



ENVETEC GENERATIONS: HOW SCOTTISH WATER TURNED PLASTIC LAB WASTE INTO A CIRCULAR RESOURCE

Enabling circularity,
improving safety,
and supporting ISO
14001 objectives
through a new
approach to
laboratory waste



**Scottish
Water**
Trusted to serve Scotland

envetec
create clean change

OVERVIEW

Scottish Water is the publicly owned utility responsible for delivering safe, clean drinking water and wastewater services to over 2.6 million homes and businesses across Scotland.



SCOTTISH WATER

Established in 2002, Scottish Water serves over 2.6 million households and plays a critical role in protecting public health and the environment.

Its operations are closely regulated, working alongside other public bodies to ensure strict compliance with water quality and environmental standards.

At the heart of this is its central laboratory in Edinburgh, supported by regional satellite laboratories, where approximately 3 million samples are analysed each year.

A team of around 250 laboratory and sampling staff carry out extensive testing across microbiology, chemistry and environmental parameters, ensuring full visibility of water quality from source to tap and safe discharge back into the environment.

SUSTAINABLE COMMITMENT

Scottish Water has made sustainability a core part of its long term strategy, with a commitment to go beyond net zero by 2040 and embed continuous environmental improvement across its operations.

Through initiatives such as its ISO 14001 environmental management programme within its scientific services, the organisation is focused on improving resource efficiency and reducing waste and increasing transparency across its processes.

Sustainability is driven at both an organisational and operational level, with dedicated teams working to identify opportunities for improvement across all activities from infrastructure and operations to laboratory services ensuring environmental performance continues to progress year on year.

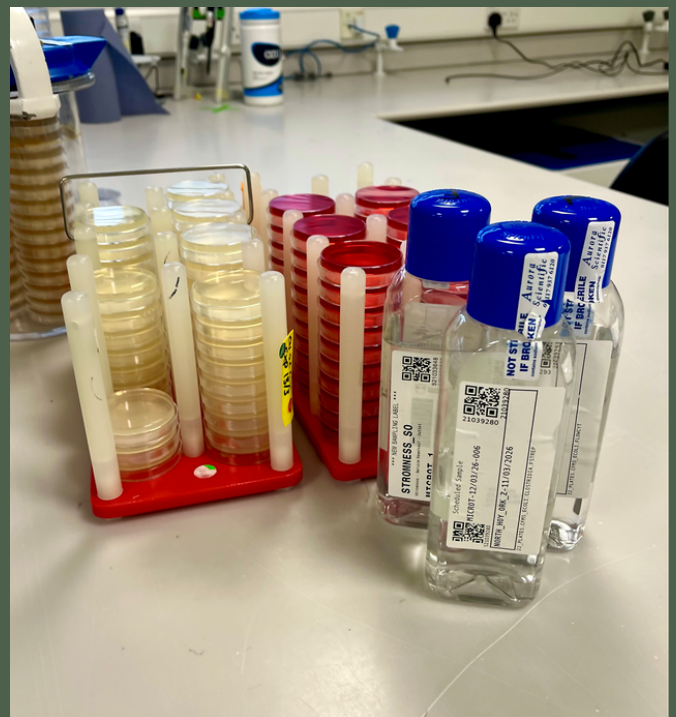


BARRIERS IN PROGRESS

Scientific Services (responsible for laboratory operations) is the largest producer of plastic waste within Scottish Water. With millions of samples processed each year, the use of single-use plastics is unavoidable in order to maintain safety, accuracy and regulatory compliance.

To move forward, Scottish Water needed a solution that could:

- Enable recycling of microbiological plastic waste that was previously sent for disposal
- Reduce reliance on autoclaving, which required significant energy, water and produced difficult waste outputs
- Remove manual handling processes, including the time-intensive emptying of plastic sampling bottles



SOLUTION

Envetec's GENERATIONS Technology



Onsite Treatment of Biohazardous Waste

GENERATIONS utilises a unique combination of simultaneous chemical disinfection and shredding to achieve STAATT IV reduction (6log10) of microbes. GENERATIONS biodegradable treatment chemical successfully treats biohazardous waste and enables resource recovery. This non-thermal, low energy approach greatly reduces reliance on autoclaves while enabling circularity for this high value material.

Circularity for Lab Plastics

By integrating GENERATIONS into their central laboratories waste process Scottish Water enabled recycling for both their biohazardous waste (petri dishes, pipette tips etc.) and their non-hazardous waste which previously required manual intervention to recycle (PET test sample bottles).

Increased Transparency & Reporting

As part of ISO 14001, there is a requirement to demonstrate continuous improvement in their environmental performance. By utilising the GENERATIONS Connect software, the Scientific Services team can gain deeper insight into their waste streams, end-of-life outcomes, and the emissions savings enabled through the GENERATIONS process.

INSTALLATION & IMPLEMENTATION

Following an initial waste audit, the suitability of the GENERATIONS system within Scottish Water's laboratory operations was assessed.

A site visit was carried out ahead of delivery to review space, utilities and integration with existing workflows. Installation was completed on-site.

Training was provided following installation, enabling the team to begin using the system shortly afterwards. As it was introduced into daily use, ongoing communication supported a smooth transition, with any queries addressed as they arose.

REPORTING INTEGRATION

As part of Scottish Water's ISO 14001 objectives, accurate and transparent reporting was an important requirement.

The reporting approach was developed to reflect the specific waste streams within the laboratory, with representative material samples used to identify polymer types and average weights. This informed a tailored reporting framework, providing clear visibility of materials treated, waste volumes and composition.

Outputs were also aligned to previous waste treatment methods, enabling a more meaningful comparison of environmental impact, including indicative emission reductions based on established baselines.



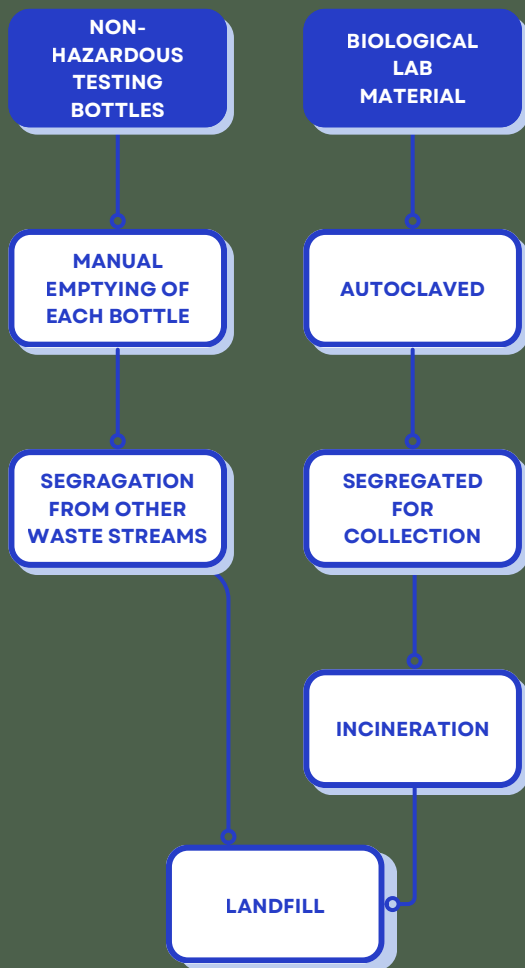
RECYCLING PARTNER

To support the recycling of treated material, Scottish Water partnered with Enva to manage collection and downstream processing.

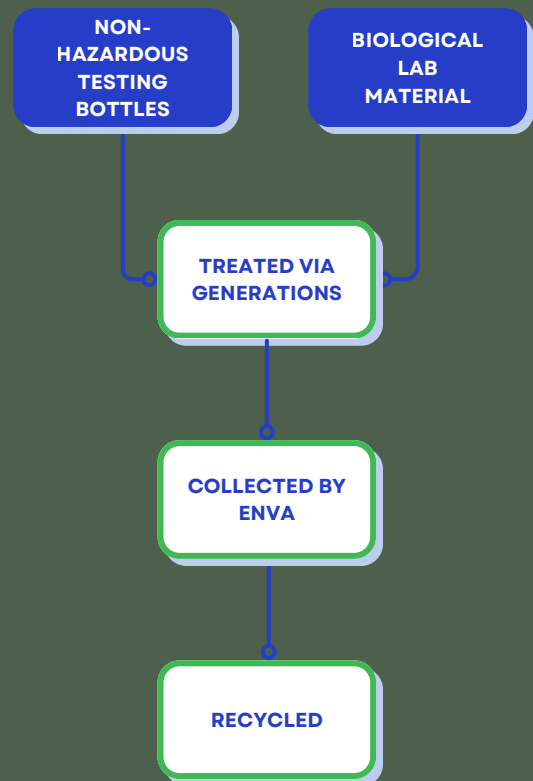
Working with the Scientific Services team, Enva identified a suitable receptacle for the treated flake and developed a collection approach that aligned with existing workflows and space constraints. Handling practices and site logistics were considered to ensure the process could be integrated safely into daily operations.



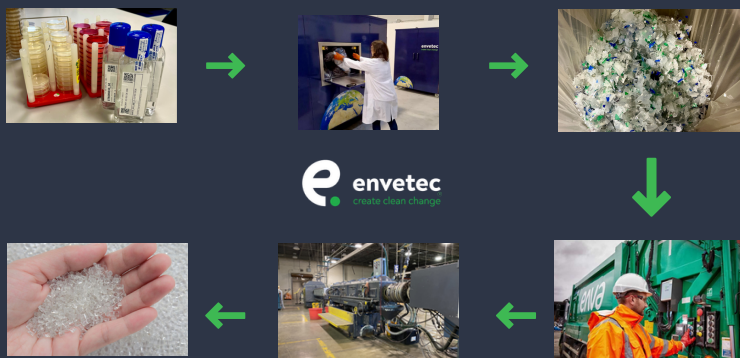
TRADITIONAL WASTE PROCESS



GENERATIONS PROCESS



GENERATIONS CYCLE



Step 1: Shreds and chemically disinfects both biohazardous microbiology waste and non-hazardous water bottles

Step 2: Treated material is aggregated and collected by Enva who transfer the material to a material recovery facility

Step 3: The material is separated using standard process such as sink/float and NIR. This separates individual polymers from each other.

Step 4: The separated material is extruded, repelletised and ready to be used in manufacturing

OUTCOMES

CARBON REDUCTION

By moving away from autoclaving and off-site disposal, Scottish Water has taken a significant step towards reducing the environmental impact of its laboratory operations.

The ability to treat waste on-site and enable recycling has shifted this stream from a disposal model to a more circular approach. Materials that were previously incinerated can now be recovered and reprocessed, supporting wider sustainability goals and contributing to improved visibility and control over the waste lifecycle.



SIMPLIFIED LOGISTICS

The introduction of on-site treatment has simplified how different waste streams are managed within the laboratory. Plastic sampling bottles and microbiological waste, which previously required separate handling processes, can now be treated within a single system.

This has reduced the volume of waste by >75% leaving the site and streamlined internal waste flows, removing the need for additional steps such as post-autoclave handling or segregation for disposal.

MANUAL HANDLING & SAFETY

Operationally, the system has reduced the level of manual handling required by laboratory staff. Processes such as unscrewing and emptying large volumes of sampling bottles are no longer required, helping to alleviate repetitive tasks that had raised concerns around strain and ergonomics.

As a result, staff have been able to adapt quickly to the new process, with more time available for core laboratory activities and a safer, more efficient approach to waste handling overall.

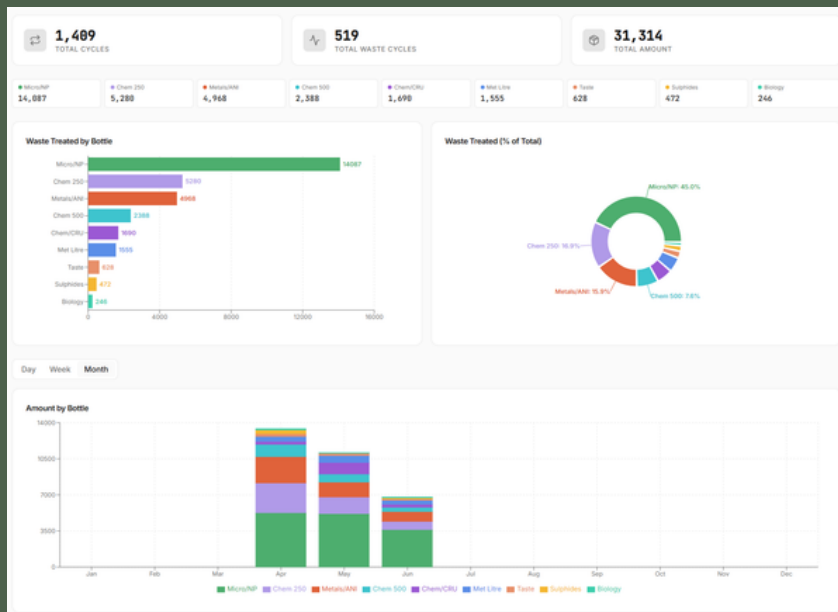
TREATED PER CYCLE			
	CHEM/CRU 30 BOTTLES		CHEM 500 60 BOTTLES
	BIOLOGY 30 BOTTLES		MET LITRE 30 BOTTLES
	TASTE 30 BOTTLES		CHEM 250 120 BOTTLES

REPORTING



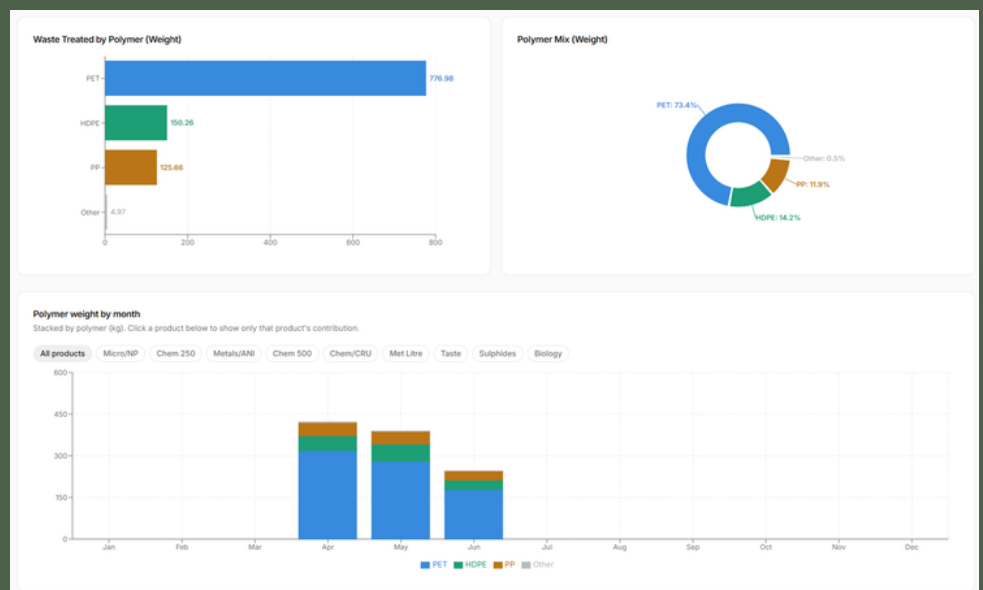
Scottish Water and Envetec are working together to map and track key aspects of laboratory waste through the treatment process, including:

- Indicative emission savings, based on comparison with previous waste treatment methods
- Types of waste, such as different bottle and consumable formats
- Waste sources, providing visibility of where materials originate within laboratory operations
- Waste volumes, enabling a clearer understanding of scale and trends
- Material outputs post-treatment, including the polymer types recovered



OPERATIONAL DATA

MATERIAL & EMISSION DATA



CLIENT FEEDBACK

“To tackle our plastic waste, we knew we had to embrace innovation.

GENERATIONS has allowed us to move away from disposal and towards a more circular approach to laboratory waste.”



“We had already made strong progress on sustainability across Scottish Water, but laboratory plastics remained a real challenge. To move forward, we knew we had to embrace innovation.

Introducing GENERATIONS in Scientific Services has allowed us to rethink how this waste is managed. We can now treat both plastic bottles and microbiological waste on site, remove manual handling steps for our team, and create a pathway for recycling materials that would previously have gone to disposal.

The installation and integration into our operations were straightforward, and the team adapted quickly. Having greater visibility over our waste and its end destination has also been an important step, particularly in supporting our ISO14001 objectives. Overall, it's been a very positive experience, both from an operational and sustainability perspective.”

**KAREN RAE, SENIOR PROJECT MANAGER
SCOTTISH WATER**