Health & Safety Laboratory
An agency of the Health & Safety Executive

HEALTH & SAFETY LABORATORY

Using our brains to save and improve the lives of workers

Exposure Scenario Testing

The Client

When it has come to devising exposure scenarios, the customers for this service have been as varied as their requirements. Typically they have been included manufacturers of big brand household cleaning products, formulators of specialist pesticides and smaller enterprises bringing new products to market.

The Problem

All our customers approached us because they required a greater understanding of worker, consumer or environmental risk potentially generated from their processes or products. There was a need to identify and characterise the relevant exposure routes and quantify the levels of exposure for many different reasons, such as:

- To meet the requirements of legislation requiring a risk assessment e.g. REACh.
- To establish safe re-entry times after product application.
- To establish whether exposure is below established exposure limits e.g. derived no effect limits (DNELs).
- To test exposure prevention measures e.g. local exhaust ventilation (LEV)
- To determine the effectiveness of personal protective equipment (PPE).

What we did

HSL worked closely with each customer to understand their requirements and to design appropriate exposure scenarios. Although we have standard approaches to measuring exposure, our experimental designs reflected the specific requirements of each, which were often unique. The following elements were considered:

- Why the data was required, e.g.for legislation, and how best to ensure was relevant for its end use?
- Did the data already exist or could it be obtained from another source?
- What were the ethical and statistical requirements?
- What constituted a typical pattern of use, in terms of dose, application and environment?
- What was the most appropriate sampling strategy? – Inhalation, dermal, surface deposition and/or biological monitoring.
- Was sampling in situ or in a more controlled environment, e.g. a test chamber, most appropriate?
- Who should the volunteers be? – The customer's own employees or HSL volunteers.
- Should the sampling duration be "task" based or "shift" based?
- What other parameters were needed for controlling and/or measuring? eg temperature, humidity, air change rate, room volume, particle size distribution.
- Could added value be achieved for the customer by conducting additional work alongside the main study?

Such considerations resulted in work plans which were achievable and which would deliver the results the customer needed.

Outcome/Benefits

The exposure scenario generated data that:

- identified and characterised the relevant exposure routes, information which assisted in risk management.
- quantified exposure and so facilitated risk assessment.
- allowed more informed decisions to be made on risk reduction measures, e.g. PPE and LEV.
- may have been required by regulation

More importantly, the data produced could then go on to be interpreted by the other specialist disciplines within HSL which enabled our customers to recognise and act upon the hazards unique to their situation.

Our experts can make appropriate recommendations with regard to exposure control, they can assess the risk or comment on the likely effect on health.