

# Development of an Odour Sampling Program

## Getting Them Right the First Time

David Hofbauer, M.A.Sc., P.Eng.  
RWDI

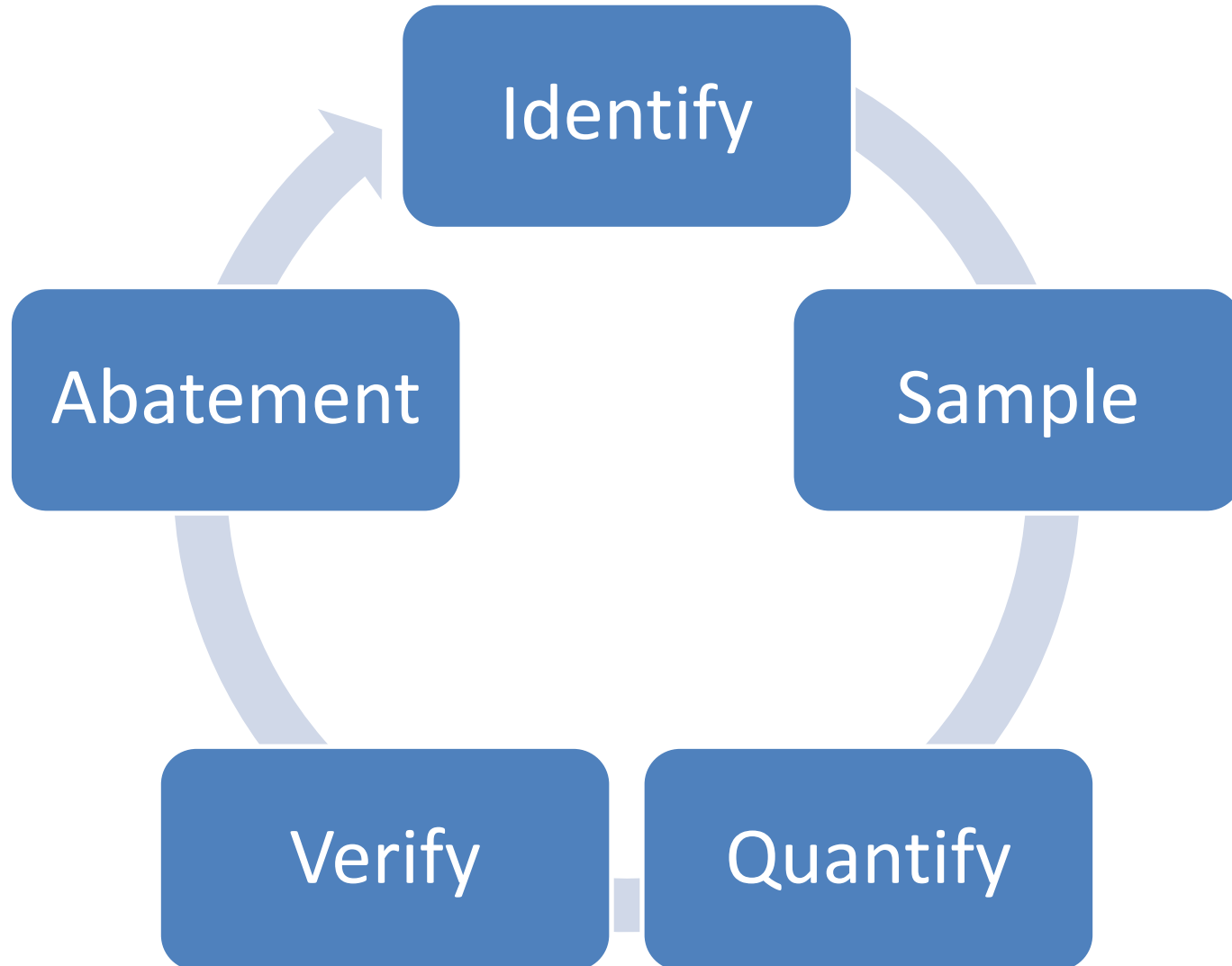
Air & Waste Management Association Odour Workshop  
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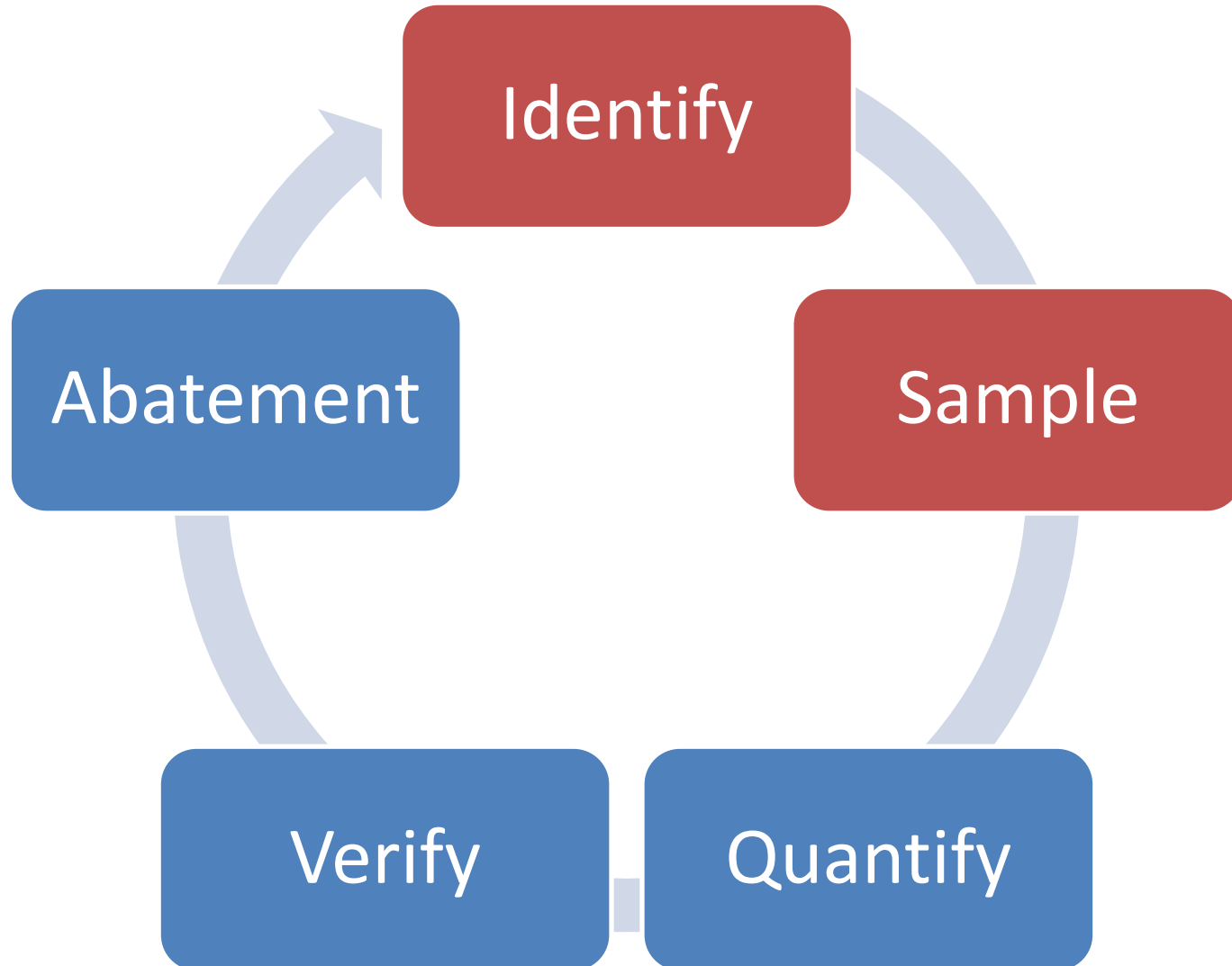


- Identification of Sources
- Sampling Programs
  - Where do they fit in
- Identification of Odourous Sources
  - Case Study: Electroplating
- Sampling of Odourous Sources
  - Ontario Source Testing Code, version 3
  - Case Studies: Pre-dilution

- Determine Emission Sources
  - Collected Discharge
    - Stack
    - Exhaust fan (wall, roof ventilator, etc.)
  - Fugitive Discharge
    - Storage piles (waste, compost, etc.)
    - Lagoons
    - Buildings with an air surplus







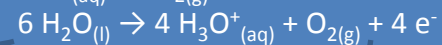
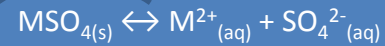
- Determine All Potential Odour Sources
  - Source Analysis
    - Chemicals in use (ESDM/MSDS)
    - Public/employee complaints
    - Met conditions and processes paired with complaints
    - Existing odour controls

- Electroplating Facility Issues

- Site

- Onsite wastewater treatment plant (WWTP)
- Building air movement (H&V)
- Open plating baths (dip process)
- Plating chemicals
- Roof dominated by point sources

- Odour complaints



- Onsite WWTP
  - Anaerobic digestion
  - Aeration
  - Biological treatment
- Building H&V
  - Fugitive release from open baths
  - Direct exhaust of odour





- Plating chemicals
  - Chemical composition
  - Similarity between chemicals
- Point sources
  - Maintain indoor air quality and indirect humidity control

- Odour complaints



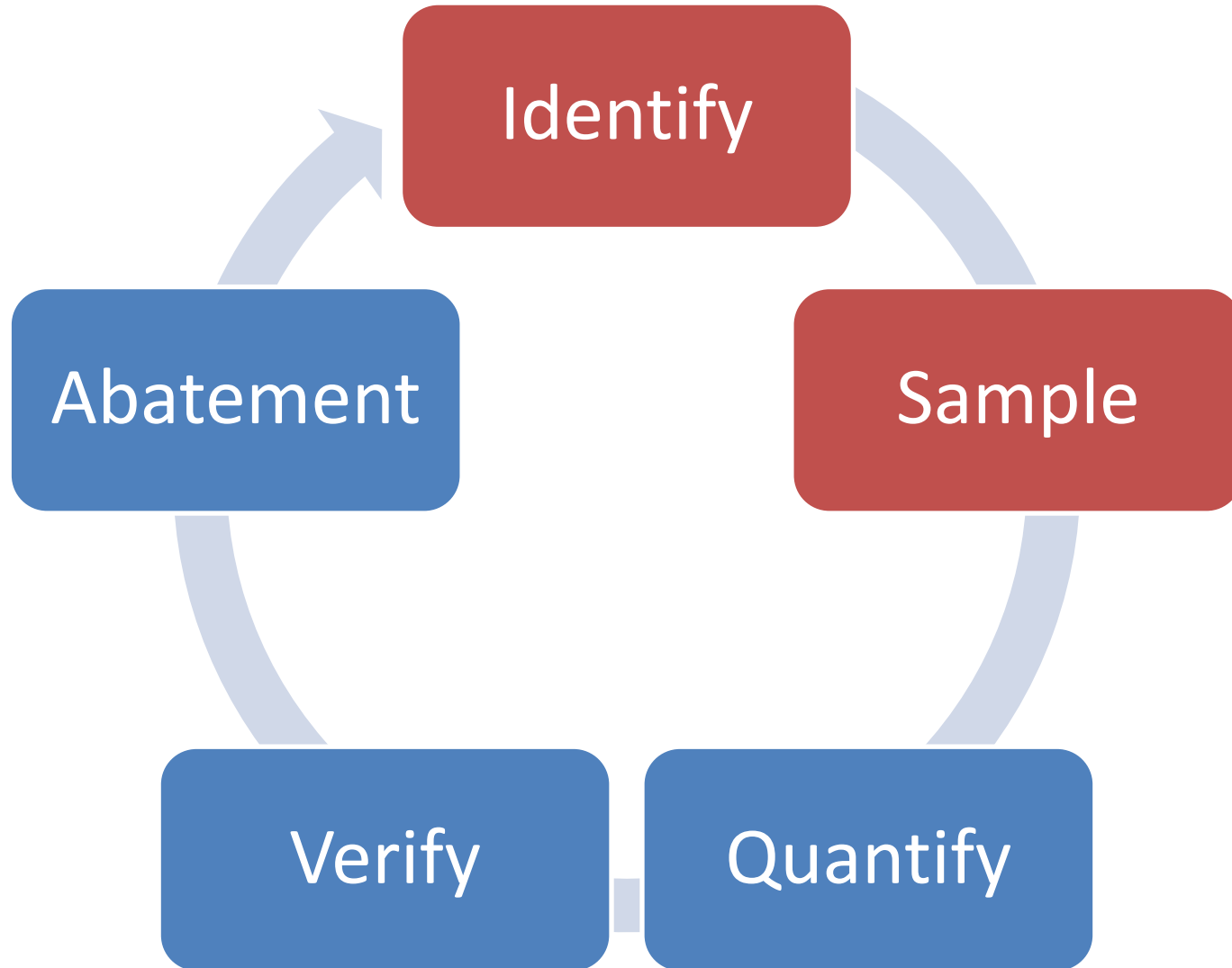
- Distant residences were cause of complaints
  - Low probability of fugitive releases (Low Risk)
  - High probability that plating chemicals combined with point sources are the cause (High Risk)

- Onsite WWTP
  - Sanitary sewer discharge
  - Metals recovery only
- Building H&V
  - Over a decade spent to ensure a plant air deficiency
  - Direct exhausts in penthouses only



- Plating chemicals
  - 11 different chemicals used
  - Two have similar chemical composition
  - Over tank sampling of 10 chemicals produced “Reference Odour”
  - Reference Odour multiplied by tank area on site gave Chemical Contributions to Odour

- Point Sources
  - 45 sources identified
  - Nine source were deemed surrogate and sampled to represent all 45 sources\*
  - Chemical Contributions to Odour combined with point sources to determine sampling program



- How do you collect odour?
  - Consider source characteristics
    - Type – Point vs. Area vs. Fugitive
    - Moisture
    - Odour intensity
    - Temperature
    - Static pressure

- Changes to Odour Sampling in Ontario
  - Included in Version 3 of the Ontario Source Testing Code (OSTC) as Method ON-6
    - Pre-dilution sampling
      - “optimum dilution” vs. “minimum dilution”
    - Undiluted sampling
    - Area source sampling
    - Open bed biofilter sampling



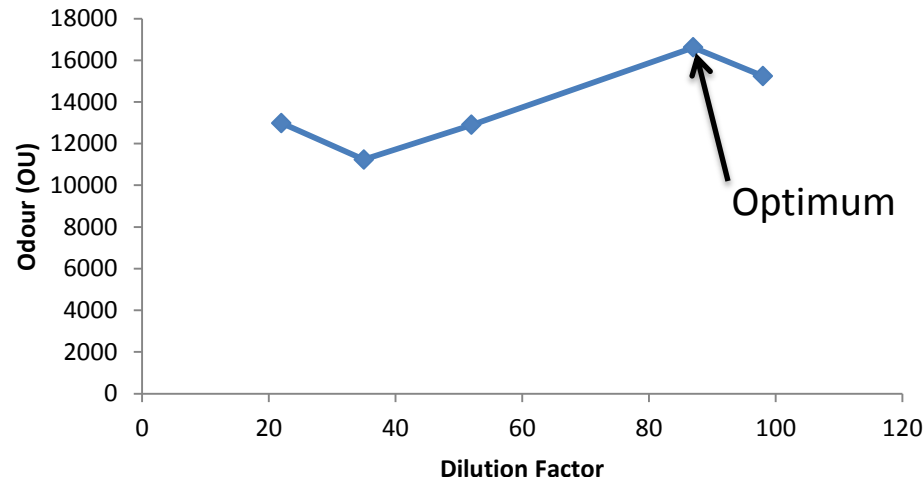
- Pre-dilution
  - High Intensity
    - Odour panel will detect on highest dilution
  - High Temperature
    - Danger to sample containment
  - High Moisture
    - Reactions/scrubbing with water

- Pre-dilution

- Optimum Dilution

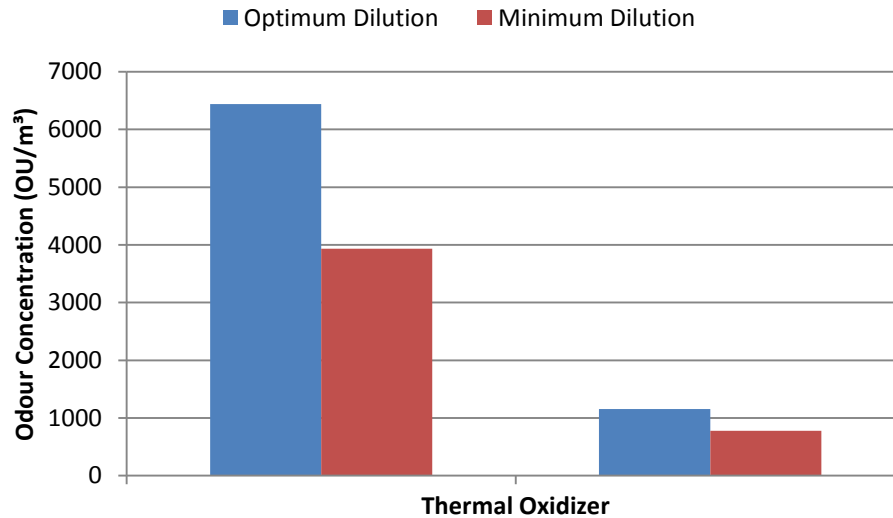


- Four to five samples taken at increasing dilution
  - Analysis performed on all collected samples to determine the statistically optimum dilution; remainder of triplicates analyzed at the optimum only



- Pre-dilution
  - Minimum Dilution
    - Field dilution selected based on
      - Moisture of stack gas ( $\text{g}/\text{m}^3$ )
      - ✓ – 100 % relative humidity in ambient air ( $\text{g}/\text{m}^3$ )
    - Minimum dilution to ensure no moisture forms in the sample container
  - Guidance provided in OSTC, v3

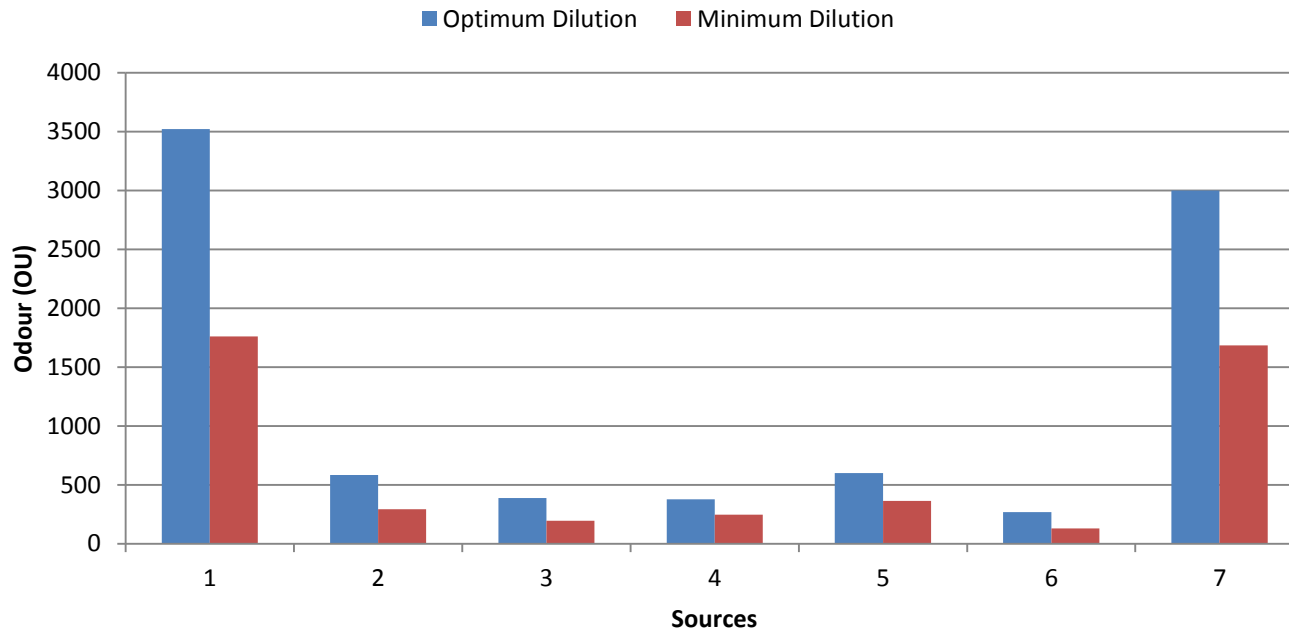
- Ethanol Plant Thermal Oxidizer (2009)



- 36 % reduction in measured odour

ECA – The Company shall ensure that the 10-minute average concentration of odour at the most impacted Sensitive Receptor, resulting from the operation of the Facility, shall not exceed 1 odour unit per cubic metre.

- Food Processing Facility (2008)



- 46 % reduction in measured odour
  - Site was under negotiation of ECA and trying to remove 1 OU/m<sup>3</sup> limit from Draft ECA

- Know the Source
  - Know the Odour
  - Know the Code (OSTC in Ontario)
- 

- Representative data the first time



## PLAN B

Because you failed Plan A

# THANK YOU

David Hofbauer  
M.A.Sc., P.Eng.  
[david.hofbauer@rwdi.com](mailto:david.hofbauer@rwdi.com)

## **RWDI**

650 Woodlawn Road West  
Guelph, ON  
N1K 1B8  
Tel: 519-823-1311  
[www.rwdi.com](http://www.rwdi.com)

