Use Case Study - Recyclers

Improved identification of SVHC through the (recycled) plastics value chain

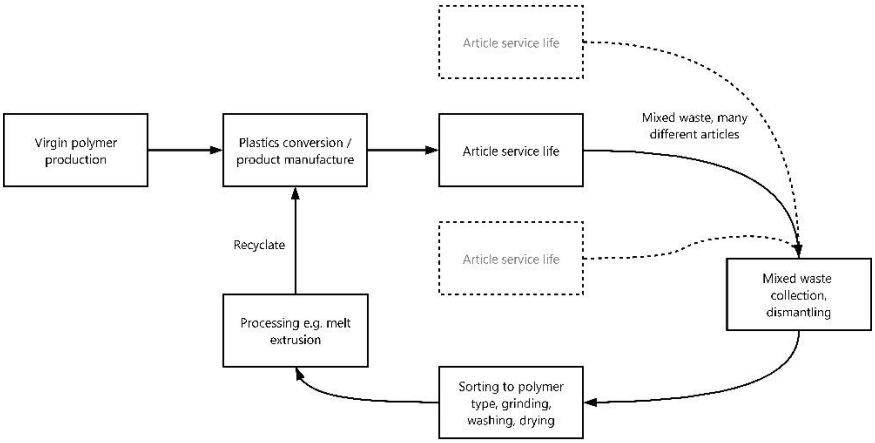
Primary Actor

Waste management companies and recyclers

Secondary Actors

Plastics producers, converters, suppliers of recycling technology

Existing Practice



Waste management companies receive plastics in a range of different products. Some are differentiated into similar product types, such as electronic & electrical equipment or end-of-life vehicles, but these will include multiple different products of different ages (and different potential to contain SVHC). Some other waste streams are even more mixed.

While in principle waste management companies should receive information on the presence of SVHC in the articles, in practice this information cannot be supplied with the individual articles. Complex articles may be dismantled, but at this stage it is not possible to identify those component articles that contain any specific SVHCs. With some waste streams (i.e. specific products), pollutants are contained in specific parts (e.g. capacitors), so these are removed and treated. The plastics fraction of WEEE and ELV is treated such that plastics containing brominated flame retardarnts are separated from other plastics.

In turn, plastics converting companies will purchase batches of plastics from recyclers for production of new products (e.g. shredded materials or processed pellets from melt extrusion). The recycler will use information from the waste seller, as well as chemical analysis, to identify the presence of SVHC. Article-level information is not relevant at this stage given the diverse waste streams and mixing of materials from different articles.

As such, for waste management companies and recyclers there is very limited visibility on whether a material stream contains SVHCs. The only sure way to get this information is through chemical analysis. This is becoming increasingly more challenging as more SVHC are identified, and as restrictions on certain SVHC require more accurate estimates of the presence of SVHC.

Challenges related to substances of (very high) concern in waste

The plastics industry has addressed some of the above challenges through initiatives such as the safety data sheet for recyclers (SDS-R) tool, which:

- uses a 'dangerous additives statistical occurrence database' to develop a 'worst case scenario' SDS based on polymer type and application
- enables a tailor-made SDS for more complex situations

- as a result can be used to help ensure worker safety and to support provision of safe use information to customers

This mapping (inventory) of specific SVHC with specified polymer types gives recyclers knowledge of the potential presence of specific SVHC in recycled polymers. However, without measurement, the specific concentration (or indeed presence) of given SVHC is not known accurately.

Measurement is expensive: for some waste streams there are up to 20 SVHC (e.g. in E&E equipment). For metals it is now routine to have XRF equipment to test for heavy metals at e.g. €20,000, plus maintenance costs; this can be done on-site. However, for organic SVHC, chemical analysis needs to be done off-site and cannot be done on-line.

Future Practice with the new database

With current recycling processes and practices, there would be limited potential to identify specific SVHC at specific concentrations in specific waste polymers. This is because recyclate is often produced from a mixed waste stream containing many products. However, the database is expected to improve understanding of the (statistical) association of specific SVHC with different polymers in different applications. This is already being done to an extent through the SDS-R tool, but the database should give access to a broader set of data.

The database could therefore be used as follows:

- Waste management companies and/or recyclers use the database (aggregated data) to understand association of specific SVHC with specific polymer types, in specific components in different product types. Aggregated data includes information on presence and concentration ranges (ideally including statistical information) at the level of:
    - Materials (polymers)
    - Product categories
    - Components (ideally including specific components in specific products/models)
    - Etc.
- Waste management companies then have improved ability to **separate out components likely to contain SVHC during dismantling**. They may not know whether a given product/article within that 'family' in the database contains an SVHC, but could identify it as being part of a family that may contain SVHCs.
- Recyclers use this information to **more effectively target chemical analysis** on those SVHC and those polymers more likely to contain them.
- Recyclers can thus provide improved information on the (potential) presence of SVHC in polymers to e.g. plastics converters and producers of final products (i.e. they have **improved information to communicate on ensuring safe use**).
- Recyclers and suppliers of recycling technology can use the database to monitor which products containing which SVHCs enter the market, in order to anticipate when they will enter the waste streams. They can use this information to **ensure recycling technologies and processes will be ready** to handle future SVHCs-contents of waste streams.

Depending on the design of the database outputs, information on the presence of SVHC in specific material types (e.g. polymers) and article types could be available at a number of different levels of aggregation, allowing improved dismantling for recycling.

In the longer term, the database could help facilitate improved separation of waste streams, and associated design and operational changes to waste management facilities, to allow more removal of those containing SVHCs, as well as enabling improved product quality of recyclate.

Potential benefits of this use

- Recycling companies could **reduce costs of chemical analysis** by improved targeting of which waste streams and materials to test (i.e. through helping to devise screening methods for testing).
- There should be **reduced risk of exposure for workers** at waste management and recycling facilities based on improved knowledge of which SVHCs appear in which materials and articles.
- This builds on the existing work done by the plastics industry i.e. the database could provide additional information for lesser known uses (niche applications). Its main benefits are expected to arise several years down the line when products produced now enter the waste phase.

	• The database may **assist with future design of waste management facilities**, providing information to help to improve separation and dismantling processes, and reducing the reliance on e.g. shredding of materials.
Incentives and barriers for this use	• There may be multiple companies in the same business lines required to notify the same informationto the database.) Without appropriate structuring and support, this could make it more difficult to draw conclusions on the likely presence and concentration of SVHC. For example, there may be hundreds of companies producing rigid PVC profiles using the same input materials. • It will be key to demonstrate to recyclers how the SCIP database could benefit them, to encourage their use. For example, for a given type of plastic-containing EEE, details of numbers (or proportion) of articles containing named SVHC in specific component/article types could illustrate how those components could be prioritised for separation. • A key incentive is the potential for reduced testing costs, as well as improved design of waste management facilities/operations. For example, information demonstrating that SVHC are not identified in specific polymers in certain product or component types (or present only at below threshold concentrations) could avoid the need for chemical analysis on those polymer streams. • Improved ability to declare recyclate SVHC-free and to market subsequent products/articles as SVHC-free, as a result of improved certainty on the presence (or not) of SVHC in waste products.
Presentation of information in the database to support his use	• Information at the article level from the SCIP database will require grouping into families/groups of articles, components, material types, etc. in order for the information to be of use to waste management (separation) companies. Depending on the information passed on to recyclers, the information could also be relevant to them. • Industry sectors have indicated that they could support further with defining nomenclature to facilitate grouping and structuring of information coming out of the database. • To facilitate more accurate data entry (e.g. on concentrations) and hence on outputs, for some waste streams where it is clear that SVHC can be found, ECHA could consider pre-filled declarations/fields (e.g. on specific substances in specific polymers and the typical concentration ranges e.g. lead in rigid PVC compound at between 0.1% and 2%).
References:	SDS-R Tool Service (https://www.polymercomplyeurope.eu/pce-services/sds-r-tool-service) Safety data sheet for recyclers tool: SRS-R Tool – Short Introduction, Polymer Comply Europe RIVM (2017): Waste handling and REACH - Recycling of materials containing SVHCs: daily practice challenges, RIVM Letter report 2016-0159.

This use case is an extract of a report that has been prepared under contract ECHA/2018/338. Further background is provided in the full report.

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