REGULATORY RISK ASSESSMENT OF DOWN-THE-DRAIN PRODUCTS: GIVING URBAN CATCHMENTS A STORY

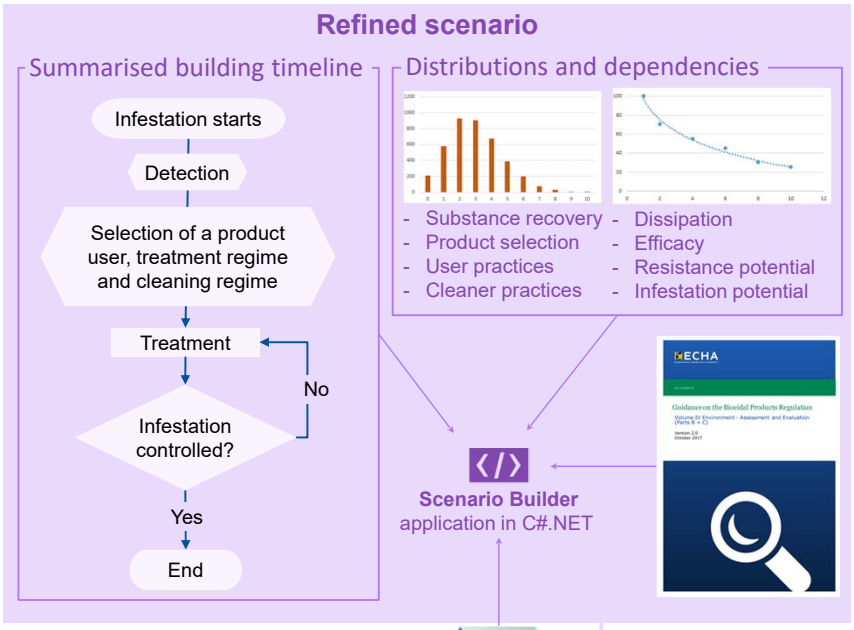
Fabienne Ericher,
Cambridge Environmental Assessments, Boxworth, UK; fabienne.ericher@cea-res.co.uk

Introduction

Standard BPR and REACH risk assessments are typically based on conservative urban catchment scenarios, that serve as benchmarks for registration, rather than as an estimation of potential environmental impact. It is possible to refine these scenarios and progress towards more realistic simulations to better assess the relative impact of product use practices.

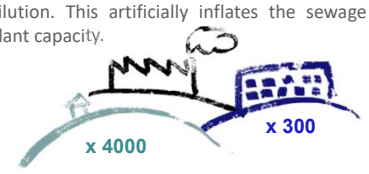
Approach

The scenarios are coded in C# using an agent-based modelling approach. Product user behaviours within each household in the urban catchment and their associated elements are modelled separately on a daily timestep. There are many conservative assumptions in the scenarios that can be refined using this approach, however, this requires additional user behaviour and/or substance data. Surveys and studies can be conducted to derive distributions of user behaviours and/or integrate the impact of time or environmental factors on some parameters. For complementary information, also see presentation "Uncertainty analysis at the catchment scale for higher-tier BPR and REACH risk assessments" (ID: 7186).



E.g. Urban catchments specifications

When an insecticidal product claims use in larger buildings, its risk assessment conservatively adds emissions from 300 larger buildings to the default scenario of 4000 households, with no additional water flow and dilution. This artificially inflates the sewage treatment plant capacity.



Parameter	Household	Larger building
Example typical BPR PT18 (insecticide) product use		
Equivalent inhabitant (PE)	2.5	0
Effluent volume (L/d)	500	0
Substance emissions (g/d)	4.425	20.25

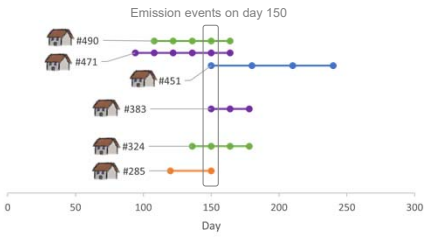
This modelling approach offers the possibility to consider a variety of realistic urban catchments, by defining and testing a variety of building specifications (houses, larger buildings: commercial, hospitals, industrial etc.).

E.g. Treatment options

For an insecticidal product used as a surface spray, there is typically a distinction in the treatment applications depending on extent or surface type; and there may be a difference in the number of maximum repeat treatments required to control the infestation.

Extent \ Zone	General surface	Cracks and crevices
Barrier	**Option #1** max 7 treatments with 14 days interval	**Option #2** max 3 treatments with 30 days interval
Spot	**Option #3** max 5 treatments with 14 days interval	**Option #4** max 4 treatments with 30 days interval

Final emissions at each timestep are a combination of treatments from different building's stories. See below an example, with each treatment (●) within its story, contributing to a day's emission.



Perspectives

In varying the default parameters of a scenario, we can get a better appreciation for the underlying variation in input parameters and the concomitant model uncertainty. The tool can integrate complex fate processes and user decision trees, thereby creating a simulation that assists regulatory decision-making by evaluating the impact of risk management measures as well as product user behavioural changes.

In addition to better characterizing urban emissions, we can better integrate them in context. For example, treatment regimes can be assessed with consideration of their relative efficacy and seasonal fluctuations (receiving water body flow, dilution and temperature) can be included in the assessment. This can help risk assessors better gauge the impact of products' composition and use practices on the protection goals.

Another potential application is greater clarity and communication with stakeholders, where it may be easier to describe emission scenarios as narratives.

SETAC EUROPE 32nd Annual meeting – 2022 Copenhagen – Presentation ID 7672

FURTHER READING

European Chemicals Agency (2012) Guidance on information requirements and chemical safety assessment Chapter R.19: Uncertainty analysis, v1.1
European Chemicals Agency (2017) Guidance on the Biocidal Products Regulation Volume IV Environment - Assessment and Evaluation (Parts B + C) Version 2.0
Jeroen P. van der Sluijs (2017) The NUSAP approach to uncertainty appraisal and communication; Chapter 29 p.301-310 in C.L. Spash (Ed.) Routledge Handbook of Ecological Economics: Nature and Society. Routlegde: London. ISBN-13: 978-1138931510.