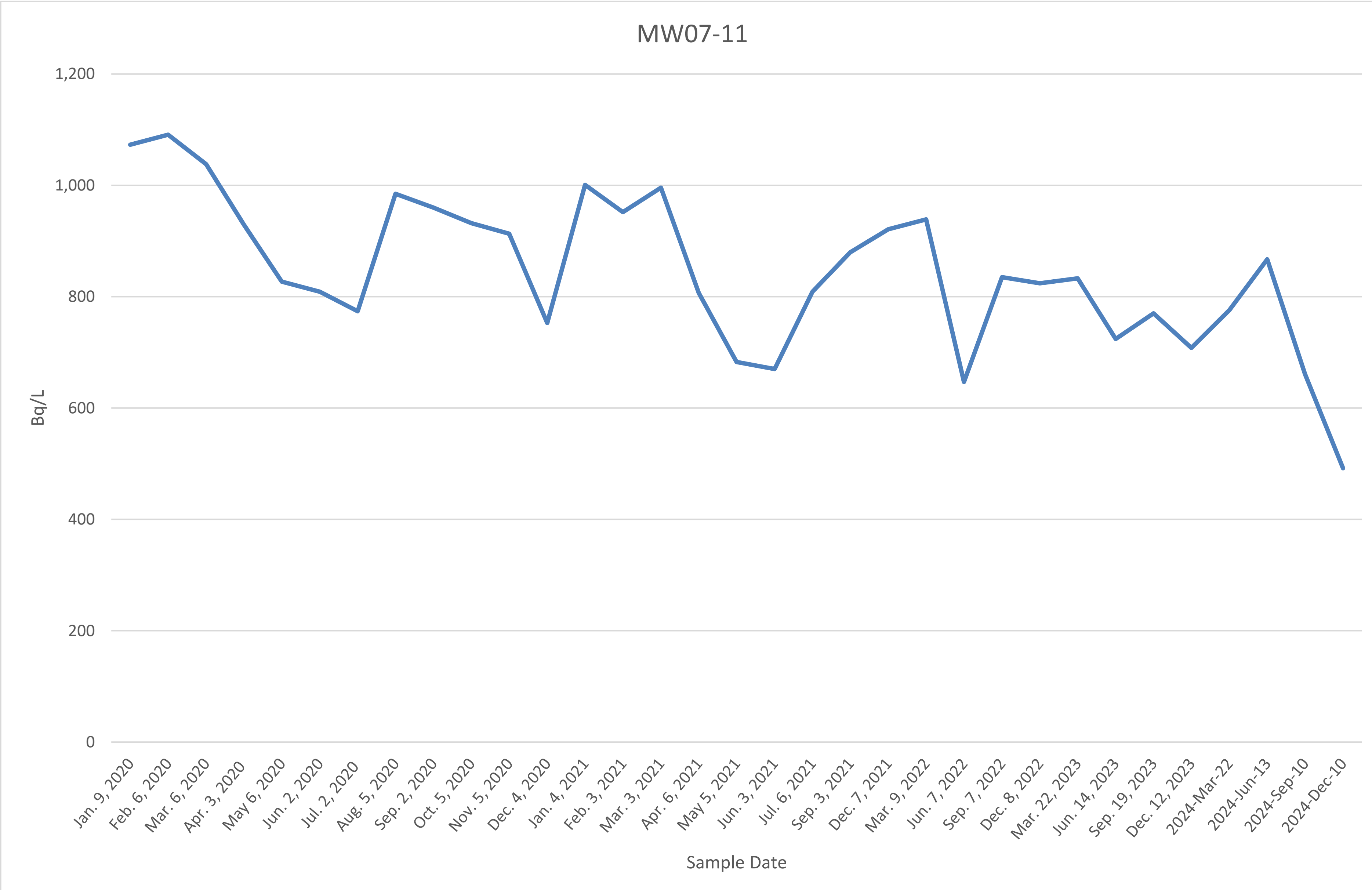

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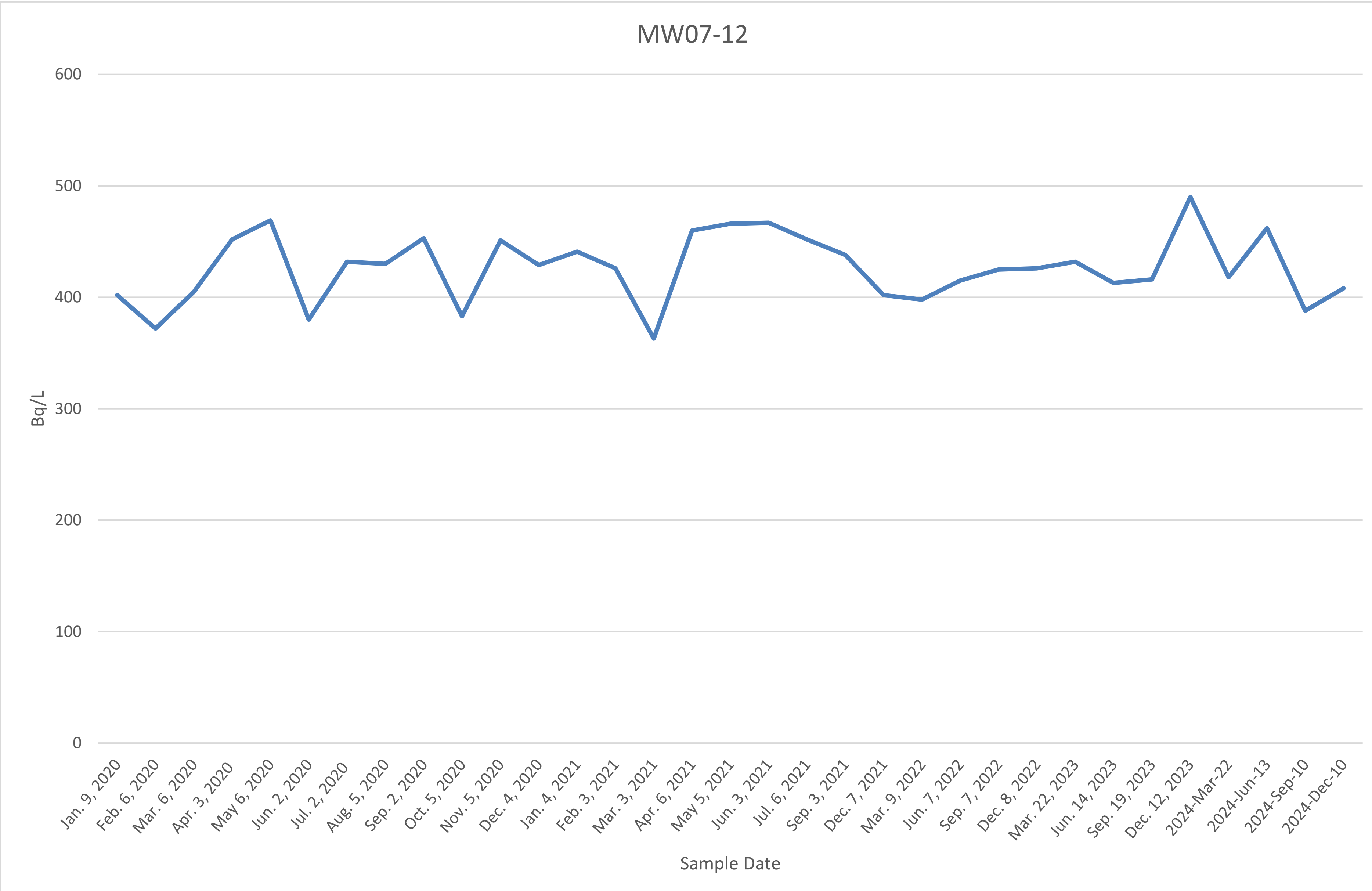

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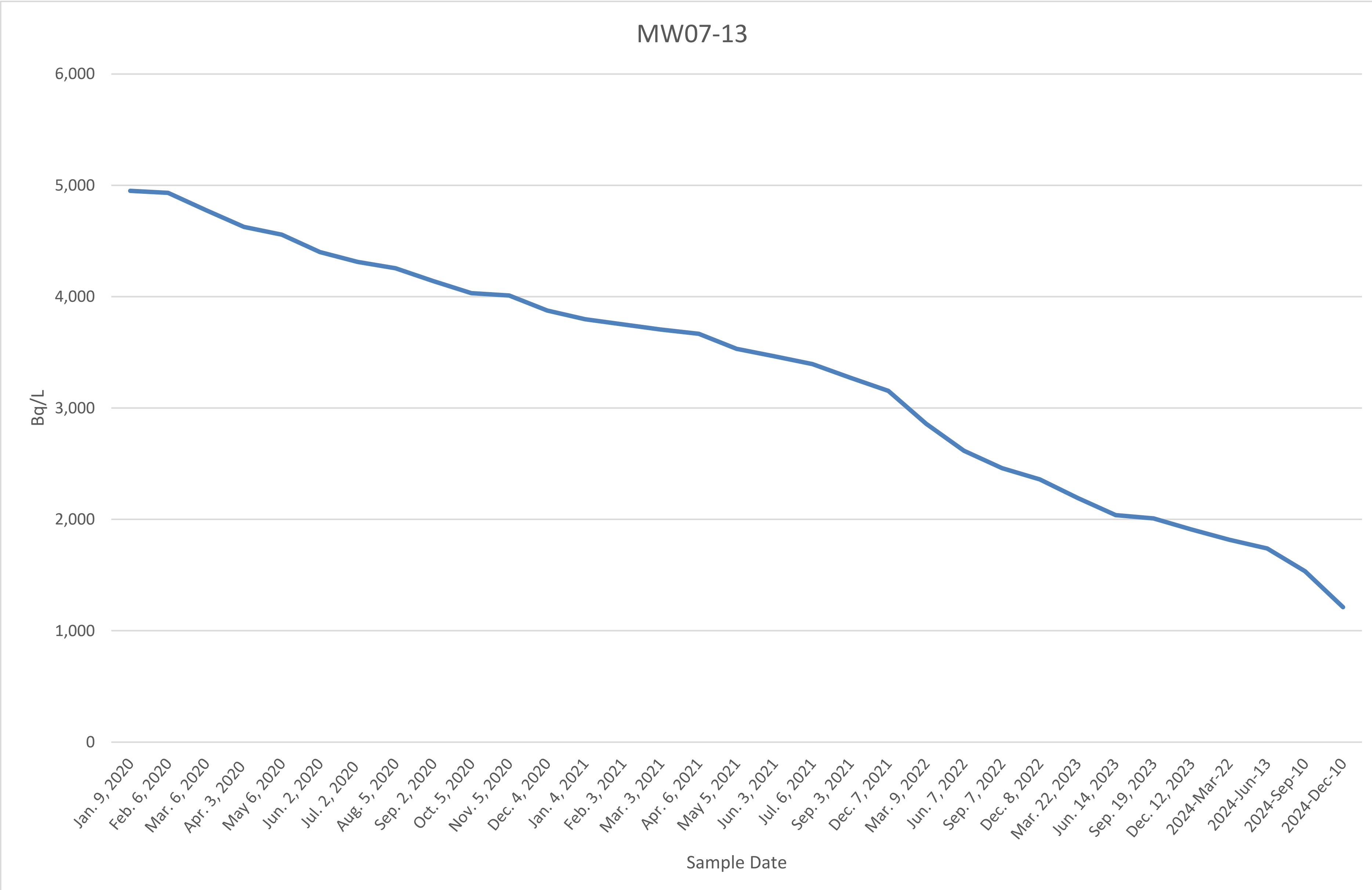

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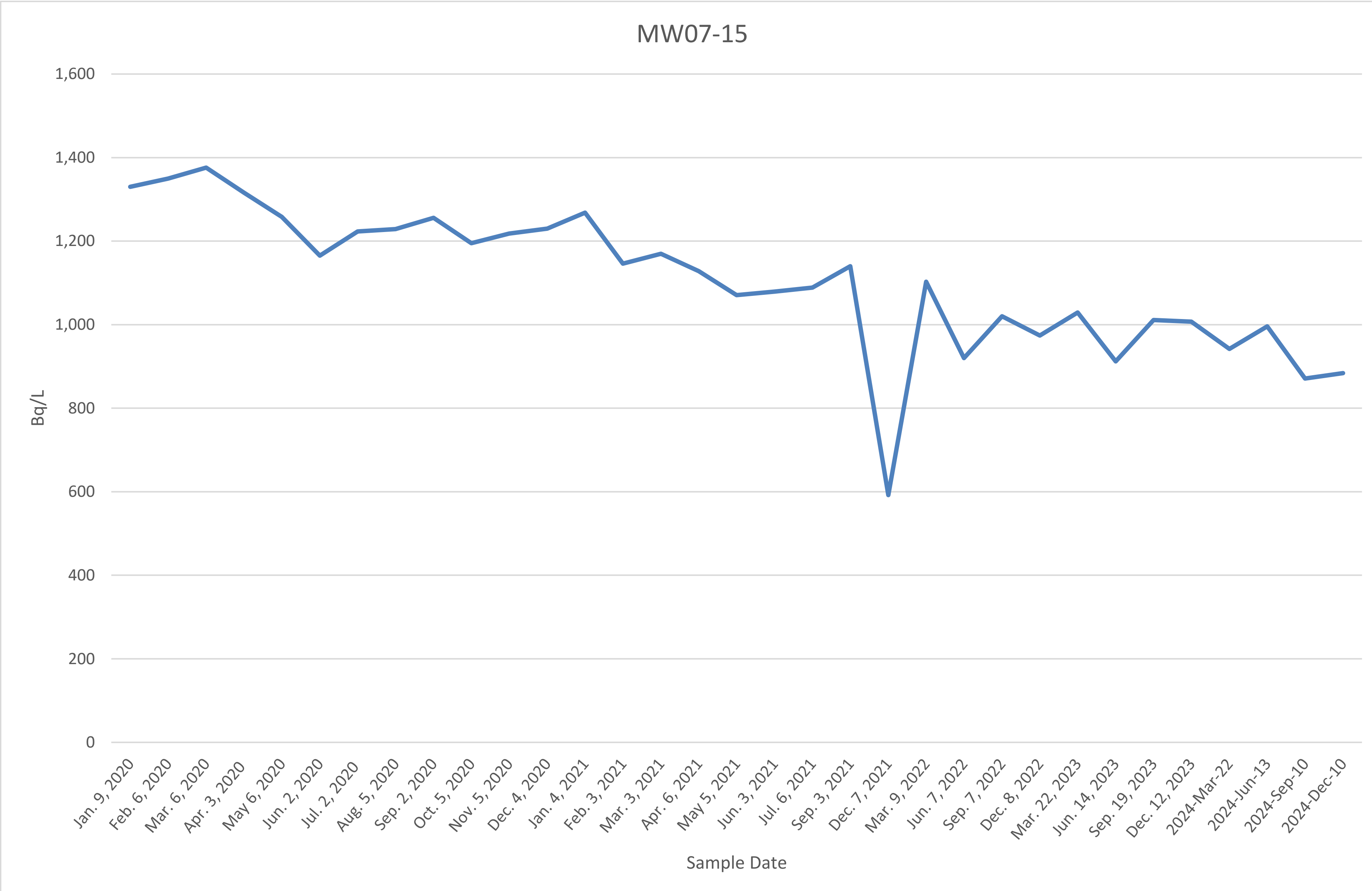

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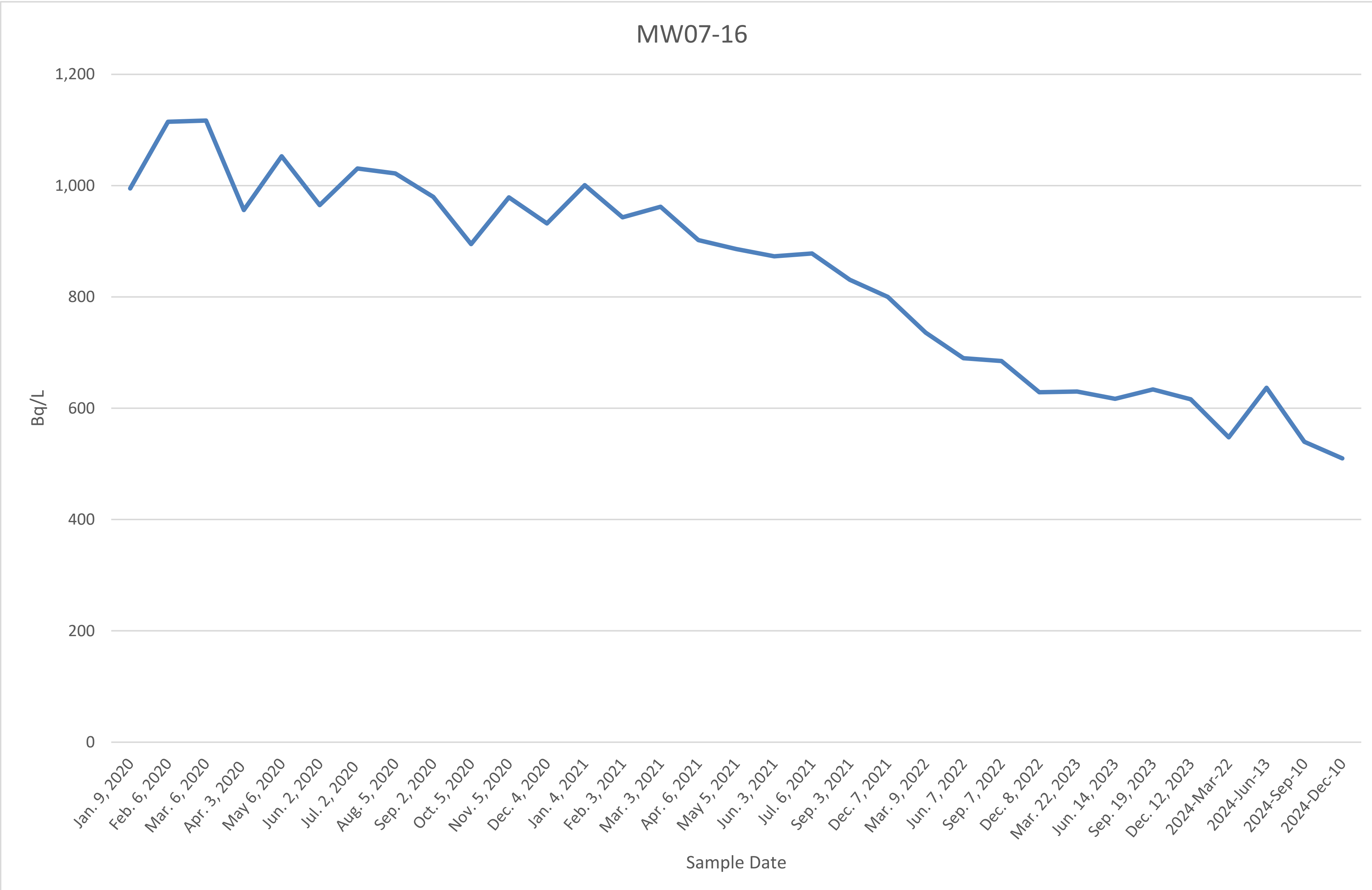

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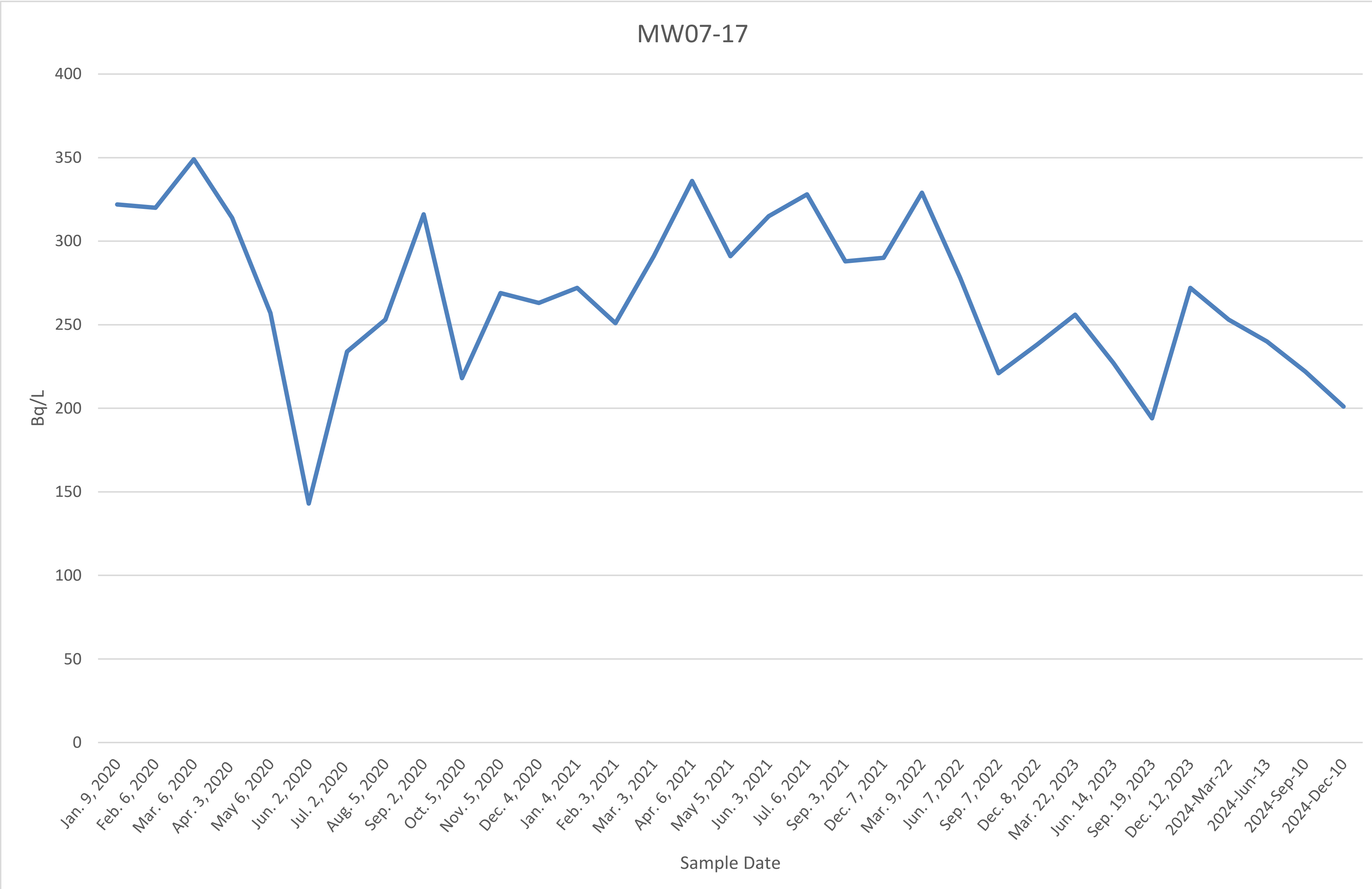

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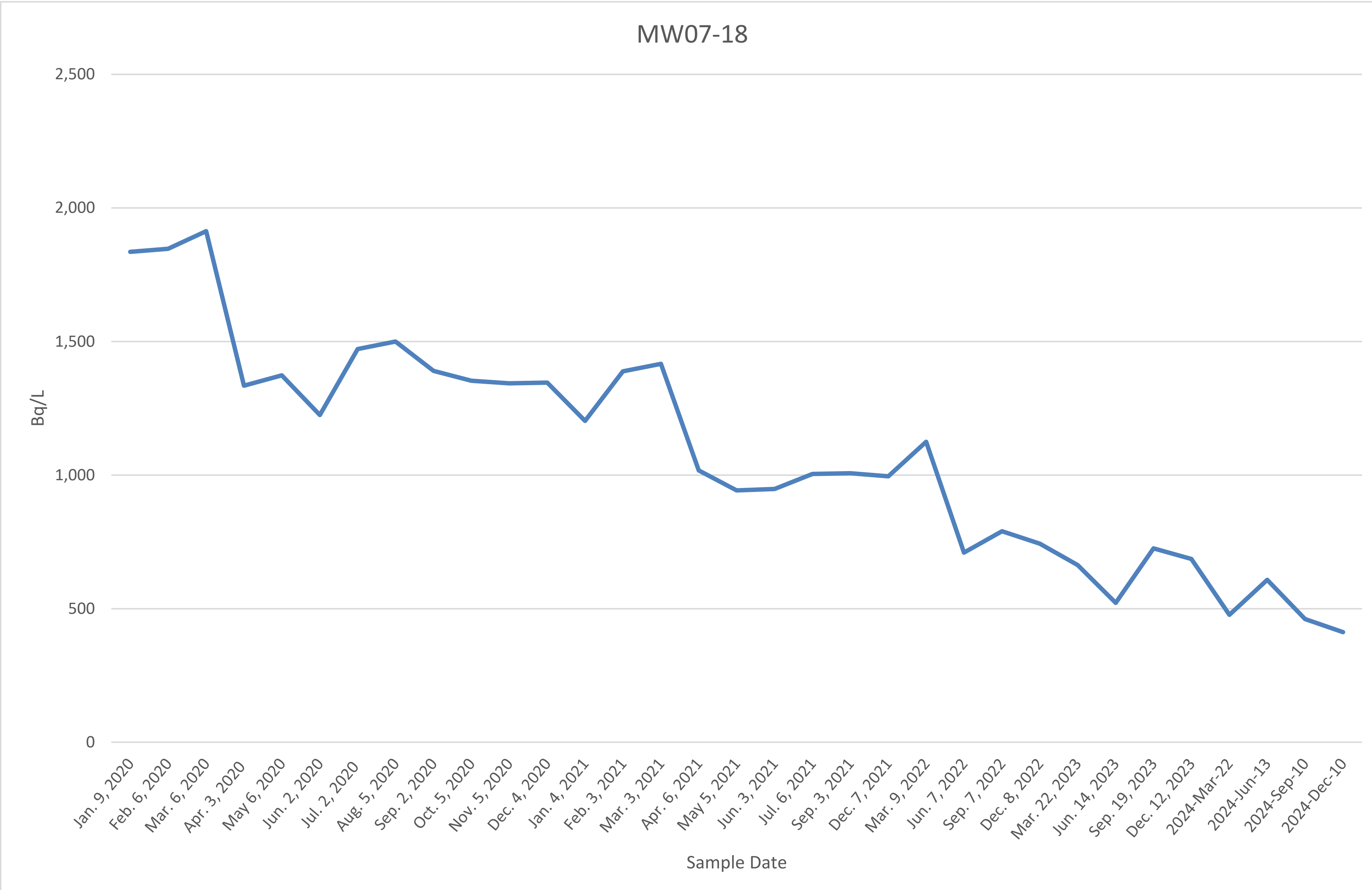

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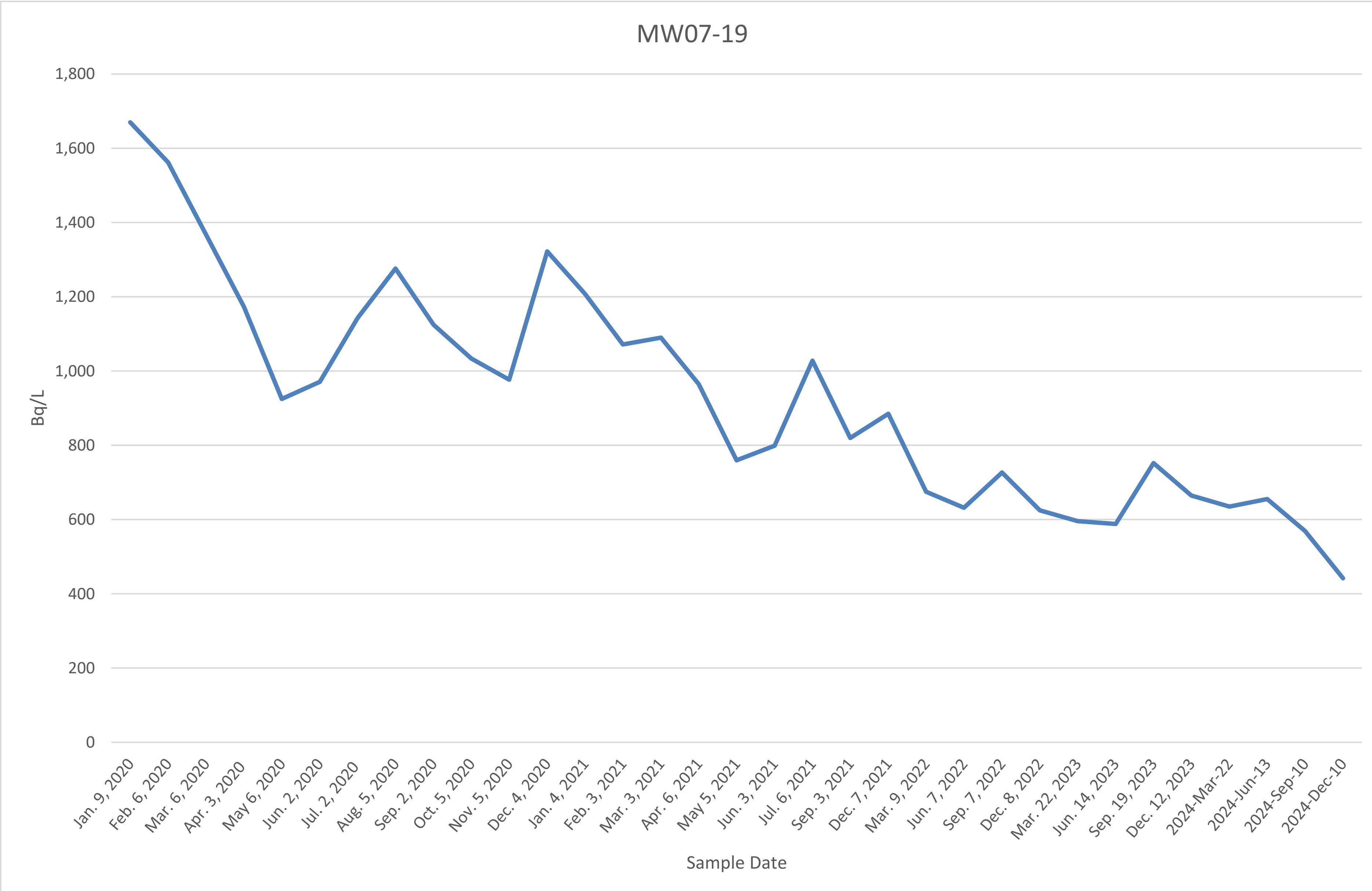

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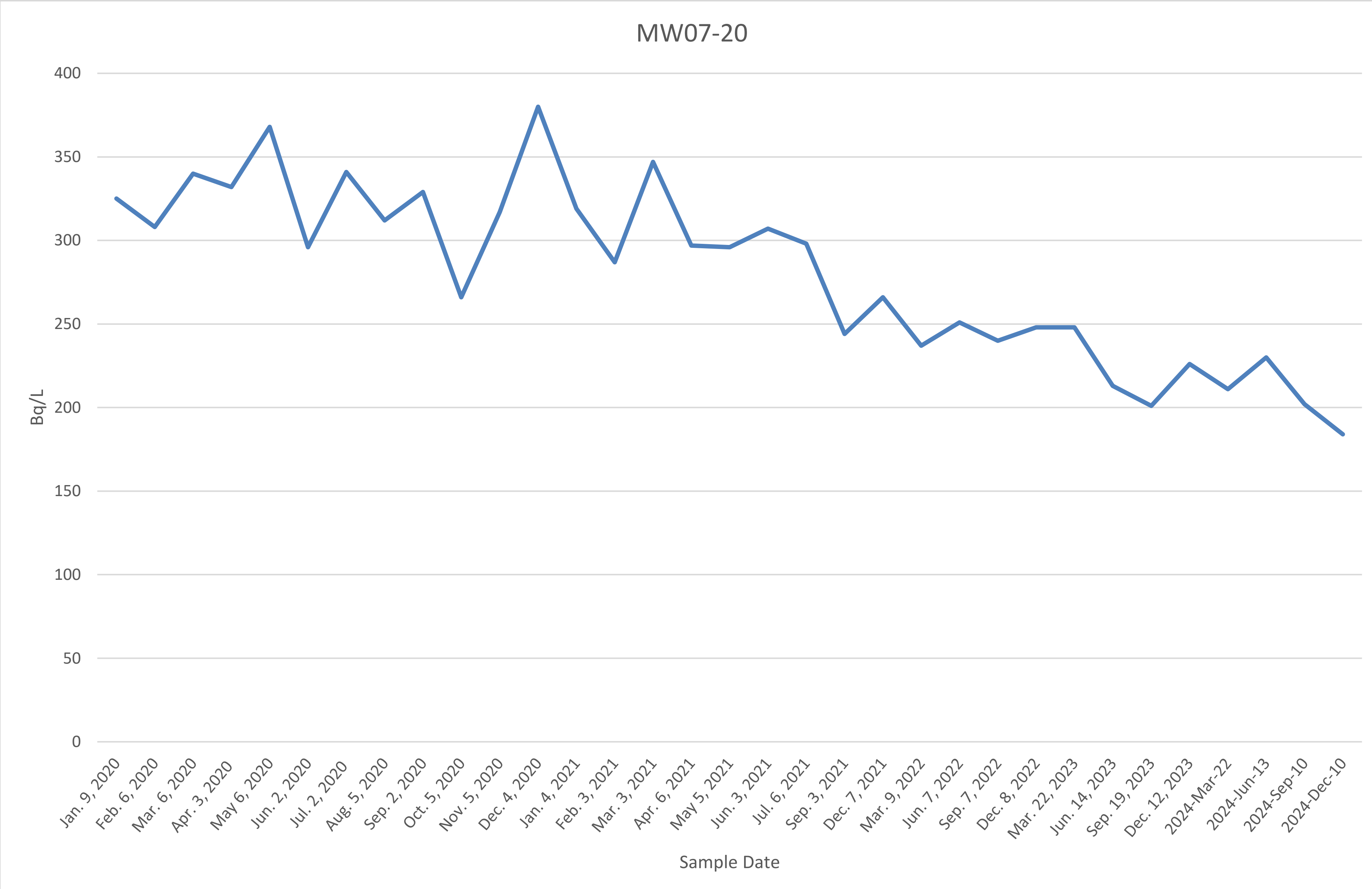

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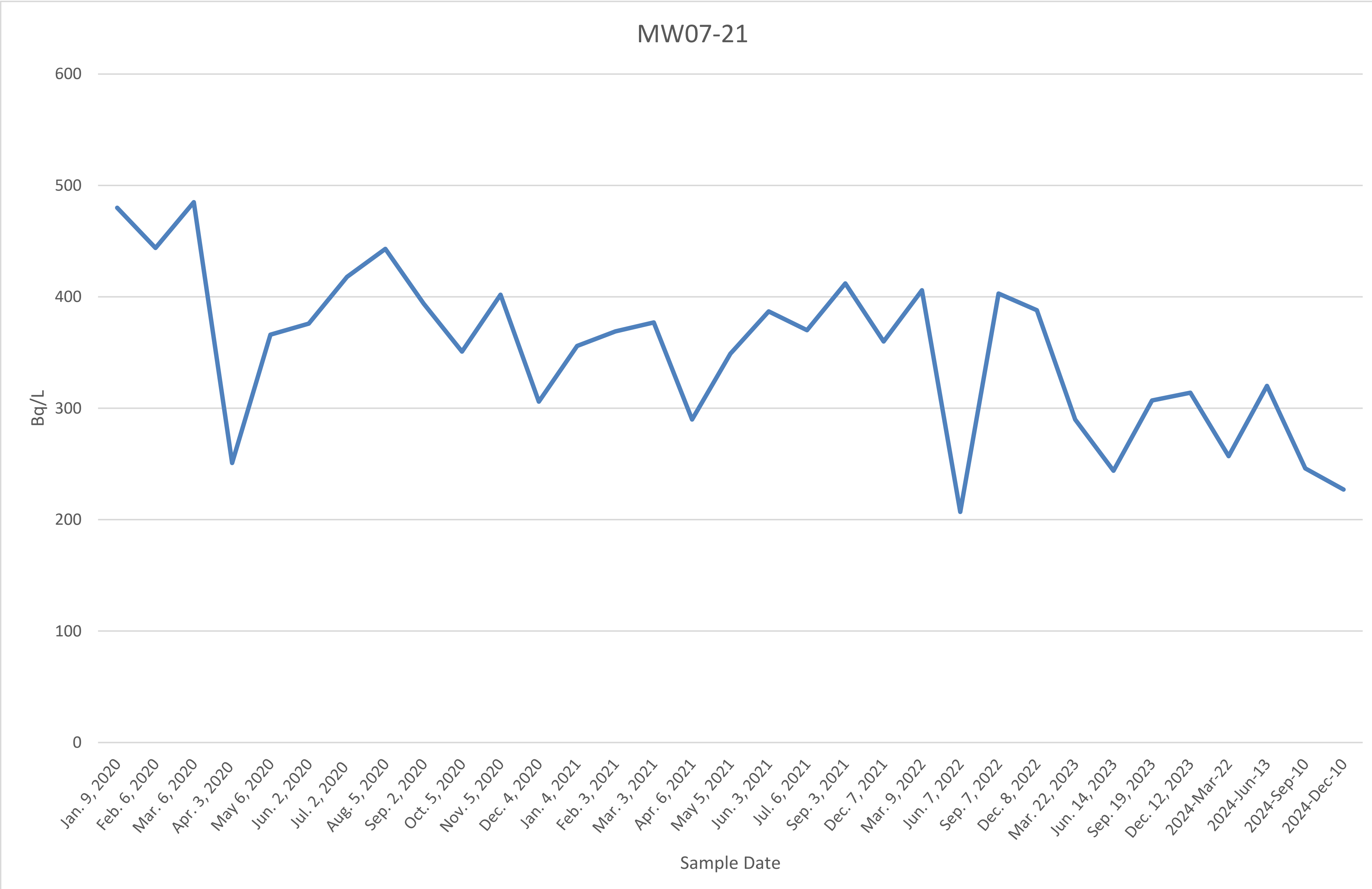

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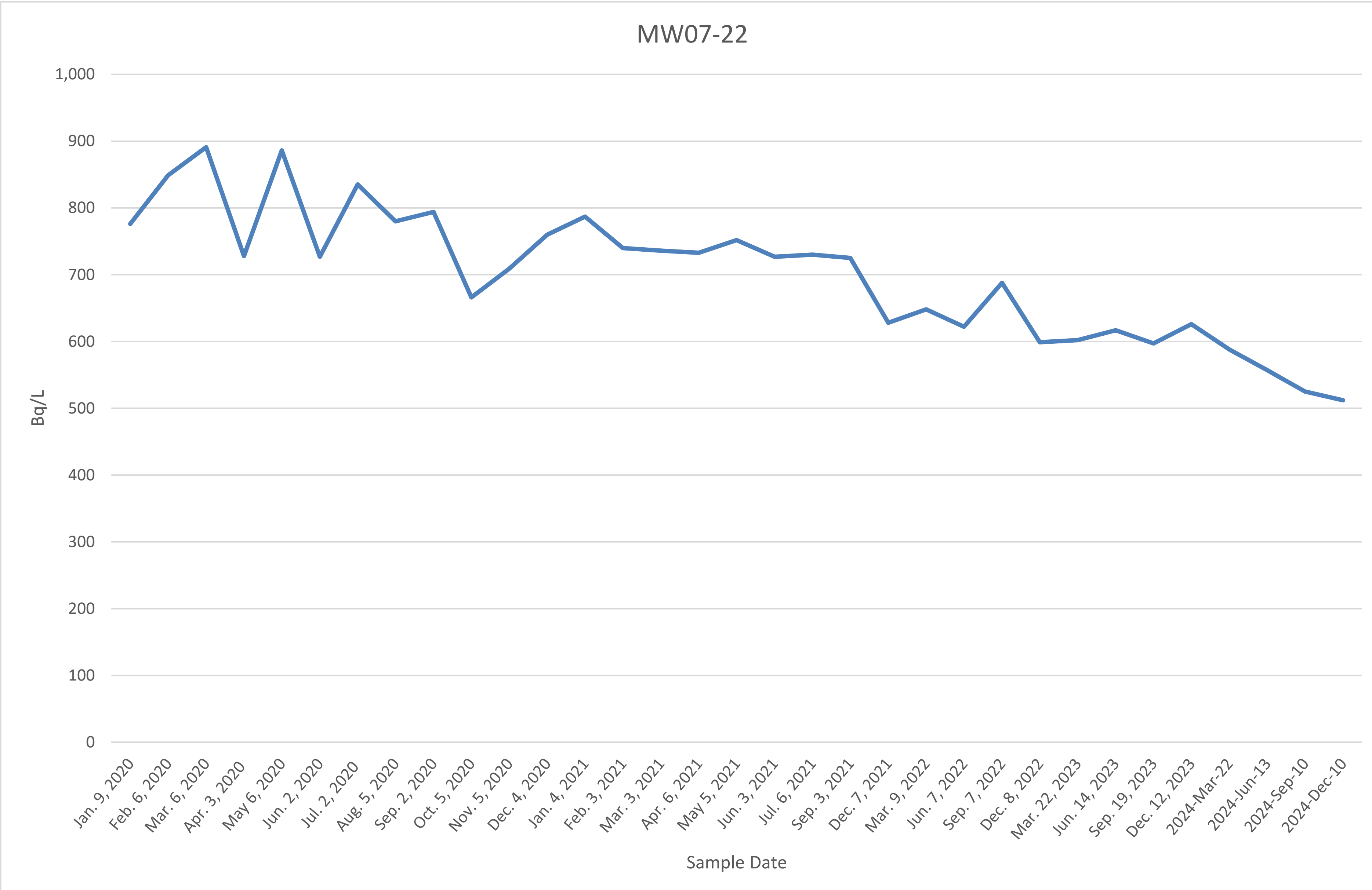

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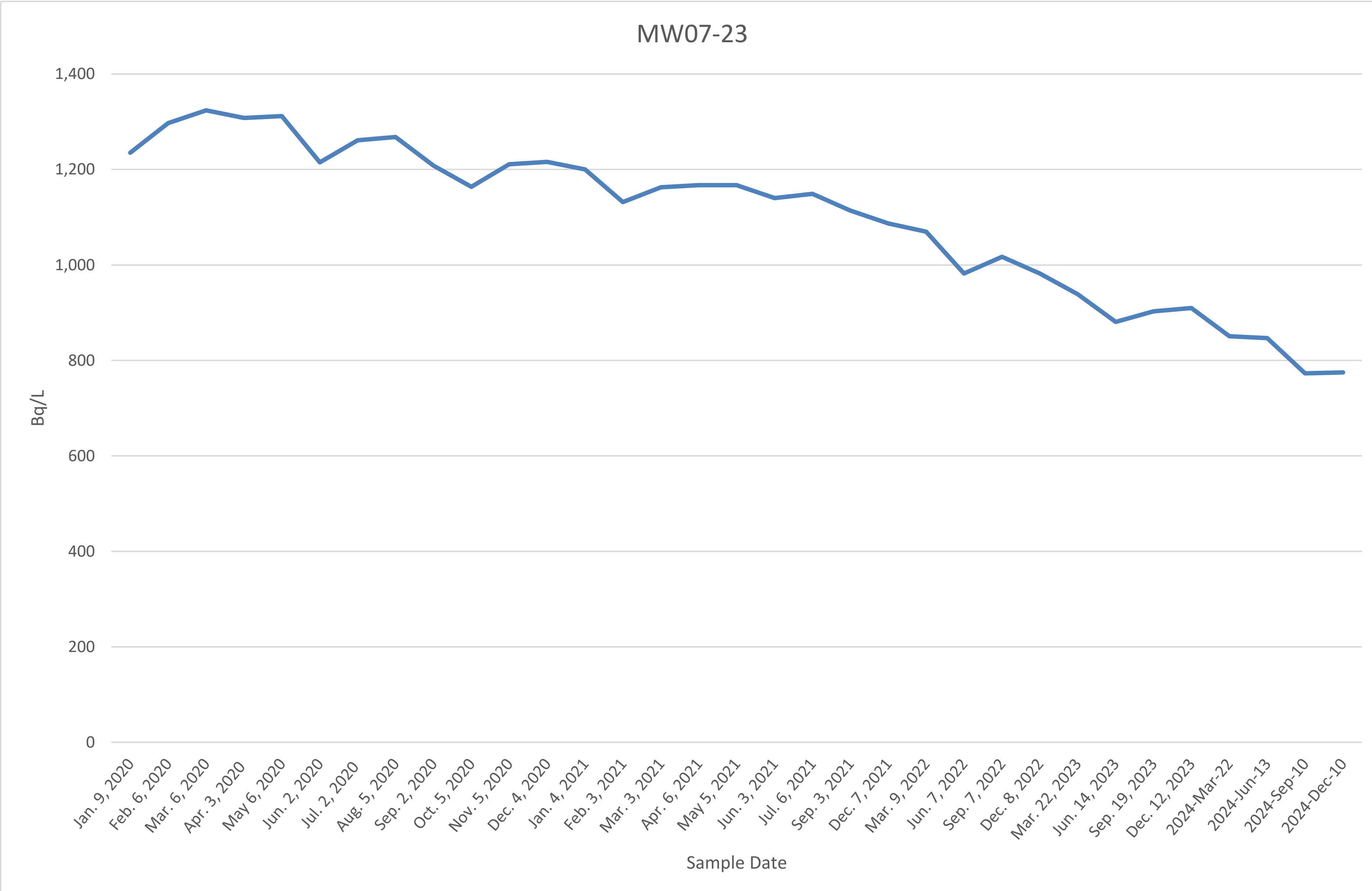

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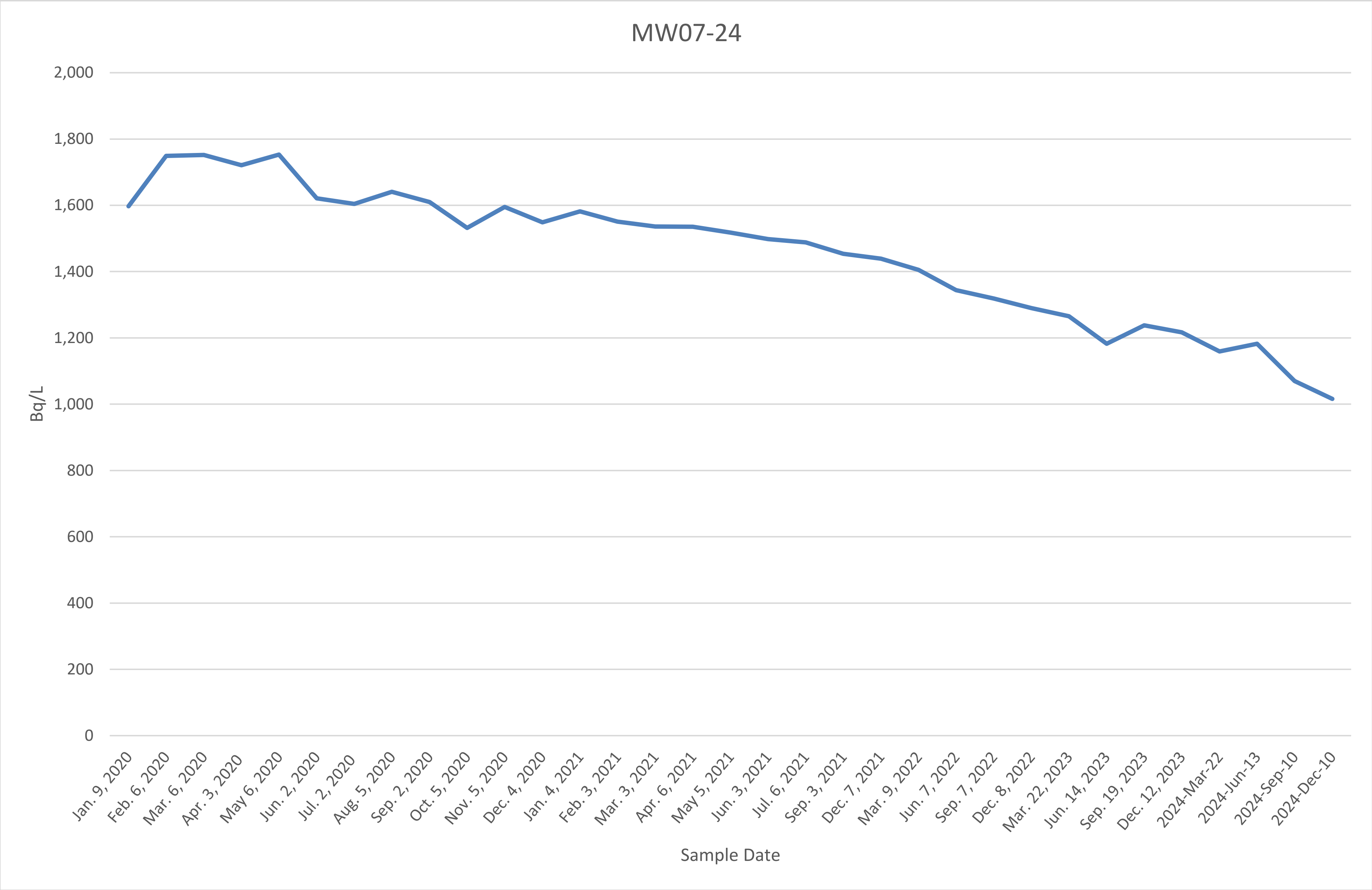

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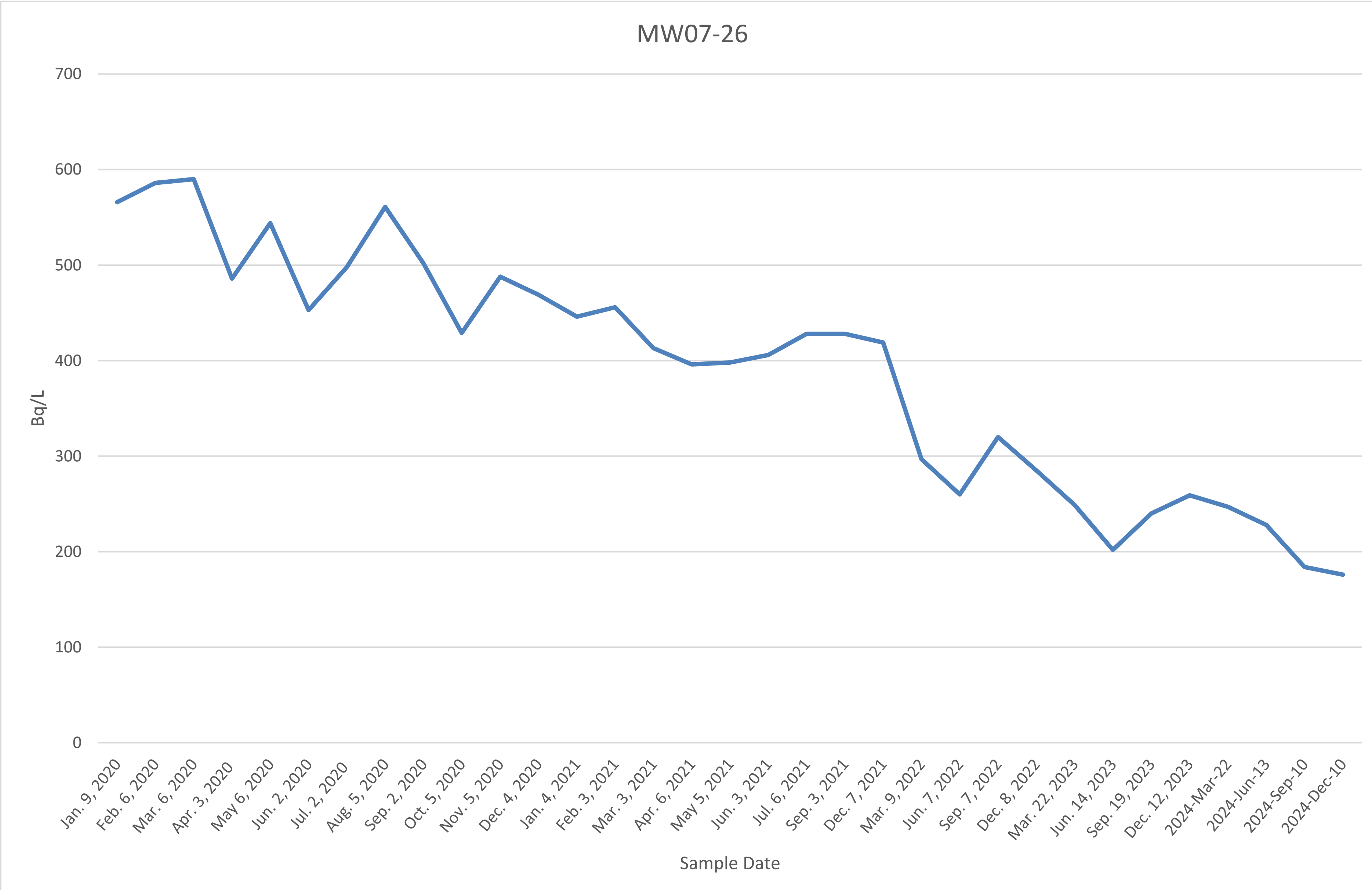

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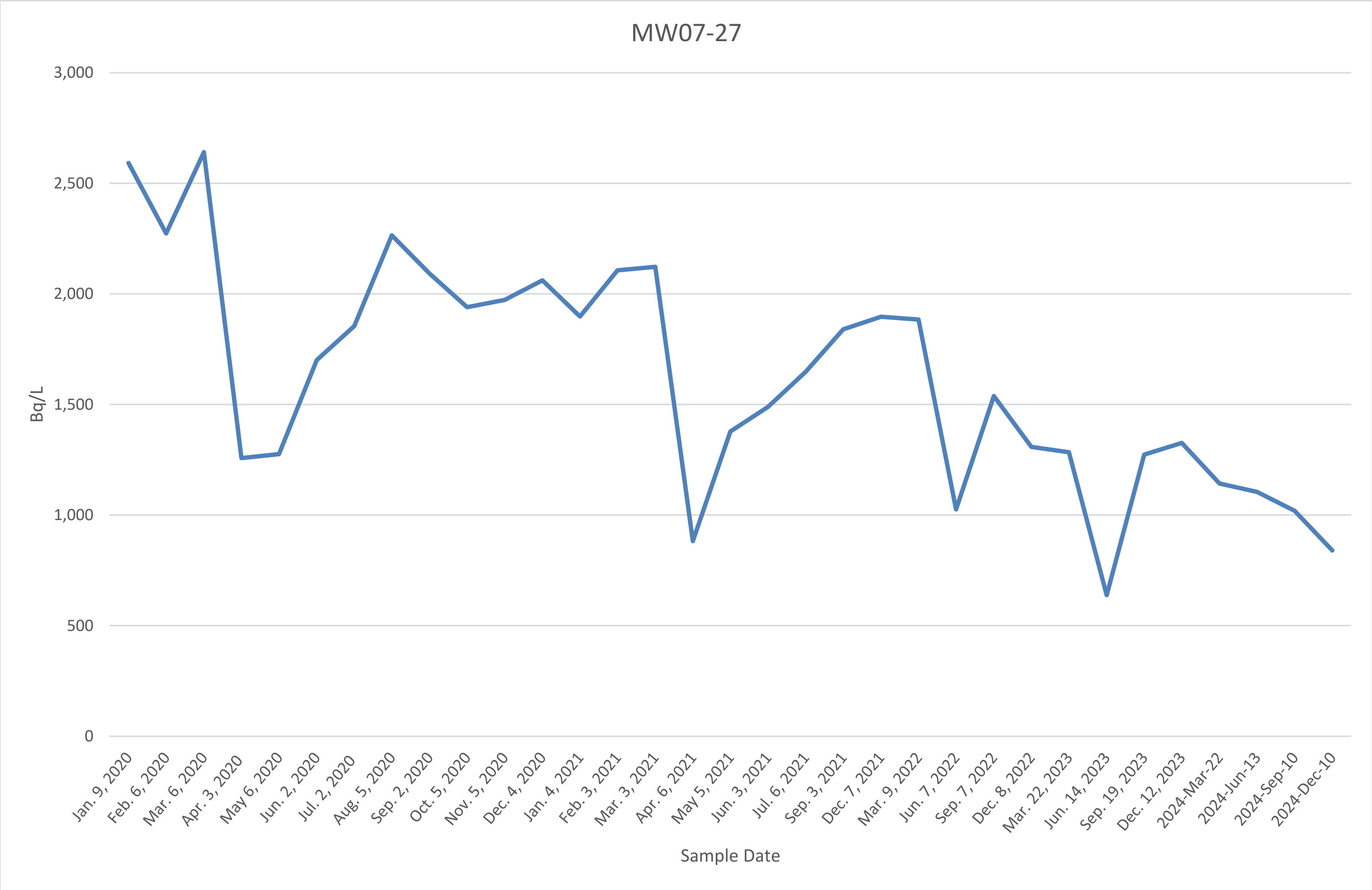

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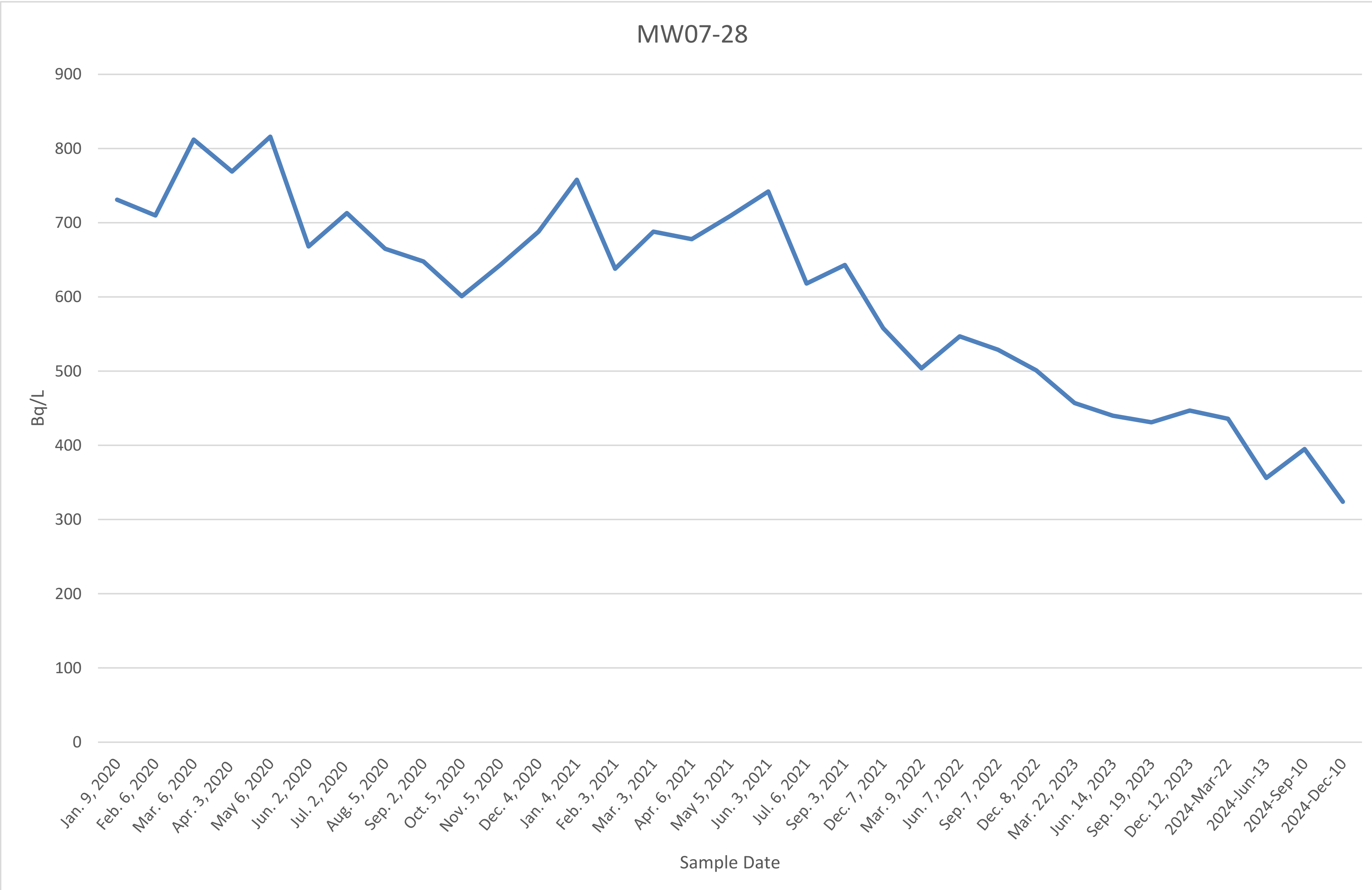

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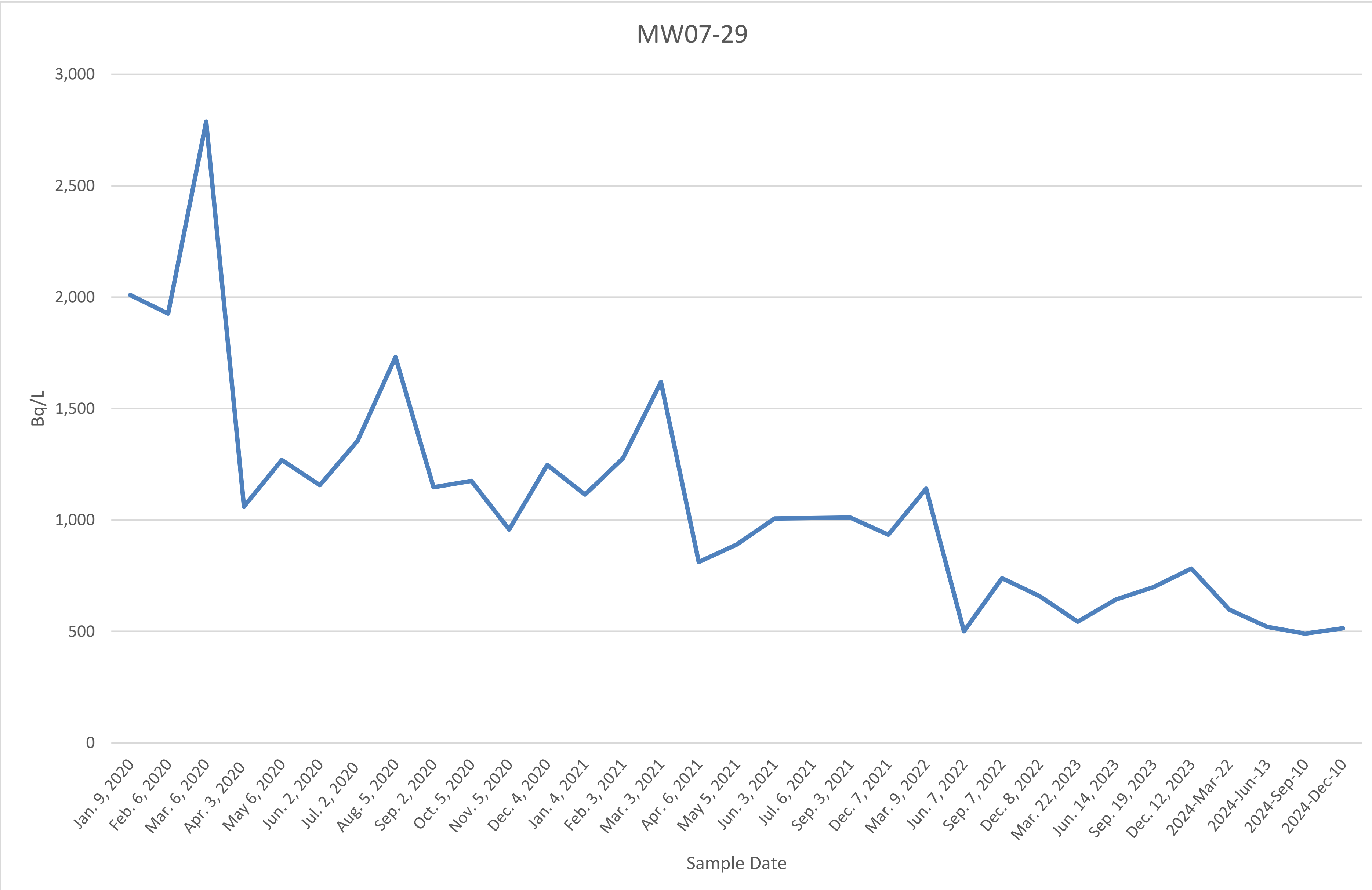

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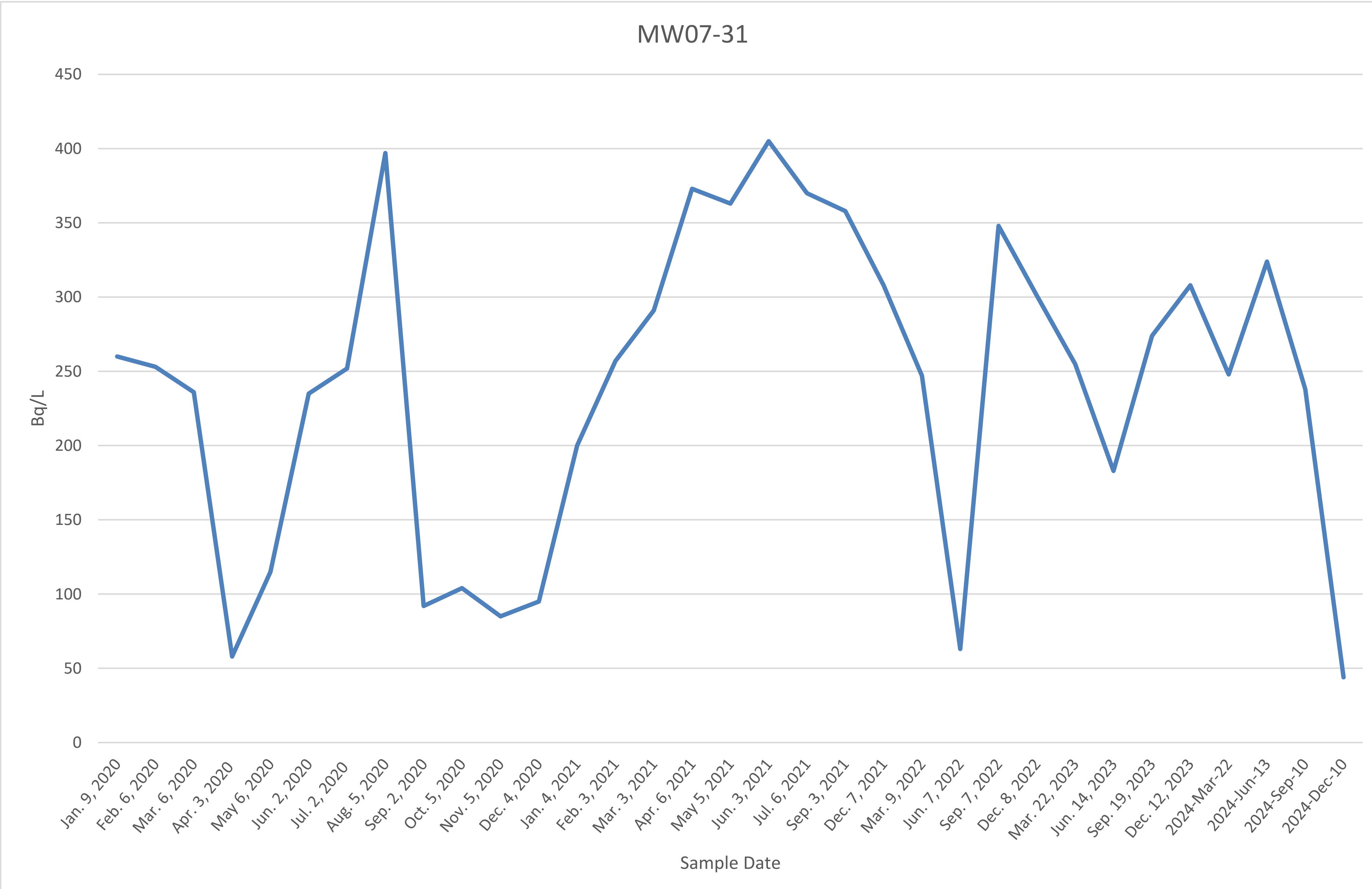

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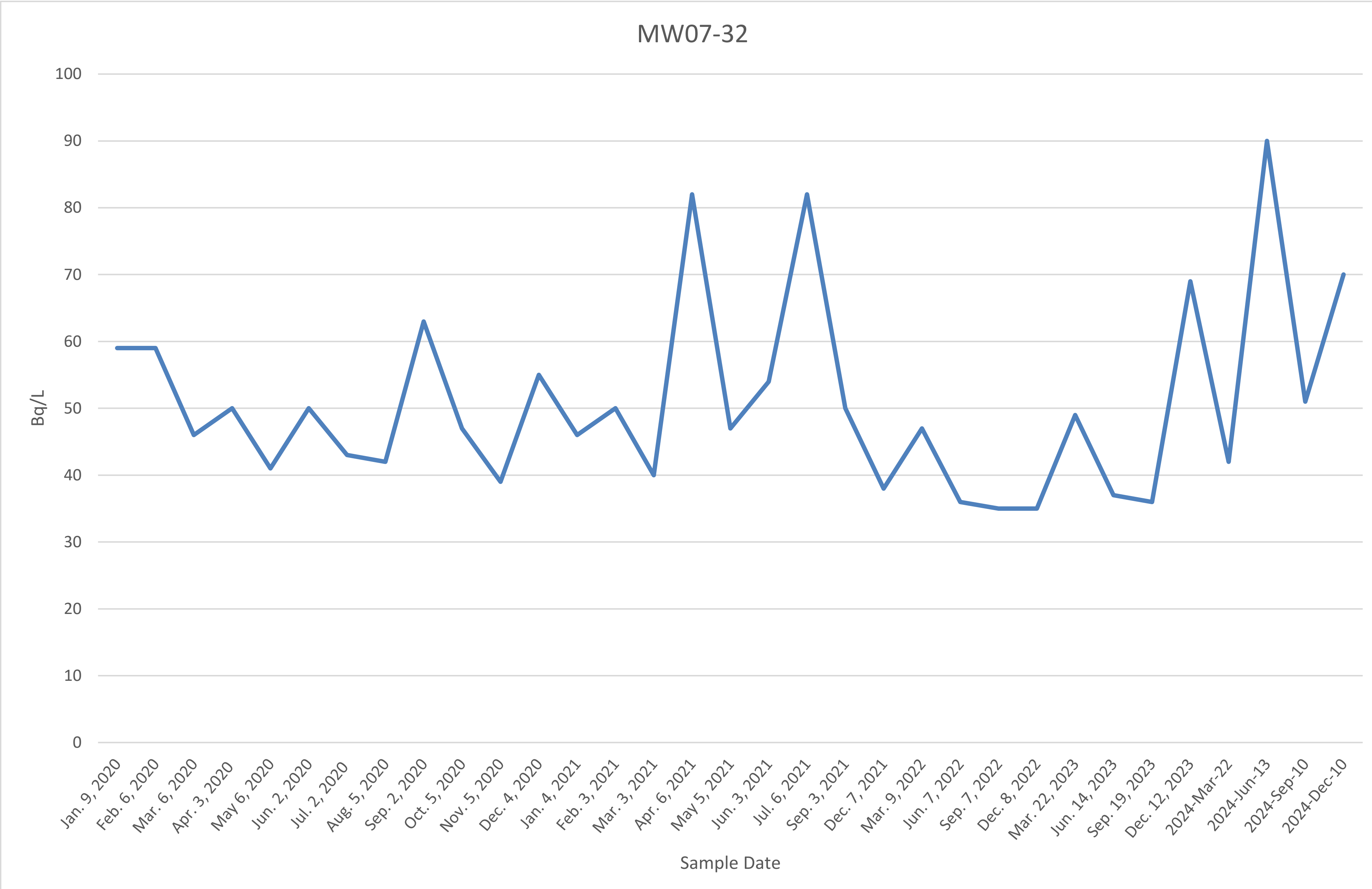

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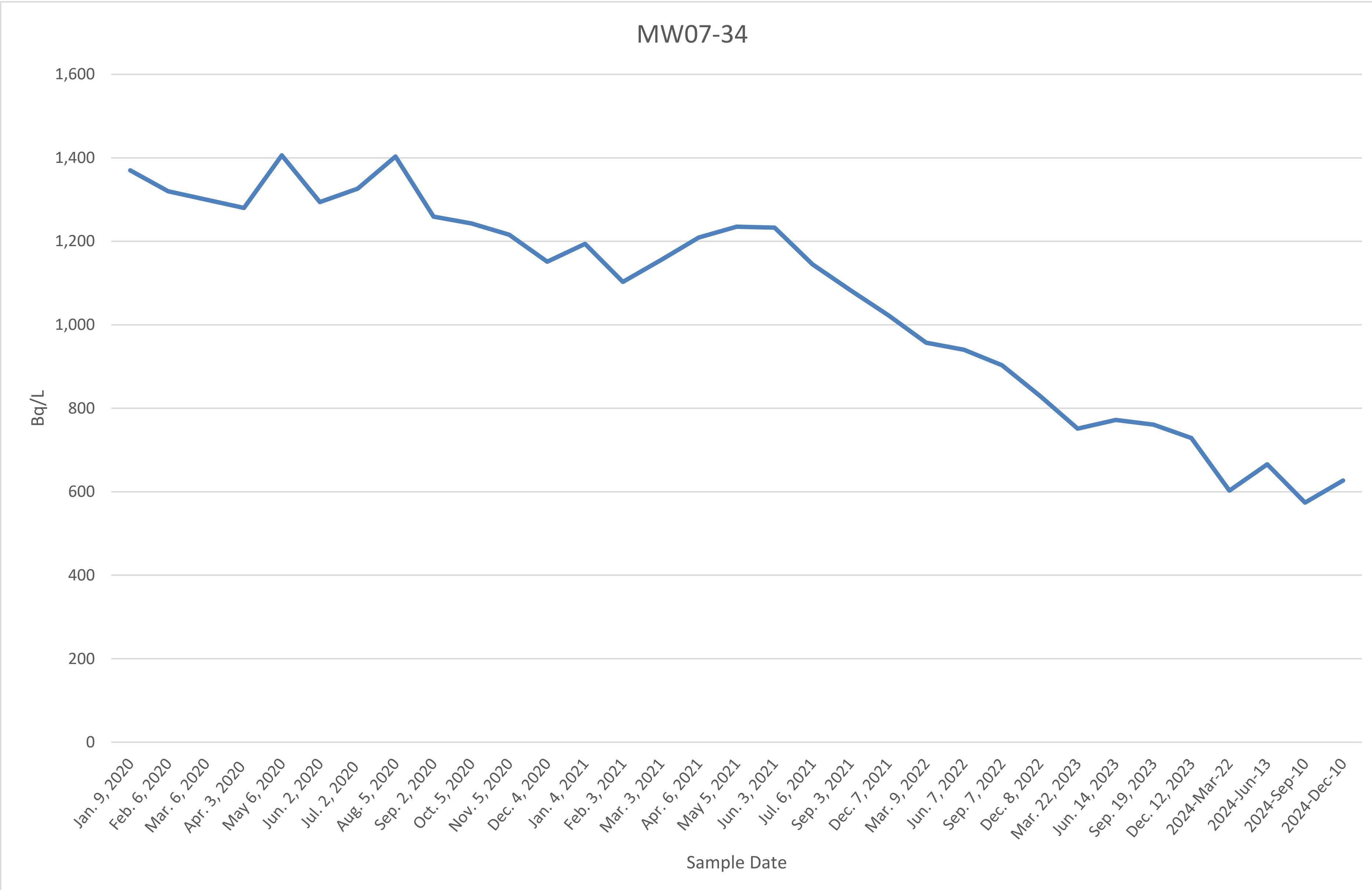

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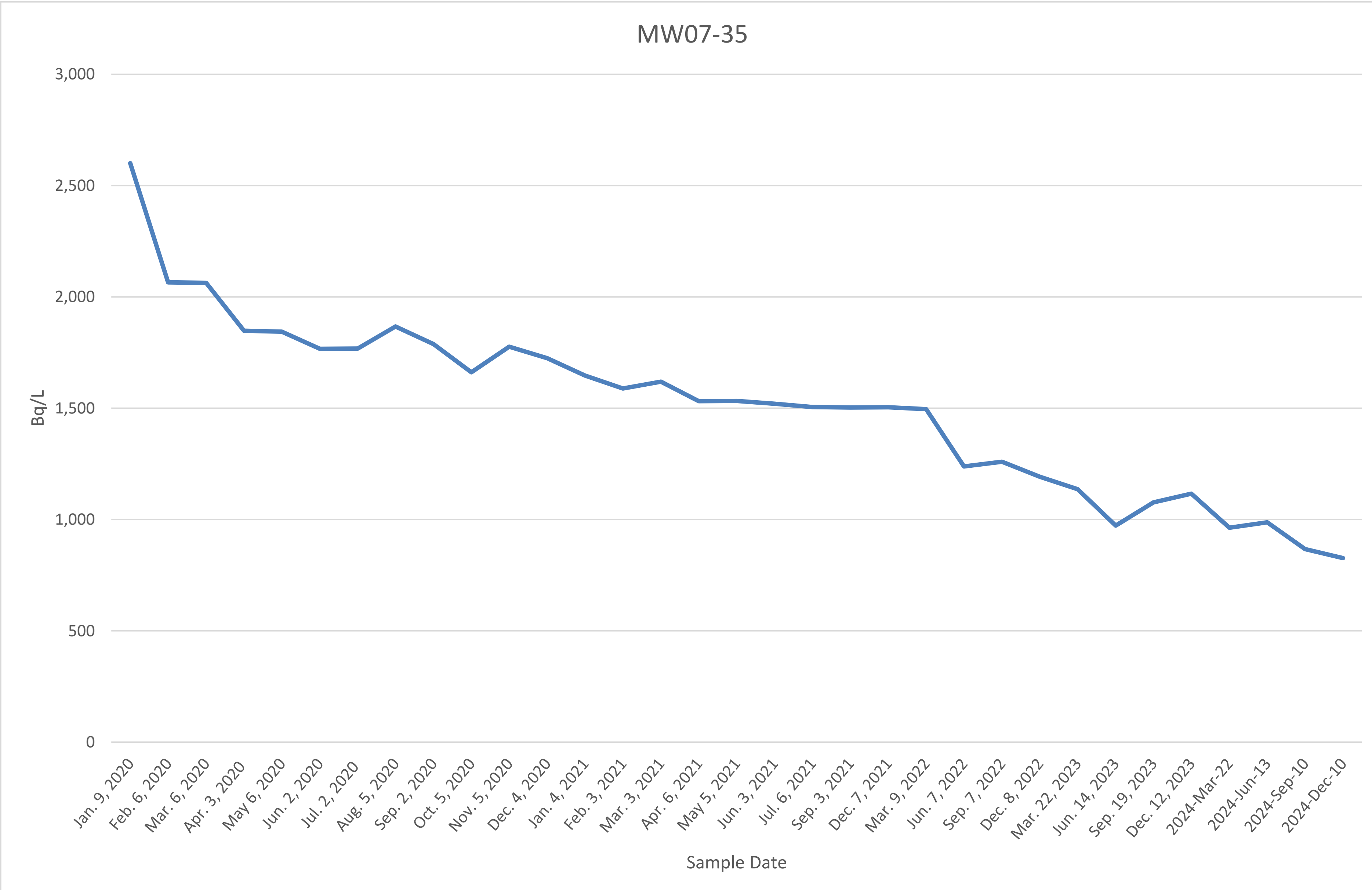

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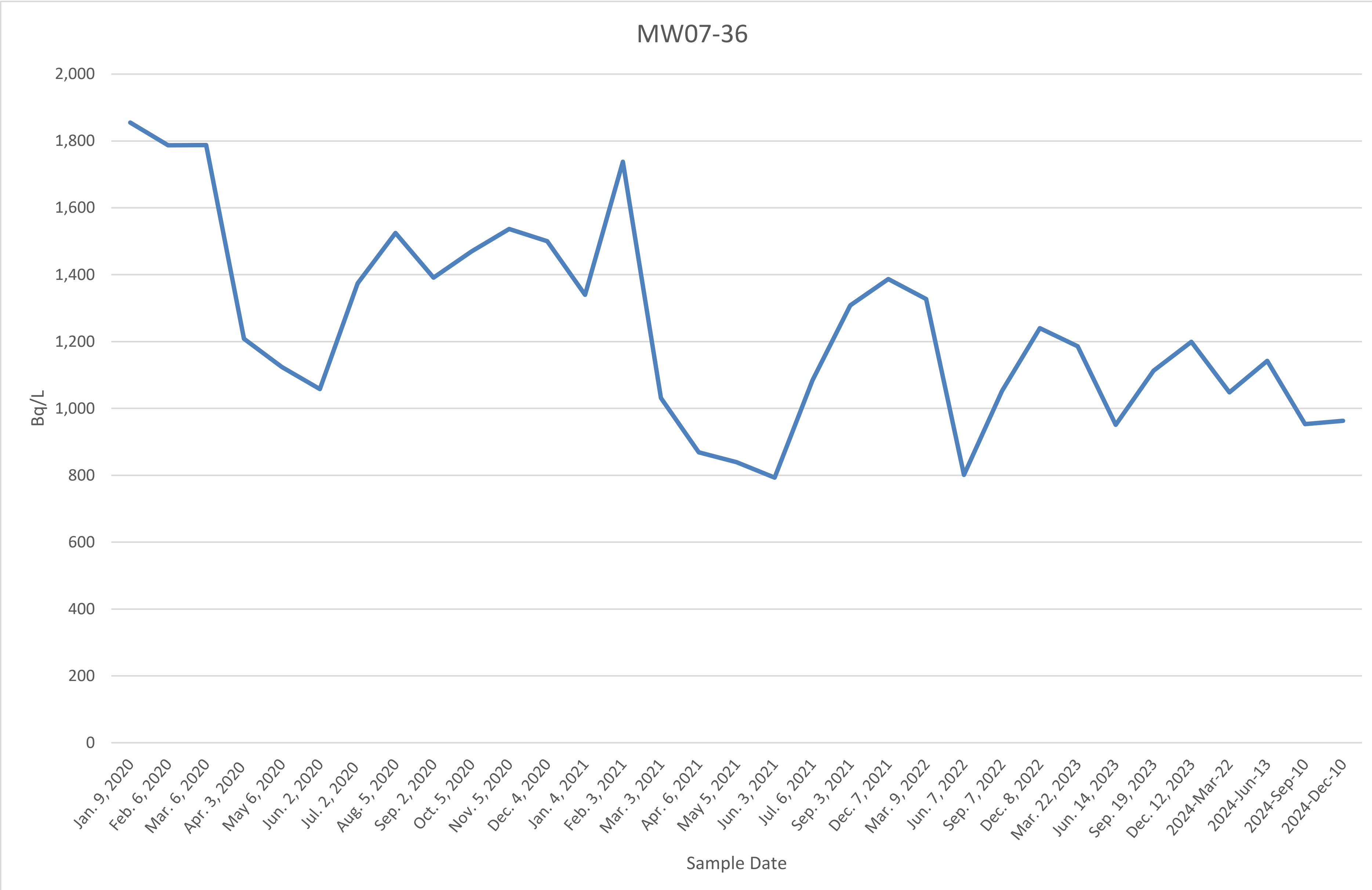

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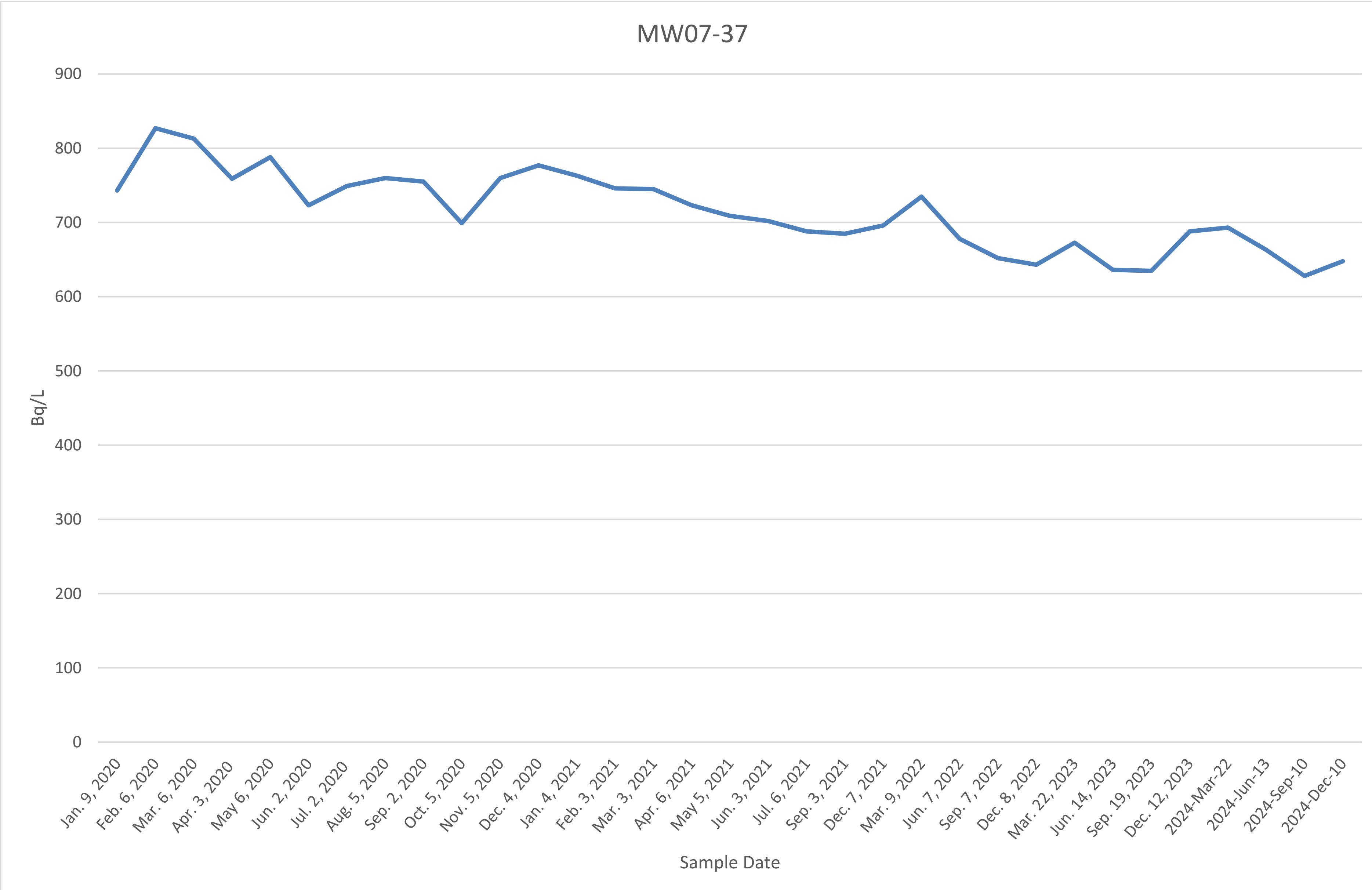


APPENDIX N

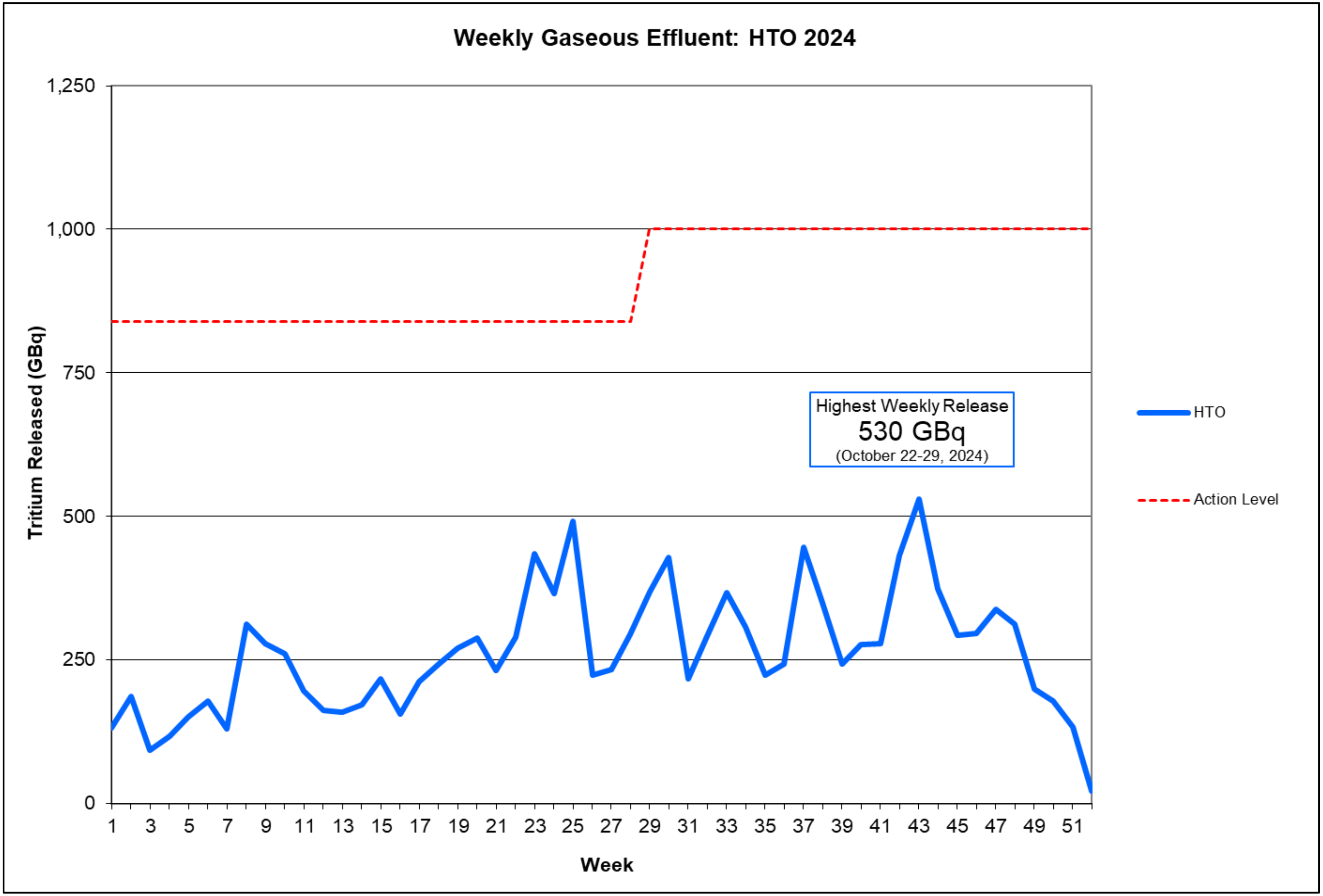
APPENDIX O

Gaseous Effluent Data

Gaseous Effluent Data

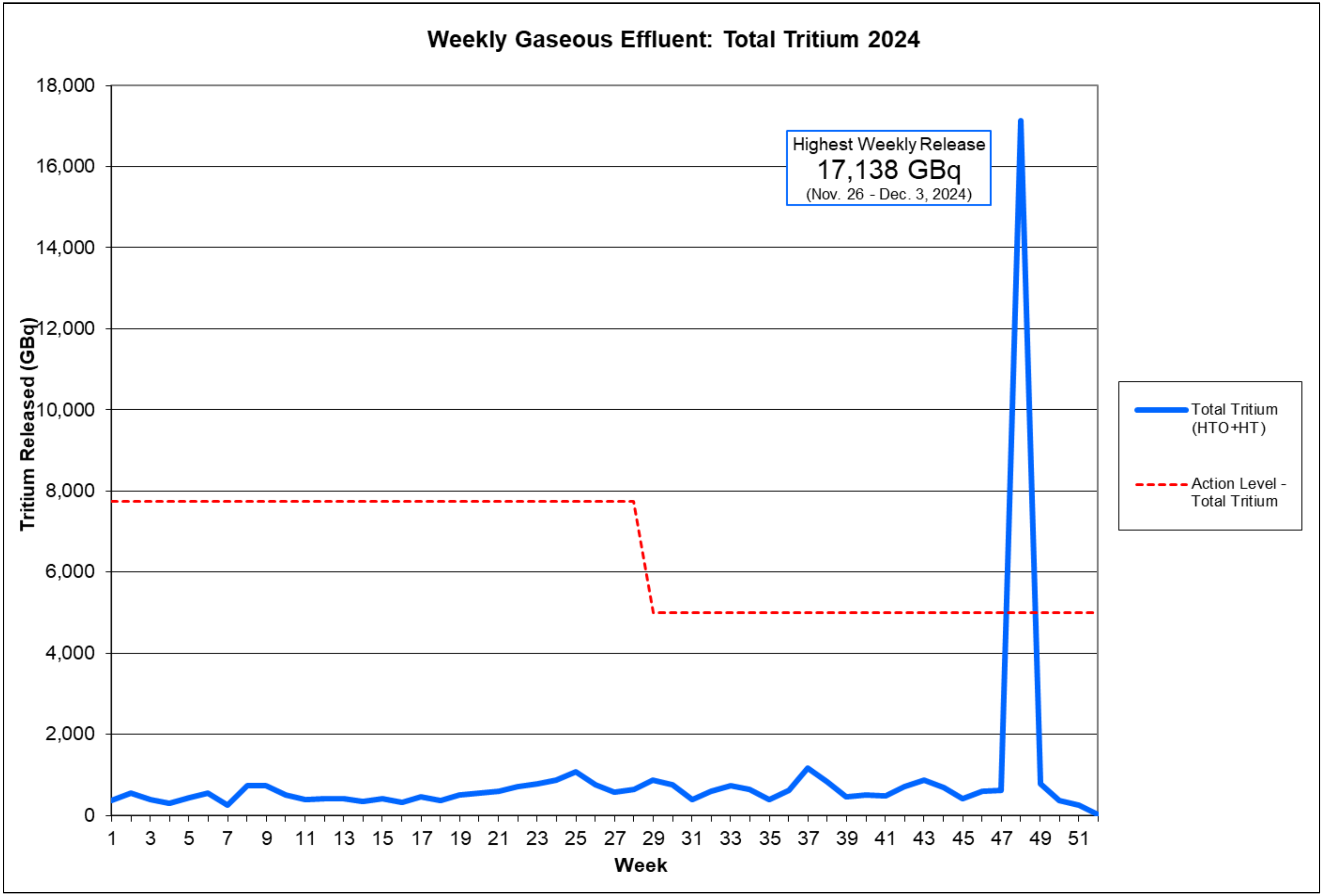
2024 Gaseous Effluent Data													
Week	Date		H-3 in Air (GBq)			(GBq)		% 2021 SRBT DRL (12 hr. TJF Data)				Weekly Action Levels	
	Initial	Final	HTO	HT	Total	∑(HTO)	∑(HTO + HT)	1 year old	10 year old	Adult Resident	Adult Worker	HTO (840 GBq)	HTO+HT (7,753 GBq)
1	2024-01-02	2024-01-09	131.39	223.80	355.19	131.39	355.19	0.05	0.06	0.05	0.13	16%	5%
2	2024-01-09	2024-01-16	186.18	365.18	551.36	317.57	906.55	0.07	0.08	0.07	0.18	22%	7%
3	2024-01-16	2024-01-23	93.12	287.91	381.03	410.69	1287.58	0.04	0.04	0.04	0.09	11%	5%
4	2024-01-23	2024-01-30	117.38	179.93	297.31	528.07	1584.89	0.04	0.05	0.05	0.11	14%	4%
5	2024-01-30	2024-02-06	150.78	283.87	434.65	678.85	2019.54	0.06	0.07	0.06	0.15	18%	6%
6	2024-02-06	2024-02-13	177.81	360.19	538.00	856.66	2557.54	0.07	0.08	0.07	0.17	21%	7%
7	2024-02-13	2024-02-20	129.70	119.00	248.70	986.36	2806.24	0.05	0.05	0.05	0.12	15%	3%
8	2024-02-20	2024-02-27	312.05	415.20	727.25	1298.41	3533.49	0.11	0.13	0.12	0.30	37%	9%
9	2024-02-27	2024-03-05	278.98	446.72	725.70	1577.39	4259.19	0.10	0.12	0.11	0.27	33%	9%
10	2024-03-05	2024-03-12	261.44	244.39	505.83	1838.83	4765.02	0.09	0.11	0.10	0.25	31%	7%
11	2024-03-12	2024-03-19	196.49	198.36	394.85	2035.32	5159.87	0.07	0.08	0.08	0.19	23%	5%
12	2024-03-19	2024-03-26	162.20	242.90	405.10	2197.52	5564.97	0.06	0.07	0.06	0.16	19%	5%
13	2024-03-26	2024-04-02	159.60	243.85	403.45	2357.12	5968.42	0.06	0.07	0.06	0.15	19%	5%
14	2024-04-02	2024-04-09	172.16	175.49	347.65	2529.28	6316.07	0.06	0.07	0.07	0.16	20%	4%
15	2024-04-09	2024-04-16	217.04	193.94	410.98	2746.32	6727.05	0.08	0.09	0.08	0.21	26%	5%
16	2024-04-16	2024-04-23	155.64	171.20	326.84	2901.96	7053.89	0.06	0.07	0.06	0.15	19%	4%
17	2024-04-23	2024-04-30	212.22	240.60	452.82	3114.18	7506.71	0.08	0.09	0.08	0.20	25%	6%
18	2024-04-30	2024-05-07	242.78	131.51	374.29	3356.96	7881.00	0.09	0.10	0.09	0.23	29%	5%
19	2024-05-07	2024-05-14	270.16	241.08	511.24	3627.12	8392.24	0.10	0.11	0.10	0.26	32%	7%
20	2024-05-14	2024-05-21	287.54	271.27	558.81	3914.66	8951.05	0.10	0.12	0.11	0.27	34%	7%
21	2024-05-21	2024-05-28	231.84	359.07	590.91	4146.50	9541.96	0.08	0.10	0.09	0.22	28%	8%
22	2024-05-28	2024-06-04	289.41	423.89	713.30	4435.91	10255.26	0.11	0.12	0.11	0.28	34%	9%
23	2024-06-04	2024-06-11	435.36	331.14	766.50	4871.27	11021.76	0.15	0.18	0.17	0.41	52%	10%
24	2024-06-11	2024-06-18	365.63	500.37	866.00	5236.90	11887.76	0.13	0.16	0.14	0.35	44%	11%
25	2024-06-18	2024-06-25	491.29	588.06	1079.35	5728.19	12967.11	0.18	0.21	0.19	0.47	58%	14%
26	2024-06-25	2024-07-02	223.06	523.28	746.34	5951.25	13713.45	0.08	0.10	0.09	0.22	27%	10%
27	2024-07-02	2024-07-09	232.76	344.00	576.76	6184.01	14290.21	0.09	0.10	0.09	0.22	28%	7%
28	2024-07-09	2024-07-16	294.20	349.20	643.40	6478.21	14933.61	0.11	0.13	0.11	0.28	35%	8%
29	2024-07-16	2024-07-23	368.20	501.81	870.01	6846.41	15803.62	0.13	0.16	0.14	0.35	37%	17%
30	2024-07-23	2024-07-30	428.57	336.17	764.74	7274.98	16568.36	0.15	0.18	0.16	0.41	43%	15%
31	2024-07-30	2024-08-06	217.90	169.90	387.80	7492.88	16956.16	0.08	0.09	0.08	0.21	22%	8%
32	2024-08-06	2024-08-13	292.13	293.36	585.49	7785.01	17541.65	0.10	0.12	0.11	0.28	29%	12%
33	2024-08-13	2024-08-20	366.58	360.32	726.90	8151.59	18268.55	0.13	0.15	0.14	0.35	37%	15%
34	2024-08-20	2024-08-27	308.19	331.41	639.60	8459.78	18908.15	0.11	0.13	0.12	0.29	31%	13%
35	2024-08-27	2024-09-03	222.93	166.90	389.83	8682.71	19297.98	0.08	0.09	0.08	0.21	22%	8%
36	2024-09-03	2024-09-10	242.99	379.64	622.63	8925.70	19920.61	0.09	0.10	0.10	0.24	24%	12%
37	2024-09-10	2024-09-17	446.86	729.85	1176.71	9372.56	21097.32	0.16	0.19	0.18	0.43	45%	24%
38	2024-09-17	2024-09-24	350.26	481.10	831.36	9722.82	21928.68	0.13	0.15	0.14	0.34	35%	17%
39	2024-09-24	2024-10-01	243.64	224.18	467.82	9966.46	22396.50	0.09	0.10	0.09	0.23	24%	9%
40	2024-10-01	2024-10-08	276.27	226.77	503.04	10242.73	22899.54	0.10	0.12	0.11	0.26	28%	10%
41	2024-10-08	2024-10-15	278.91	208.69	487.60	10521.64	23387.14	0.10	0.12	0.11	0.26	28%	10%
42	2024-10-15	2024-10-22	431.06	282.62	713.68	10952.70	24100.82	0.15	0.18	0.16	0.41	43%	14%
43	2024-10-22	2024-10-29	529.63	349.51	879.14	11482.33	24979.96	0.19	0.22	0.20	0.50	53%	18%
44	2024-10-29	2024-11-05	373.26	303.33	676.59	11855.59	25656.55	0.13	0.16	0.14	0.35	37%	14%
45	2024-11-05	2024-11-12	293.24	117.11	410.35	12148.83	26066.90	0.10	0.12	0.11	0.27	29%	8%
46	2024-11-12	2024-11-19	295.88	301.76	597.64	12444.71	26664.54	0.11	0.13	0.11	0.28	30%	12%
47	2024-11-19	2024-11-26	338.34	278.75	617.09	12783.05	27281.63	0.12	0.14	0.13	0.32	34%	12%
48	2024-11-26	2024-12-03	312.85	16824.84	17137.69	13095.90	44419.32	0.34	0.37	0.36	0.75	31%	343%
49	2024-12-03	2024-12-10	199.11	589.11	788.22	13295.01	45207.54	0.08	0.09	0.08	0.20	20%	16%
50	2024-12-10	2024-12-17	178.72	193.58	372.30	13473.73	45579.84	0.06	0.08	0.07	0.17	18%	7%
51	2024-12-17	2024-12-24	132.48	129.78	262.26	13606.21	45842.10	0.05	0.06	0.05	0.13	13%	5%
52	2024-12-24	2024-12-31	22.27	3.19	25.46	13628.48	45867.56	0.01	0.01	0.01	0.02	2%	1%
	Annual Total		13628.48	32239.08	45867.56			Average % DRL					
	Weekly Average		262.09	619.98	882.07			0.10	0.12	0.11	0.26		
			Limit (Bq/a)		% Limit (2021)			Projected Dose (uSv/a)					
% Annual Release Limit:		HTO	6.72E+13		20.28			0.99	1.16	1.06	2.60		
		HTO + HT	4.48E+14		10.24			1 year old	10 year old	Adult Resident	Adult Worker		
Derived Weekly HTO Release/Emission Limit (GBq/week)								2.90E+05	2.45E+05	2.71E+05	1.08E+05		
Derived Weekly HT Release/ Emission Limit (GBq/week)								7.24E+06	6.83E+06	6.90E+06	3.63E+06		

Gaseous Effluent Data



**Note: Action level for gaseous effluent releases of HTO updated on July 14, 2024 to 1,000 GBq per week. Revision to action levels performed in accordance with requirements and guidance of CSA N288.8-17, Establishing and Implementing Action Levels for Releases to the Environment from Nuclear Facilities.*

Gaseous Effluent Data



**Note: Action level for gaseous effluent releases of total tritium updated on July 14, 2024 to 5,000 GBq per week. Revision to action levels performed in accordance with requirements and guidance of CSA N288.8-17, Establishing and Implementing Action Levels for Releases to the Environment from Nuclear Facilities.*

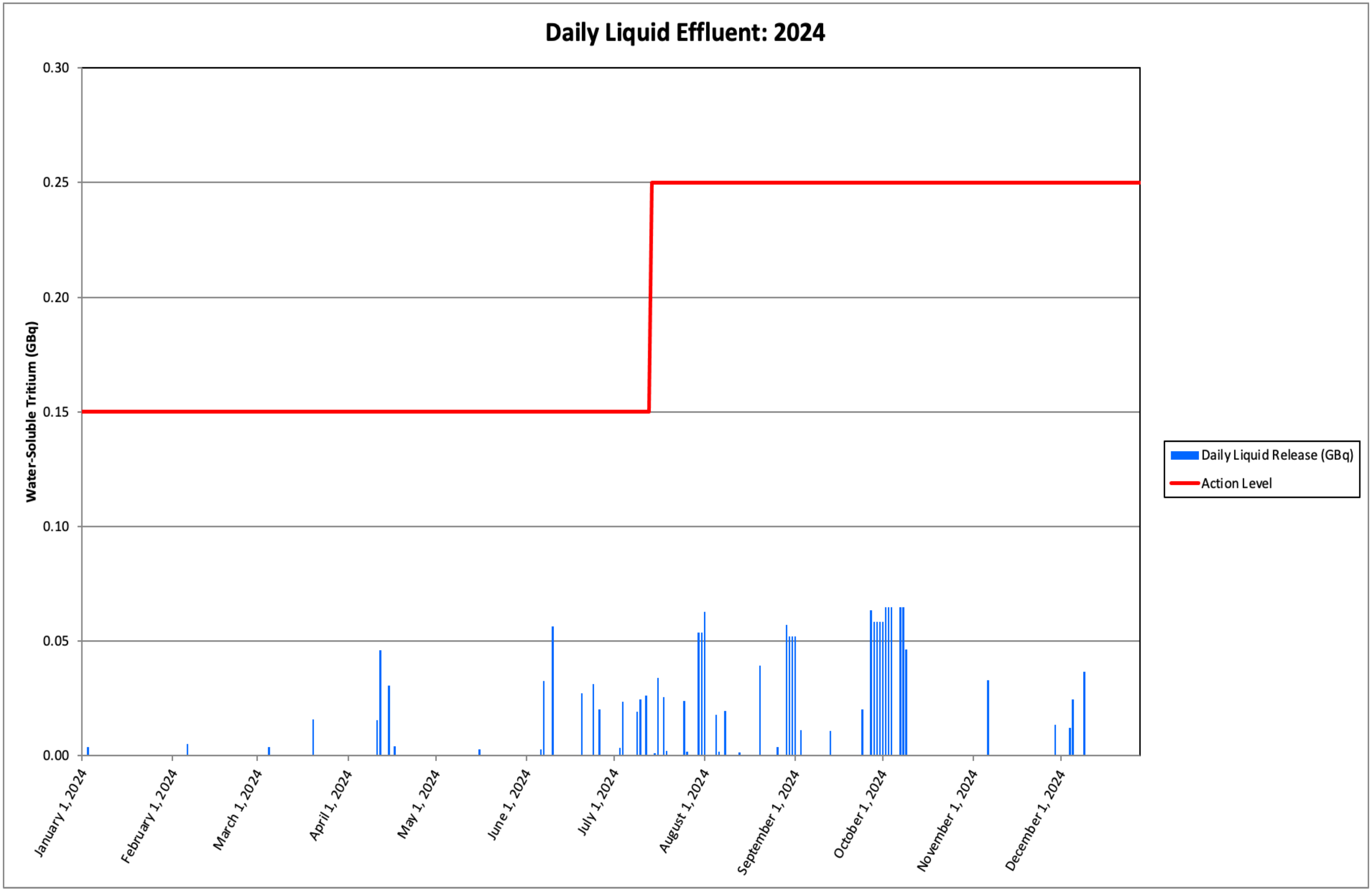
APPENDIX P

Liquid Effluent Data

Liquid Effluent Data

ANNUAL LIQUID EFFLUENT TRACKING TABLE		
Year = 2024		
WEEK ENDING	WEEKLY RELEASE (Bq)	WEEK
7-Jan-24	3,891,500	1
14-Jan-24	0	2
21-Jan-24	0	3
28-Jan-24	0	4
4-Feb-24	0	5
11-Feb-24	5,132,720	6
18-Feb-24	0	7
25-Feb-24	0	8
3-Mar-24	0	9
10-Mar-24	3,775,393	10
17-Mar-24	0	11
24-Mar-24	16,428,396	12
31-Mar-24	0	13
7-Apr-24	0	14
14-Apr-24	61,289,400	15
21-Apr-24	34,741,580	16
28-Apr-24	0	17
5-May-24	0	18
12-May-24	0	19
19-May-24	2,629,440	20
26-May-24	0	21
2-Jun-24	0	22
9-Jun-24	35,349,007	23
16-Jun-24	56,491,600	24
23-Jun-24	27,162,283	25
30-Jun-24	51,481,317	26
7-Jul-24	27,017,913	27
14-Jul-24	69,995,517	28
21-Jul-24	62,834,394	29
28-Jul-24	25,600,227	30
4-Aug-24	169,958,947	31
11-Aug-24	39,265,820	32
18-Aug-24	1,473,600	33
25-Aug-24	39,212,067	34
1-Sep-24	216,892,997	35
8-Sep-24	11,111,000	36
15-Sep-24	10,935,527	37
22-Sep-24	0	38
29-Sep-24	200,671,604	39
6-Oct-24	311,706,300	40
13-Oct-24	175,903,347	41
20-Oct-24	0	42
27-Oct-24	0	43
3-Nov-24	0	44
10-Nov-24	32,870,360	45
17-Nov-24	0	46
24-Nov-24	0	47
1-Dec-24	13,379,600	48
8-Dec-24	36,579,330	49
15-Dec-24	36,579,330	50
22-Dec-24	0	51
29-Dec-24	0	52
Annual Total (Bq)	1,780,360,516	
Annual Total (GBq)	1.78	
Limit (GBq)	200	
% of limit	**0.89**	

Liquid Effluent Data



**Note: Action level for liquid effluent releases updated on July 14, 2024 to 1.75 GBq per week (or, 0.25 GBq per day). Revision to action levels performed in accordance with requirements and guidance of CSA N288.8-17, Establishing and Implementing Action Levels for Releases to the Environment from Nuclear Facilities.*

APPENDIX Q

Groundwater Monitoring Well Level Data

Groundwater Monitoring Well Level Data

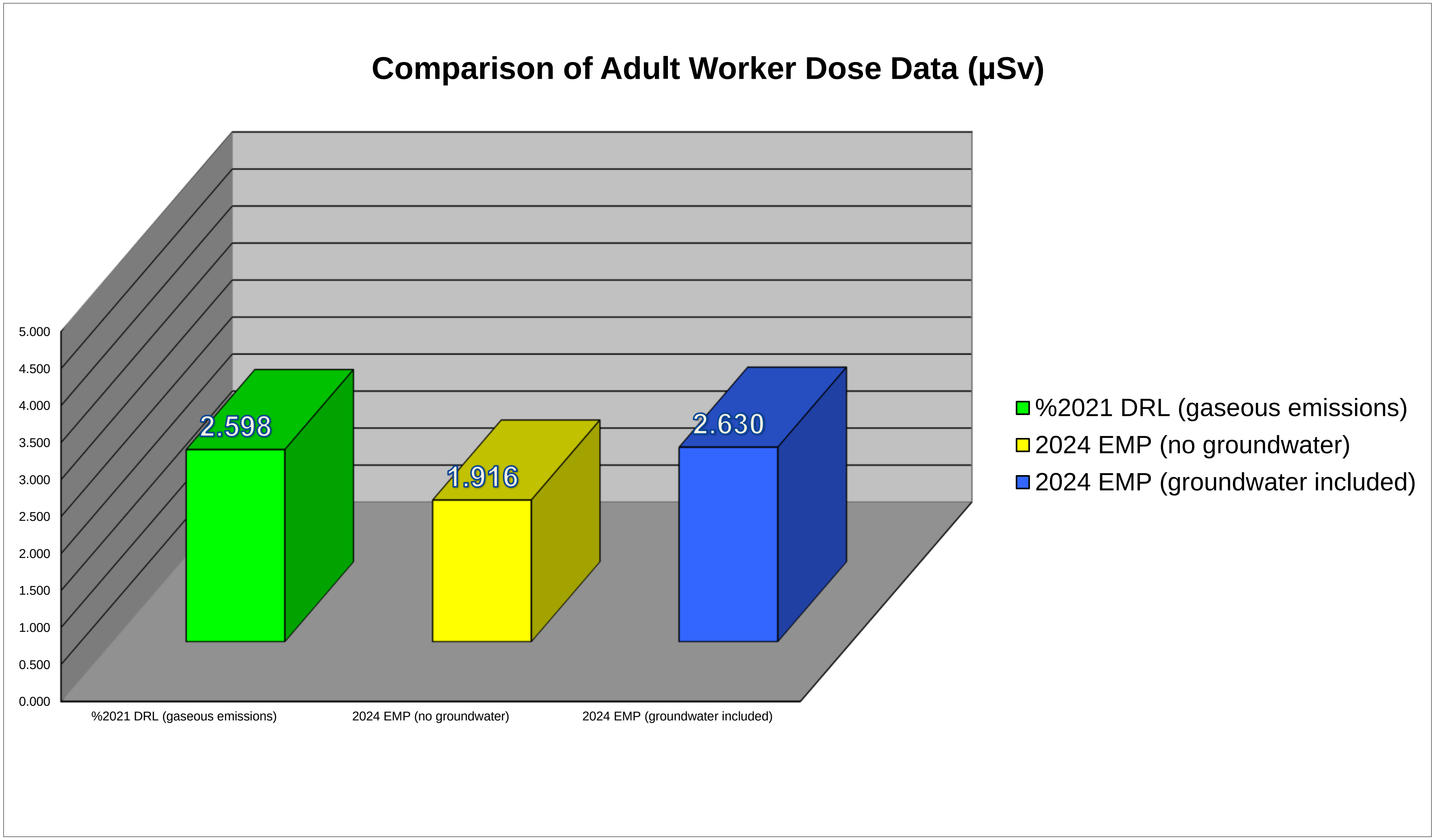
Well ID	Well Location and Characteristics							2024 Well Level Measurements (masl)			
	Easting	Northing	TOP Elevation (m)	GS Elevation (m)	Well Diameter (m)	Well Depth (m)	Stick-up (m)	Mar. 21	Jun. 12	Sep. 9	Dec. 9
MW06-1	335449	5074615	130.99	130.17	0.051	5.165	0.820	128.77	128.30	128.86	128.41
MW06-2	335478	5074578	130.03	129.24	0.051	5.330	0.788	127.78	127.51	127.72	127.69
MW06-3	335363	5074535	133.09	132.32	0.051	6.130	0.767	128.19	127.41	129.91	128.22
MW06-8	335464	5074590	130.30	129.58	0.032	6.700	0.720	127.37	126.65	127.61	127.00
MW06-9	335401	5074605	131.15	129.86	0.032	5.930	1.290	128.80	128.00	128.56	128.33
MW06-10	335408	5074506	131.32	130.24	0.032	7.770	1.077	128.37	127.33	128.82	127.82
MW07-11	335478	5074576	130.06	129.15	0.032	7.215	0.905	127.37	126.69	127.68	127.04
MW07-12	335465	5074588	130.41	129.58	0.032	7.450	0.835	127.33	126.61	127.63	126.95
MW07-13	335448	5074616	130.92	130.03	0.032	6.615	0.893	127.30	126.51	127.58	126.89
MW07-15	335403	5074605	130.84	129.93	0.032	7.230	0.910	128.44	127.45	128.74	127.72
MW07-16	335393	5074599	130.98	130.16	0.032	7.050	0.822	128.38	127.32	128.73	127.70
MW07-17	335392	5074599	131.08	130.16	0.051	14.610	0.915	123.62	122.35	123.16	123.11
MW07-18	335387	5074595	131.23	130.37	0.032	7.250	0.868	128.37	127.34	128.86	127.73
MW07-19	335378	5074587	131.61	130.79	0.032	7.400	0.815	128.62	127.37	129.01	127.83
MW07-20	335296	5074616	130.70	129.85	0.032	7.820	0.850	126.20	125.34	126.73	126.00
MW07-21	335522	5074584	129.51	128.78	0.032	7.580	0.730	125.71	124.08	126.35	125.45
MW07-22	335472	5074584	130.25	129.05	0.032	7.465	1.200	127.19	126.49	127.50	126.85
MW07-23	335492	5074560	130.04	129.29	0.032	5.905	0.750	127.75	127.09	127.91	127.43
MW07-24	335519	5074530	129.03	128.22	0.032	6.525	0.810	126.85	126.16	127.08	126.63
MW07-26	335357	5074567	132.42	131.85	0.032	7.310	0.570	128.76	126.75	129.32	127.72
MW07-27	335354	5074611	132.89	132.02	0.032	8.330	0.870	127.86	126.45	128.22	127.07
MW07-28	335352	5074612	132.71	132.04	0.032	14.400	0.670	123.55	122.47	123.46	123.11
MW07-29	335384	5074592	131.09	130.57	0.032	13.000	0.520	123.54	122.46	123.44	123.09
MW07-31	335471	5074583	130.16	129.38	0.032	13.240	0.780	122.79	121.01	122.56	122.57
MW07-32	335517	5074530	128.86	128.23	0.032	13.090	0.630	122.76	121.01	122.51	122.53
MW07-34	335393	5074591	131.12	130.71	0.032	9.110	0.410	127.15	126.01	127.50	126.55
MW07-35	335354	5074613	132.89	132.16	0.032	9.390	0.730	127.47	126.14	127.77	126.75
MW07-36	335338	5074629	133.10	132.31	0.032	9.330	0.790	126.26	125.08	126.55	125.61
MW07-37	335468	5074589	130.06	129.47	0.032	8.590	0.590	127.49	126.76	127.78	127.13

APPENDIX R

Public Dose Data

Public Dose Data
ADULT WORKER

Dose Calculation	2024 µSv
%2021 DRL (gaseous emissions)	2.598
2024 EMP (no groundwater)	1.916
2024 EMP (groundwater included)	2.630



Public Dose Data
ADULT WORKER

Stack Emissions

	2024 Emissions as %2021 SRBT DRL	
	ADULT WORKER	
Sample End	% weekly DRL	(uSv)
2024-01-09	0.13	0.0246
2024-01-16	0.18	0.0351
2024-01-23	0.09	0.0181
2024-01-30	0.11	0.0219
2024-02-06	0.15	0.0284
2024-02-13	0.17	0.0336
2024-02-20	0.12	0.0237
2024-02-27	0.30	0.0578
2024-03-05	0.27	0.0520
2024-03-12	0.25	0.0478
2024-03-19	0.19	0.0360
2024-03-26	0.16	0.0302
2024-04-02	0.15	0.0297
2024-04-09	0.16	0.0316
2024-04-16	0.21	0.0397
2024-04-23	0.15	0.0286
2024-04-30	0.20	0.0391
2024-05-07	0.23	0.0439
2024-05-14	0.26	0.0494
2024-05-21	0.27	0.0526
2024-05-28	0.22	0.0432
2024-06-04	0.28	0.0538
2024-06-11	0.41	0.0793
2024-06-18	0.35	0.0678
2024-06-25	0.47	0.0906
2024-07-02	0.22	0.0425
2024-07-09	0.22	0.0433
2024-07-16	0.28	0.0542
2024-07-23	0.35	0.0682
2024-07-30	0.41	0.0781
2024-08-06	0.21	0.0397
2024-08-13	0.28	0.0536
2024-08-20	0.35	0.0672
2024-08-27	0.29	0.0566
2024-09-03	0.21	0.0406
2024-09-10	0.24	0.0453
2024-09-17	0.43	0.0834
2024-09-24	0.34	0.0649
2024-10-01	0.23	0.0446
2024-10-08	0.26	0.0504
2024-10-15	0.26	0.0508
2024-10-22	0.41	0.0783
2024-10-29	0.50	0.0962
2024-11-05	0.35	0.0681
2024-11-12	0.27	0.0528
2024-11-19	0.28	0.0543
2024-11-26	0.32	0.0617
2024-12-03	0.75	0.1448
2024-12-10	0.20	0.0386
2024-12-17	0.17	0.0328
2024-12-24	0.13	0.0243
2024-12-31	0.02	0.0040
Sum (uSv)		**2.598**
Ave. (%DRL)	**0.26**	
Annual Dose Est.	**2.598 uSv/a**	

Public Dose Data
ADULT WORKER
EMP Factors for Dose

Pathways Analysis of Dose to the Public			
		per annum	
Atmospheric HTO inhalation, immersion	P(i)19, P(e)19	1.459	
Surface HTO ingestion	P(i)29	0.714	
Surface HTO immersion	P(e)29	0.000	
External soil exposure	P39	0.000	
Forage & crop ingestion	P49	0.442	
Animal produce ingestion	P59	0.015	
Aquatic animal ingestion	P69	0.000	
Aquatic plant ingestion	P79	0.000	
External sediment exposure	P89	0.000	
Total	**(uSv)**	**2.630**	**uSv/a**
Total without P_{29}	**(uSv)**	**1.916**	**uSv/a**

Public Dose Data
ADULT WORKER
EMP Factors for Dose P19

P19 is the transfer pathway of exposure to HTO from compartment 1 (Atmosphere) to 9 (dose)
P(i)19 is the pathway of exposure due to inhalation of HTO, and also implicitly captures skin absorption dose P(e)19 as per CSA N288.1-14 Table C.1.

Formula:
P(i)19 (uSv) = [HTO]air (Bq/m3) x Inhalation (m3) x DCF (uSv/Bq)

Calculation:

PAS # (#)	P(i)19 (uSv)	[HTO]air (Bq/m^3)	Volume (m^3)	(uSv/Bq)	(uSv/a)	(uSv/a)	(uSv/a)	Maximum (uSv/a)
1	0.500	8.350	1994.496	3.000E-05	0.500			
2	0.482	8.050	1994.496	3.000E-05		0.482		
3	0.000			3.000E-05				
4	0.959	4.990	6405.504	3.000E-05	0.959	0.959	0.959	
5	0.000			3.000E-05				
6	0.000			3.000E-05				
7	0.000			3.000E-05				
8	0.000			3.000E-05				
9	0.000			3.000E-05				
10	0.000			3.000E-05				
11	0.000			3.000E-05				
12	0.000			3.000E-05				
13	0.253	4.220	1994.496	3.000E-05			0.253	
			P(i)19	**Sum**	**1.459**	**1.441**	**1.212**	**1.459** uSv/a

Public Dose Data
ADULT WORKER
EMP Factors for Dose P29

P29 is the transfer pathway of exposure to HTO from compartment 2 (Surface Water) to 9 (Dose)
P(i)29 is the pathway of exposure due to ingestion of HTO
P(e)29 is the pathway of exposure due to immersion in HTO

Formula:
P(i)29 = [HTO] (Bq/L) x Ingestion (L) x DCF (uSv/Bq)

Well	P(i)29 (uSv/a)	[HTO]well (Bq/L)	Ingestion (L/a)	DCF (uSv/Bq)
2	0.465	21.5	1081.1	2.00E-05
3	0.714	33.0	1081.1	2.00E-05
5	0.162	7.5	1081.1	2.00E-05
6	0.097	4.5	1081.1	2.00E-05
7	0.108	5.0	1081.1	2.00E-05
Avg P(i)29	0.309	**uSv/annum**		

Date	Well 2 (Bq/L)	Well 3 (Bq/L)	Well 5 (Bq/L)	Well 6 (Bq/L)	Well 7 (Bq/L)
March 22, 2024	22	33	10	4	5
September 10, 2024	21	NS	5	5	5
Average	**21.5**	**33.0**	**7.5**	**4.5**	**5.0**

Well 2	185 Mud Lake Road
Well 3	183 Mud Lake Road
Well 5	171 Sawmill Road
Well 6	40987 Highway 41
Well 7	40925 Highway 41

Well 3	**P(i)29**	0.714	**uSv/a**
	P(e)29	0.000	**uSv/a**
	P29	0.714	**uSv/a**

P(e)29 is the pathway of exposure to HTO due to immersion in surface water, and is negligible.

Public Dose Data
ADULT WORKER
EMP Factors for Dose P49

P49 is the pathway for exposure to HTO due to ingestion of forage and crops.

Produce Sample Results (Bq free water tritium / kg fresh weight)									
Source	**1232 Pembroke Street East**		**Residences**						
Type	**Rhubarb**	**Average**	**LOCATION**	**Cucumber**	**Tomatoes**	**Carrots**	**Beans**	**Rhubarb**	**Average**
FWT	2	**2.0**	611 MOSS DRIVE	171	189	113			**157.7**
			171 SAWMILL ROAD	15	12	12	34		18.3
			632 JOHNSON CRES.					80	80.0
Average		2.0	**Average**	93	101	63	34	80	57.0
Produce Sample Results (Bq organically bound tritium / kg fresh weight)									
OBT	0.8	**0.80**	611 MOSS DRIVE	6	4				**5.0**
			171 SAWMILL ROAD	0.2	0.2				0.2

Produce Consumption						
100%=	**413.300**	**kg/a**	**[HTO] (Bq/kg)**	**(Bq/a)**	**[OBT] (Bq/kg)**	**(Bq/a)**
70%	289.310	**kg/a**	2.0	578.62	0.8	231.45
30%	123.990	**kg/a**	157.7	19549.09	5.0	619.95

P49 = [HTO or OBT]produce (Bq/kg) x Produce Ingested (kg/mo) x DCF (uSv/Bq)

P49 (uSv/a)	[HTO] pro (Bq/a)	DCF (uSv/Bq)	[OBT] pro (Bq/a)	DCF (uSv/Bq)
0.442	**20127.71**	2.00E-05	**851.40**	4.60E-05

P49	**0.442**	**uSv/a**

Public Dose Data
ADULT WORKER
EMP Factors for Dose P59

P59 is the exposure to HTO due to ingestion of animal produce.

Local Producer	
	(Bq/L)
1	3.00
2	3.00
Average	**3.00**

Local Distributor	
	(Bq/L)
1	2.00
2	8.00
Average	**5.00**

TOTAL AVERAGE	**4.00**	Bq/L

Milk Density Adjustment		
Milk Average (Bq/L) x Milk density (L/kg)		
Bq/L	**L/kg**	**Bq/kg**
4.00	0.97	**3.880**

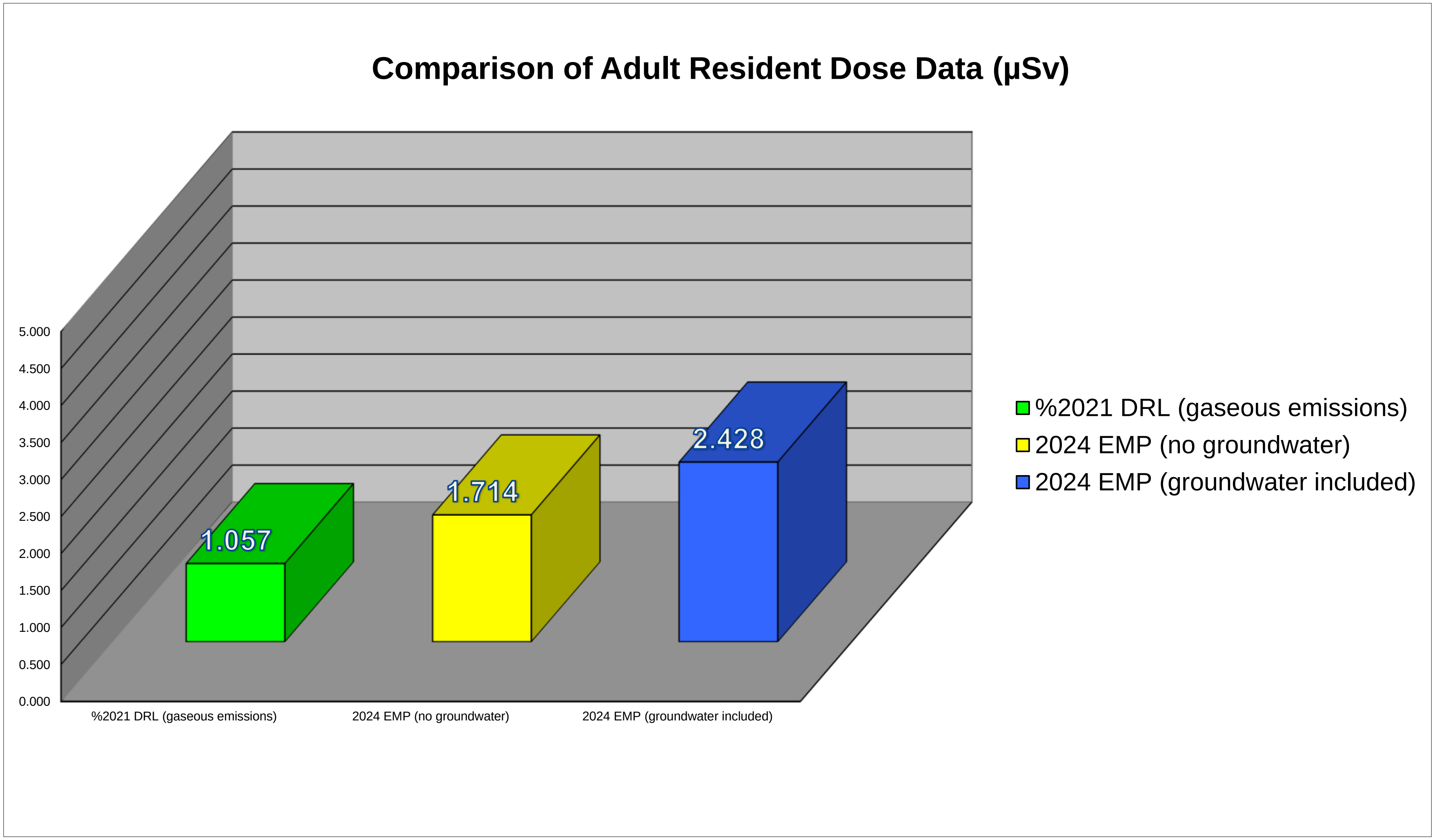
Consumption		
kg/da x da/a = kg/a		
(kg/da)	**(da/a)**	**(kg/a)**
0.516	365.25	**188.5**

P59 = [HTO]animal produce (Bq/kg) x Ingestion (kg) x DCF			
P59	**[HTO]**	**Ingested**	**DCF**
(uSv/a)	**(Bq/kg)**	**(kg/a)**	**(uSv/Bq)**
0.015	**3.88**	**188.5**	2.00E-05

P59	**0.015**	**uSv/a**

Public Dose Data
ADULT RESIDENT

Dose Calculation	2024 µSv
%2021 DRL (gaseous emissions)	1.057
2024 EMP (no groundwater)	1.714
2024 EMP (groundwater included)	2.428



Public Dose Data
ADULT RESIDENT

Stack Emissions

	2024 Emissions as %2021 SRBT DRL	
	ADULT RESIDENT	
Sample End	**% weekly DRL**	**(uSv)**
2024-01-09	0.05	0.0099
2024-01-16	0.07	0.0142
2024-01-23	0.04	0.0074
2024-01-30	0.05	0.0088
2024-02-06	0.06	0.0115
2024-02-13	0.07	0.0136
2024-02-20	0.05	0.0095
2024-02-27	0.12	0.0233
2024-03-05	0.11	0.0210
2024-03-12	0.10	0.0192
2024-03-19	0.08	0.0145
2024-03-26	0.06	0.0122
2024-04-02	0.06	0.0120
2024-04-09	0.07	0.0127
2024-04-16	0.08	0.0159
2024-04-23	0.06	0.0115
2024-04-30	0.08	0.0157
2024-05-07	0.09	0.0176
2024-05-14	0.10	0.0198
2024-05-21	0.11	0.0212
2024-05-28	0.09	0.0175
2024-06-04	0.11	0.0217
2024-06-11	0.17	0.0318
2024-06-18	0.14	0.0273
2024-06-25	0.19	0.0365
2024-07-02	0.09	0.0173
2024-07-09	0.09	0.0175
2024-07-16	0.11	0.0219
2024-07-23	0.14	0.0275
2024-07-30	0.16	0.0313
2024-08-06	0.08	0.0159
2024-08-13	0.11	0.0215
2024-08-20	0.14	0.0270
2024-08-27	0.12	0.0228
2024-09-03	0.08	0.0163
2024-09-10	0.10	0.0183
2024-09-17	0.18	0.0337
2024-09-24	0.14	0.0262
2024-10-01	0.09	0.0179
2024-10-08	0.11	0.0202
2024-10-15	0.11	0.0204
2024-10-22	0.16	0.0314
2024-10-29	0.20	0.0386
2024-11-05	0.14	0.0273
2024-11-12	0.11	0.0211
2024-11-19	0.11	0.0218
2024-11-26	0.13	0.0248
2024-12-03	0.36	0.0691
2024-12-10	0.08	0.0158
2024-12-17	0.07	0.0132
2024-12-24	0.05	0.0098
2024-12-31	0.01	0.0016
Sum (uSv)		**1.057**
Ave. (%DRL)	**0.11**	
Annual Dose Est.	**1.057 uSv/a**	

Public Dose Data
ADULT RESIDENT
EMP Factors for Dose

Pathways Analysis of Dose to the Public			
		per annum	
Atmospheric HTO inhalation, immersion	P(i)19, P(e)19	1.257	
Surface HTO ingestion	P(i)29	0.714	
Surface HTO immersion	P(e)29	0.000	
External soil exposure	P39	0.000	
Forage & crop ingestion	P49	0.442	
Animal produce ingestion	P59	0.015	
Aquatic animal ingestion	P69	0.000	
Aquatic plant ingestion	P79	0.000	
External sediment exposure	P89	0.000	
Total	**(uSv)**	**2.428**	**uSv/a**
Total without P_{29}	**(uSv)**	**1.714**	**uSv/a**

Public Dose Data
ADULT RESIDENT
EMP Factors for Dose P19

P19 is the transfer pathway of exposure to HTO from compartment 1 (Atmosphere) to 9 (dose)
P(i)19 is the pathway of exposure due to inhalation of HTO, and also implicitly captures skin absorption dose P(e)19 as per CSA N288.1-14 Table C.1.

Formula:
P(i)19 (uSv) = [HTO]air (Bq/m3) x Inhalation (m3) x DCF (uSv/Bq)

Calculation:

PAS # (#)	P(i)19 (uSv)	[HTO]air (Bq/m^3)	Volume (m^3)	(uSv/Bq)	(uSv/a)	(uSv/a)	(uSv/a)	Maximum (uSv/a)	
1	0.000			3.000E-05					
2	0.000			3.000E-05					
3	0.000			3.000E-05					
4	1.257	4.990	8400.000	3.000E-05	1.257	1.257	1.257		
5	0.000			3.000E-05					
6	0.000			3.000E-05					
7	0.000			3.000E-05					
8	0.000			3.000E-05					
9	0.000			3.000E-05					
10	0.000			3.000E-05					
11	0.000			3.000E-05					
12	0.000			3.000E-05					
13	0.000			3.000E-05					
			P(i)19	**Sum**	**1.257**	**1.257**	**1.257**	**1.257**	**uSv/a**

Public Dose Data
ADULT RESIDENT
EMP Factors for Dose P29

P29 is the transfer pathway of exposure to HTO from compartment 2 (Surface Water) to 9 (Dose)
P(i)29 is the pathway of exposure due to ingestion of HTO
P(e)29 is the pathway of exposure due to immersion in HTO

Formula:
P(i)29 = [HTO] (Bq/L) x Ingestion (L) x DCF (uSv/Bq)

Well	P(i)29 (uSv/a)	[HTO]well (Bq/L)	Ingestion (L/a)	DCF (uSv/Bq)
2	0.465	21.5	1081.1	2.00E-05
3	0.714	33.0	1081.1	2.00E-05
5	0.162	7.5	1081.1	2.00E-05
6	0.097	4.5	1081.1	2.00E-05
7	0.108	5.0	1081.1	2.00E-05
Avg P(i)29	0.309	**uSv/annum**		

Date	Well 2 (Bq/L)	Well 3 (Bq/L)	Well 5 (Bq/L)	Well 6 (Bq/L)	Well 7 (Bq/L)
March 22, 2024	22	33	10	4	5
September 10, 2024	21	NS	5	5	5
Average	**21.5**	**33.0**	**7.5**	**4.5**	**5.0**

Well 2	185 Mud Lake Road
Well 3	183 Mud Lake Road
Well 5	171 Sawmill Road
Well 6	40987 Highway 41
Well 7	40925 Highway 41

Well 3	**P(i)29**	0.714	**uSv/a**
	P(e)29	0.000	**uSv/a**
	P29	0.714	**uSv/a**

P(e)29 is the pathway of exposure to HTO due to immersion in surface water, and is negligible.

Public Dose Data
ADULT RESIDENT
EMP Factors for Dose P49

P49 is the pathway for exposure to HTO due to ingestion of forage and crops.

Produce Sample Results (Bq free water tritium / kg fresh weight)									
Source	**1232 Pembroke Street East**		**Residences**						
Type	**Rhubarb**	**Average**	**LOCATION**	**Cucumber**	**Tomatoes**	**Carrots**	**Beans**	**Rhubarb**	**Average**
FWT	2	**2.0**	611 MOSS DRIVE	171	189	113			**157.7**
			171 SAWMILL ROAD	15	12	12	34		18.3
			632 JOHNSON CRES.					80	80.0
Average		2.0	**Average**	93	101	63	34	80	57.0
Produce Sample Results (Bq organically bound tritium / kg fresh weight)									
OBT	0.8	**0.80**	611 MOSS DRIVE	6	4				**5.0**
			171 SAWMILL ROAD	0.2	0.2				0.2

Produce Consumption							
100%=	**413.300**	**kg/a**	**[HTO] (Bq/kg)**	**(Bq/a)**	**[OBT] (Bq/kg)**	**(Bq/a)**
70%	289.310	**kg/a**	2.0	578.62	0.8	231.45
30%	123.990	**kg/a**	157.7	19549.09	5.0	619.95

P49 = [HTO or OBT]produce (Bq/kg) x Produce Ingested (kg/mo) x DCF (uSv/Bq)

P49 (uSv/a)	**[HTO] pro (Bq/a)**	**DCF (uSv/Bq)**	**[OBT] pro (Bq/a)**	**DCF (uSv/Bq)**
0.442	**20127.71**	2.00E-05	**851.40**	4.60E-05

P49	**0.442**	**uSv/a**

Public Dose Data
ADULT RESIDENT
EMP Factors for Dose P59

P59 is the exposure to HTO due to ingestion of animal produce.

Local Producer	
	(Bq/L)
1	3.00
2	3.00
Average	3.00

Local Distributor	
	(Bq/L)
1	2.00
2	8.00
Average	5.00

TOTAL AVERAGE	4.00	Bq/L

Milk Density Adjustment Milk Average (Bq/L) x Milk density (L/kg)		
Bq/L	L/kg	Bq/kg
4.00	0.97	3.880

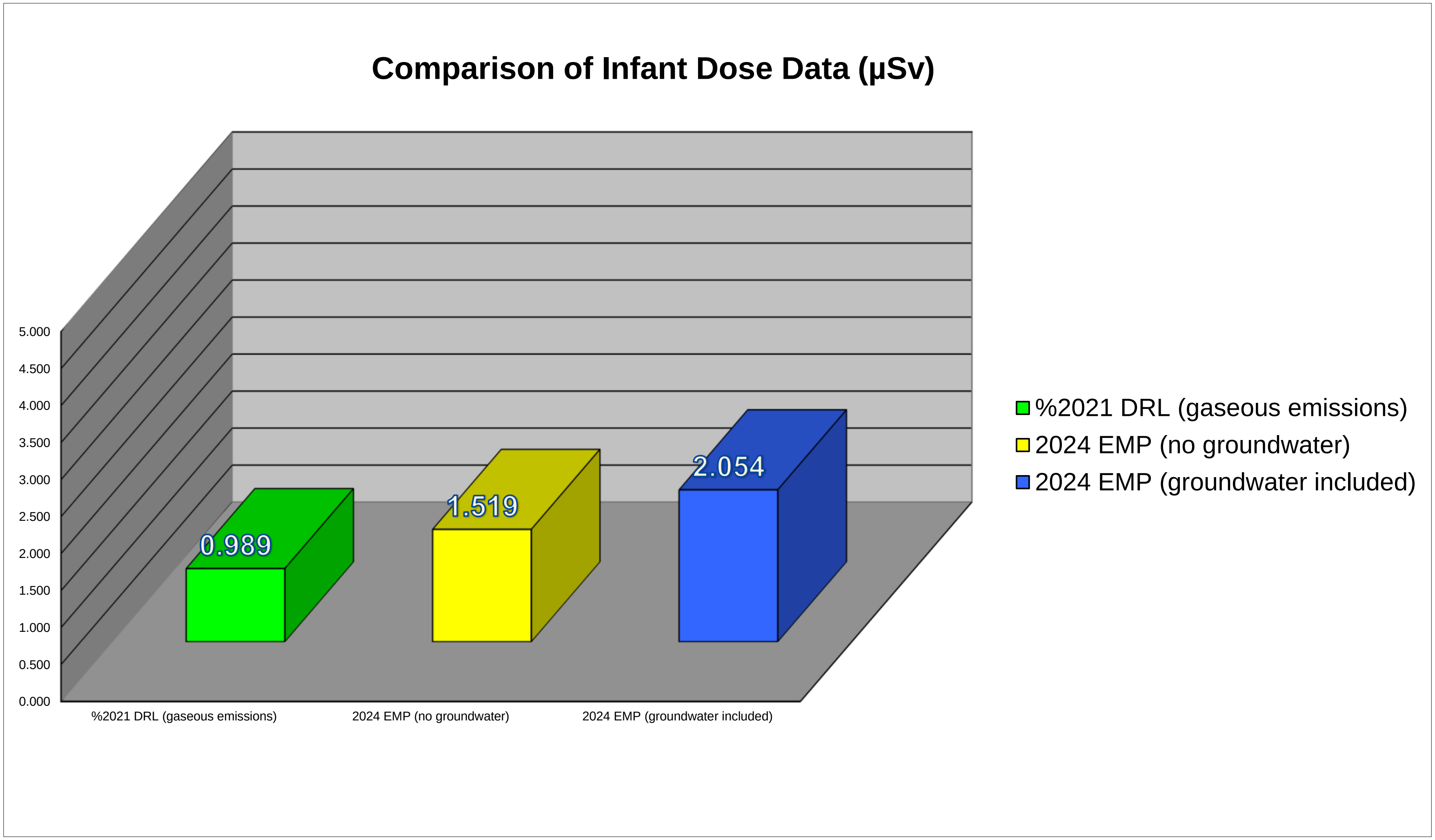
Consumption kg/da x da/a = kg/a		
(kg/da)	(da/a)	(kg/a)
0.516	365.25	188.5

P59 = [HTO]animal produce (Bq/kg) x Ingestion (kg) x DCF			
P59	[HTO]	Ingested	DCF
(uSv/a)	(Bq/kg)	(kg/a)	(uSv/Bq)
0.015	3.88	188.5	2.00E-05

P59	0.015	uSv/a

Public Dose Data
INFANT - 1 YEAR OLD

Dose Calculation	2024 µSv
%2021 DRL (gaseous emissions)	0.989
2024 EMP (no groundwater)	1.519
2024 EMP (groundwater included)	2.054



Public Dose Data
INFANT - 1 YEAR OLD

Stack Emissions

	2024 Emissions as %2021 SRBT DRL	
	INFANT - 1 YEAR OLD	
Sample End	% weekly DRL	(uSv)
2024-01-09	0.05	0.0093
2024-01-16	0.07	0.0133
2024-01-23	0.04	0.0069
2024-01-30	0.04	0.0083
2024-02-06	0.06	0.0108
2024-02-13	0.07	0.0127
2024-02-20	0.05	0.0089
2024-02-27	0.11	0.0218
2024-03-05	0.10	0.0197
2024-03-12	0.09	0.0180
2024-03-19	0.07	0.0136
2024-03-26	0.06	0.0114
2024-04-02	0.06	0.0112
2024-04-09	0.06	0.0119
2024-04-16	0.08	0.0149
2024-04-23	0.06	0.0108
2024-04-30	0.08	0.0147
2024-05-07	0.09	0.0164
2024-05-14	0.10	0.0186
2024-05-21	0.10	0.0198
2024-05-28	0.08	0.0163
2024-06-04	0.11	0.0203
2024-06-11	0.15	0.0297
2024-06-18	0.13	0.0256
2024-06-25	0.18	0.0341
2024-07-02	0.08	0.0162
2024-07-09	0.09	0.0163
2024-07-16	0.11	0.0204
2024-07-23	0.13	0.0257
2024-07-30	0.15	0.0293
2024-08-06	0.08	0.0149
2024-08-13	0.10	0.0202
2024-08-20	0.13	0.0253
2024-08-27	0.11	0.0213
2024-09-03	0.08	0.0152
2024-09-10	0.09	0.0171
2024-09-17	0.16	0.0316
2024-09-24	0.13	0.0245
2024-10-01	0.09	0.0168
2024-10-08	0.10	0.0189
2024-10-15	0.10	0.0190
2024-10-22	0.15	0.0293
2024-10-29	0.19	0.0360
2024-11-05	0.13	0.0256
2024-11-12	0.10	0.0198
2024-11-19	0.11	0.0204
2024-11-26	0.12	0.0232
2024-12-03	0.34	0.0654
2024-12-10	0.08	0.0148
2024-12-17	0.06	0.0124
2024-12-24	0.05	0.0091
2024-12-31	0.01	0.0015
Sum (uSv)		**0.989**
Ave. (%DRL)	**0.10**	
Annual Dose Est.	**0.989 uSv/a**	

Public Dose Data
INFANT - 1 YEAR OLD
EMP Factors for Dose

Pathways Analysis of Dose to the Public			
		per annum	
Atmospheric HTO inhalation, immersion	P(i)19, P(e)19	1.094	
Surface HTO ingestion	P(i)29	0.535	
Surface HTO immersion	P(e)29	0.000	
External soil exposure	P39	0.000	
Forage & crop ingestion	P49	0.355	
Animal produce ingestion	P59	0.070	
Aquatic animal ingestion	P69	0.000	
Aquatic plant ingestion	P79	0.000	
External sediment exposure	P89	0.000	
Total	**(uSv)**	**2.054**	**uSv/a**
Total without P_{29}	**(uSv)**	**1.519**	**uSv/a**

Public Dose Data
INFANT - 1 YEAR OLD
EMP Factors for Dose P19

P19 is the transfer pathway of exposure to HTO from compartment 1 (Atmosphere) to 9 (dose)
P(i)19 is the pathway of exposure due to inhalation of HTO, and also implicitly captures skin absorption dose P(e)19 as per CSA N288.1-14 Table C.1.

Formula:
P(i)19 (uSv) = [HTO]air (Bq/m3) x Inhalation (m3) x DCF (uSv/Bq)

Calculation:

PAS # (#)	P(i)19 (uSv)	[HTO]air (Bq/m^3)	Volume (m^3)	(uSv/Bq)	(uSv/a)	(uSv/a)	(uSv/a)	Maximum (uSv/a)
1	0.000			8.000E-05				
2	0.000			8.000E-05				
3	0.000			8.000E-05				
4	1.094	4.990	2740.000	8.000E-05	1.094	1.094	1.094	
5	0.000			8.000E-05				
6	0.000			8.000E-05				
7	0.000			8.000E-05				
8	0.000			8.000E-05				
9	0.000			8.000E-05				
10	0.000			8.000E-05				
11	0.000			8.000E-05				
12	0.000			8.000E-05				
13	0.000			8.000E-05				
			P(i)19	**Sum**	**1.094**	**1.094**	**1.094**	**1.094** uSv/a

Public Dose Data
INFANT - 1 YEAR OLD
EMP Factors for Dose P29

P29 is the transfer pathway of exposure to HTO from compartment 2 (Surface Water) to 9 (Dose)
P(i)29 is the pathway of exposure due to ingestion of HTO
P(e)29 is the pathway of exposure due to immersion in HTO

Formula:
P(i)29 = [HTO] (Bq/L) x Ingestion (L) x DCF (uSv/Bq)

Well	P(i)29 (uSv/a)	[HTO]well (Bq/L)	Ingestion (L/a)	DCF (uSv/Bq)
2	0.348	21.5	305.7	5.30E-05
3	0.535	33.0	305.7	5.30E-05
5	0.122	7.5	305.7	5.30E-05
6	0.073	4.5	305.7	5.30E-05
7	0.081	5.0	305.7	5.30E-05
Avg P(i)29	0.232	**uSv/annum**		

Date	Well 2 (Bq/L)	Well 3 (Bq/L)	Well 5 (Bq/L)	Well 6 (Bq/L)	Well 7 (Bq/L)
March 22, 2024	22	33	10	4	5
September 10, 2024	21	NS	5	5	5
Average	**21.5**	**33.0**	**7.5**	**4.5**	**5.0**

Well 2	185 Mud Lake Road
Well 3	183 Mud Lake Road
Well 5	171 Sawmill Road
Well 6	40987 Highway 41
Well 7	40925 Highway 41

Well 3	**P(i)29**	0.535	**uSv/a**
	P(e)29	0.000	**uSv/a**
	P29	0.535	**uSv/a**

P(e)29 is the pathway of exposure to HTO due to immersion in surface water, and is negligible.

Public Dose Data
INFANT - 1 YEAR OLD
EMP Factors for Dose P49

P49 is the pathway for exposure to HTO due to ingestion of forage and crops.

Produce Sample Results (Bq free water tritium / kg fresh weight)									
Source	**1232 Pembroke Street East**		**Residences**						
Type	**Rhubarb**	**Average**	**LOCATION**	**Cucumber**	**Tomatoes**	**Carrots**	**Beans**	**Rhubarb**	**Average**
FWT	2	**2.0**	611 MOSS DRIVE	171	189	113			**157.7**
			171 SAWMILL ROAD	15	12	12	34		18.3
			632 JOHNSON CRES.					80	80.0
Average		2.0	**Average**	93	101	63	34	80	57.0
Produce Sample Results (Bq organically bound tritium / kg fresh weight)									
OBT	0.8	**0.80**	611 MOSS DRIVE	6	4				**5.0**
			171 SAWMILL ROAD	0.2	0.2				0.2

Produce Consumption						
100%=	**124.800**	**kg/a**	**[HTO] (Bq/kg)**	**(Bq/a)**	**[OBT] (Bq/kg)**	**(Bq/a)**
70%	87.360	**kg/a**	2.0	174.72	0.8	69.89
30%	37.440	**kg/a**	157.7	5903.04	5.0	187.20

P49 = [HTO or OBT]produce (Bq/kg) x Produce Ingested (kg/mo) x DCF (uSv/Bq)

P49 (uSv/a)	[HTO] pro (Bq/a)	DCF (uSv/Bq)	[OBT] pro (Bq/a)	DCF (uSv/Bq)
0.355	**6077.76**	5.30E-05	**257.09**	1.30E-04

P49	**0.355**	**uSv/a**

Public Dose Data
INFANT - 1 YEAR OLD
EMP Factors for Dose P59

P59 is the exposure to HTO due to ingestion of animal produce.

Local Producer	
	(Bq/L)
1	3.00
2	3.00
Average	**3.00**

Local Distributor	
	(Bq/L)
1	2.00
2	8.00
Average	**5.00**

TOTAL AVERAGE	**4.00**	Bq/L

Milk Density Adjustment		
Milk Average (Bq/L) x Milk density (L/kg)		
Bq/L	**L/kg**	**Bq/kg**
4.00	0.97	**3.880**

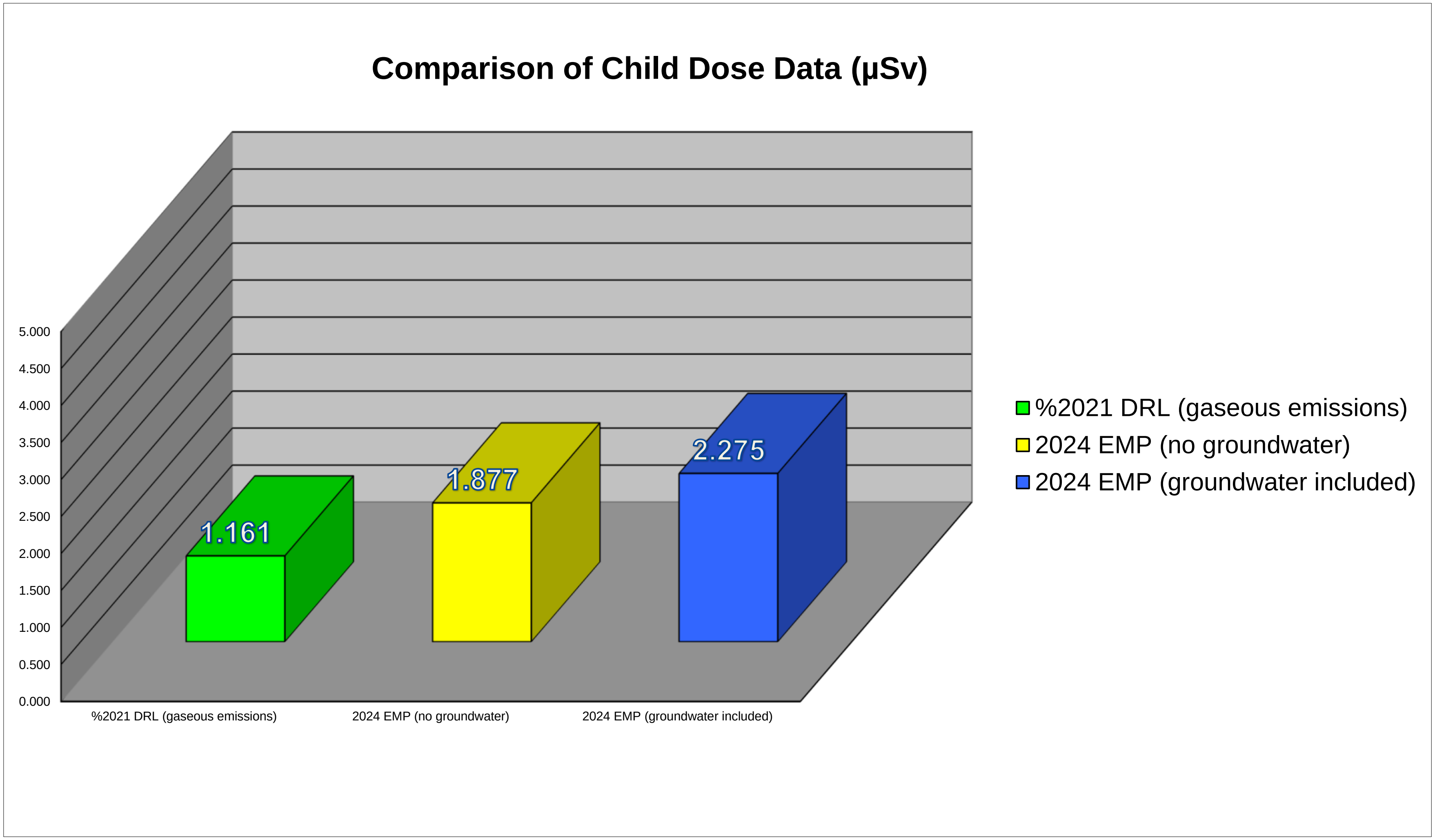
Consumption		
kg/da x da/a = kg/a		
(kg/da)	**(da/a)**	**(kg/a)**
0.931	365.25	**340.0**

P59 = [HTO]animal produce (Bq/kg) x Ingestion (kg) x DCF			
P59	**[HTO]**	**Ingested**	**DCF**
(uSv/a)	**(Bq/kg)**	**(kg/a)**	**(uSv/Bq)**
0.070	**3.88**	**340.0**	5.30E-05

P59	**0.070**	**uSv/a**

Public Dose Data
CHILD - 10 YEAR OLD

Dose Calculation	2024 µSv
%2021 DRL (gaseous emissions)	1.161
2024 EMP (no groundwater)	1.877
2024 EMP (groundwater included)	2.275



Public Dose Data
CHILD - 10 YEAR OLD

Stack Emissions

	2024 Emissions as %2021 SRBT DRL	
	CHILD - 10 YEAR OLD	
Sample End	**% weekly DRL**	**(uSv)**
2024-01-09	0.06	0.0109
2024-01-16	0.08	0.0156
2024-01-23	0.04	0.0081
2024-01-30	0.05	0.0097
2024-02-06	0.07	0.0126
2024-02-13	0.08	0.0150
2024-02-20	0.05	0.0105
2024-02-27	0.13	0.0257
2024-03-05	0.12	0.0232
2024-03-12	0.11	0.0212
2024-03-19	0.08	0.0160
2024-03-26	0.07	0.0134
2024-04-02	0.07	0.0132
2024-04-09	0.07	0.0140
2024-04-16	0.09	0.0176
2024-04-23	0.07	0.0127
2024-04-30	0.09	0.0173
2024-05-07	0.10	0.0194
2024-05-14	0.11	0.0219
2024-05-21	0.12	0.0233
2024-05-28	0.10	0.0192
2024-06-04	0.12	0.0239
2024-06-11	0.18	0.0351
2024-06-18	0.16	0.0301
2024-06-25	0.21	0.0402
2024-07-02	0.10	0.0190
2024-07-09	0.10	0.0192
2024-07-16	0.13	0.0241
2024-07-23	0.16	0.0303
2024-07-30	0.18	0.0346
2024-08-06	0.09	0.0176
2024-08-13	0.12	0.0238
2024-08-20	0.15	0.0298
2024-08-27	0.13	0.0251
2024-09-03	0.09	0.0180
2024-09-10	0.10	0.0201
2024-09-17	0.19	0.0371
2024-09-24	0.15	0.0288
2024-10-01	0.10	0.0198
2024-10-08	0.12	0.0223
2024-10-15	0.12	0.0225
2024-10-22	0.18	0.0346
2024-10-29	0.22	0.0426
2024-11-05	0.16	0.0302
2024-11-12	0.12	0.0233
2024-11-19	0.13	0.0241
2024-11-26	0.14	0.0273
2024-12-03	0.37	0.0719
2024-12-10	0.09	0.0173
2024-12-17	0.08	0.0146
2024-12-24	0.06	0.0108
2024-12-31	0.01	0.0018
Sum (uSv)		**1.161**
Ave. (%DRL)	**0.12**	
Annual Dose Est.	**1.161 uSv/a**	

Public Dose Data
CHILD - 10 YEAR OLD
EMP Factors for Dose

Pathways Analysis of Dose to the Public			
		per annum	
Atmospheric HTO inhalation, immersion	P(i)19, P(e)19	1.489	
Surface HTO ingestion	P(i)29	0.398	
Surface HTO immersion	P(e)29	0.000	
External soil exposure	P39	0.000	
Forage & crop ingestion	P49	0.357	
Animal produce ingestion	P59	0.031	
Aquatic animal ingestion	P69	0.000	
Aquatic plant ingestion	P79	0.000	
External sediment exposure	P89	0.000	
Total	**(uSv)**	**2.275**	**uSv/a**
Total without P_{29}	**(uSv)**	**1.877**	**uSv/a**

Public Dose Data
CHILD - 10 YEAR OLD
EMP Factors for Dose P19

P19 is the transfer pathway of exposure to HTO from compartment 1 (Atmosphere) to 9 (dose)
P(i)19 is the pathway of exposure due to inhalation of HTO, and also implicitly captures skin absorption dose P(e)19 as per CSA N288.1-14 Table C.1.

Formula:
P(i)19 (uSv) = [HTO]air (Bq/m3) x Inhalation (m3) x DCF (uSv/Bq)

Calculation:

PAS # (#)	P(i)19 (uSv)	[HTO]air (Bq/m^3)	Volume (m^3)	(uSv/Bq)	(uSv/a)	(uSv/a)	(uSv/a)	Maximum (uSv/a)
1	0.000			3.800E-05				
2	0.000			3.800E-05				
3	0.000			3.800E-05				
4	1.489	4.990	7850.000	3.800E-05	1.489	1.489	1.489	
5	0.000			3.800E-05				
6	0.000			3.800E-05				
7	0.000			3.800E-05				
8	0.000			3.800E-05				
9	0.000			3.800E-05				
10	0.000			3.800E-05				
11	0.000			3.800E-05				
12	0.000			3.800E-05				
13	0.000			3.800E-05				
			P(i)19	**Sum**	**1.489**	**1.489**	**1.489**	**1.489** uSv/a

Public Dose Data
CHILD - 10 YEAR OLD
EMP Factors for Dose P29

P29 is the transfer pathway of exposure to HTO from compartment 2 (Surface Water) to 9 (Dose)
P(i)29 is the pathway of exposure due to ingestion of HTO
P(e)29 is the pathway of exposure due to immersion in HTO

Formula:
P(i)29 = [HTO] (Bq/L) x Ingestion (L) x DCF (uSv/Bq)

Well	P(i)29 (uSv/a)	[HTO]well (Bq/L)	Ingestion (L/a)	DCF (uSv/Bq)
2	0.259	21.5	482.1	2.50E-05
3	0.398	33.0	482.1	2.50E-05
5	0.090	7.5	482.1	2.50E-05
6	0.054	4.5	482.1	2.50E-05
7	0.060	5.0	482.1	2.50E-05
Avg P(i)29	0.172	**uSv/annum**		

Date	Well 2 (Bq/L)	Well 3 (Bq/L)	Well 5 (Bq/L)	Well 6 (Bq/L)	Well 7 (Bq/L)
March 22, 2024	22	33	10	4	5
September 10, 2024	21	NS	5	5	5
Average	**21.5**	**33.0**	**7.5**	**4.5**	**5.0**

Well 2	185 Mud Lake Road
Well 3	183 Mud Lake Road
Well 5	171 Sawmill Road
Well 6	40987 Highway 41
Well 7	40925 Highway 41

Well 3	**P(i)29**	0.398	**uSv/a**
	P(e)29	0.000	**uSv/a**
	P29	0.398	**uSv/a**

P(e)29 is the pathway of exposure to HTO due to immersion in surface water, and is negligible.

Public Dose Data
CHILD - 10 YEAR OLD
EMP Factors for Dose P49

P49 is the pathway for exposure to HTO due to ingestion of forage and crops.

Produce Sample Results (Bq free water tritium / kg fresh weight)									
Source	**1232 Pembroke Street East**		**Residences**						
Type	**Rhubarb**	**Average**	**LOCATION**	**Cucumber**	**Tomatoes**	**Carrots**	**Beans**	**Rhubarb**	**Average**
	2	**2.0**	611 MOSS DRIVE	171	189	113			**157.7**
FWT			171 SAWMILL ROAD	15	12	12	34		18.3
			632 JOHNSON CRES.					80	80.0
Average		2.0	**Average**	93	101	63	34	80	57.0
Produce Sample Results (Bq organically bound tritium / kg fresh weight)									
OBT	0.8	**0.80**	611 MOSS DRIVE	6	4				**5.0**
			171 SAWMILL ROAD	0.2	0.2				0.2

Produce Consumption						
100%=	**265.200**	**kg/a**	**[HTO] (Bq/kg)**	**(Bq/a)**	**[OBT] (Bq/kg)**	**(Bq/a)**
70%	185.640	**kg/a**	2.0	371.28	0.8	148.51
30%	79.560	**kg/a**	157.7	12543.96	5.0	397.80

P49 = [HTO or OBT]produce (Bq/kg) x Produce Ingested (kg/mo) x DCF (uSv/Bq)

P49 (uSv/a)	[HTO] pro (Bq/a)	DCF (uSv/Bq)	[OBT] pro (Bq/a)	DCF (uSv/Bq)
0.357	**12915.24**	2.50E-05	**546.31**	6.30E-05

P49	**0.357**	**uSv/a**

Public Dose Data
CHILD - 10 YEAR OLD
EMP Factors for Dose P59

P59 is the exposure to HTO due to ingestion of animal produce.

Local Producer	
	(Bq/L)
1	3.00
2	3.00
Average	**3.00**

Local Distributor	
	(Bq/L)
1	2.00
2	8.00
Average	**5.00**

TOTAL AVERAGE	4.00	Bq/L

Milk Density Adjustment		
Milk Average (Bq/L) x Milk density (L/kg)		
Bq/L	**L/kg**	**Bq/kg**
4.00	0.97	**3.880**

Consumption kg/da x da/a = kg/a		
(kg/da)	**(da/a)**	**(kg/a)**
0.875	365.25	**319.6**

P59 = [HTO]animal produce (Bq/kg) x Ingestion (kg) x DCF			
P59	**[HTO]**	**Ingested**	**DCF**
(uSv/a)	**(Bq/kg)**	**(kg/a)**	**(uSv/Bq)**
0.031	**3.88**	**319.6**	2.50E-05

P59	0.031	uSv/a

APPENDIX R

APPENDIX S

Summary of Outgoing Shipments Containing Radioactive Material

Summary of Outgoing Shipments Containing Radioactive Material

Month	Number of Shipments
January	66
February	63
March	59
April	59
May	50
June	60
July	47
August	63
September	38
October	56
November	69
December	40
TOTAL	**670**
Average per month	*56*

Distribution of Outgoing Shipments

Country	Number of Shipments
United States	371
Canada	238
United Kingdom	16
South Korea	11
Netherlands	6
Singapore	5
Germany	3
Mexico	3
Bulgaria	3
Switzerland	2
China	2
France	2
Brazil	2
Spain	1
South Africa	1
Norway	1
India	1
Taiwan	1
Mauritius	1

APPENDIX T

Summary of Incoming Shipments Containing Radioactive Material

Summary of Incoming Shipments Containing Radioactive Material

Month	Number of Shipments
January	28
February	16
March	24
April	34
May	22
June	16
July	9
August	14
September	8
October	15
November	13
December	13
TOTAL	**212**
Average per month	*18*

Distribution of Incoming Shipments

Country	Number of Shipments
United States	171
Canada	31
Switzerland	3
Singapore	3
Japan	1
China	1
United Kingdom	1
Italy	1