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# Toxics Reduction Act 2009

## O. Reg. 455/09

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# Ontario Toxic Reduction Strategy

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Focused on

- managing and reducing the use and creation of toxic substances in order to protect the environment and human health
- informing the public about toxics in their communities
- helping ensure that Ontario is well-positioned to compete in an the emerging green global economy.

# Ontario Toxic Reduction Strategy

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- This strategy supplements the traditional 'end of pipe' approach to managing toxic substances released into the environment by focusing on reducing the creation and use of these substances at the 'front end' of manufacturing processes.

# Toxics Reduction Act

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The act requires regulated facilities to:

- track and quantify the toxic substances that they use and create
- develop plans to reduce the use and creation of these substances
- make summaries of their plans available to the public.

# Ontario Regulation 455/09

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Facilities meeting the following criteria are subject:

- Class of facility – those engaged in manufacturing or mineral processing
- Minimum number of employees – in line with NPRI
- Minimum use/creation of Toxic substances – NPRI thresholds

# Requirements

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- Regulated facilities must comply with the following requirements:
- track and quantify the amount of each substance that is used, created, transformed, destroyed, contained in product, released, disposed of, and transferred;
- prepare plans to reduce their use and creation of toxic substances;

## Requirements contd.

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- prepare summaries of their plans, submit them to the Ministry, make them available to the public on the Internet and notify employees of their availability;
- report annually to the Ministry on progress in reducing the prescribed toxic substances, make some information available to the public and notify employees of its availability; and,
- review their plans in fixed years.
- Plan certification by highest ranking employee at the facility

# Toxic Substances

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- All substances on the federal National pollutant Release inventory (NPRI)
- Acetone (adopted from O.Reg. 127/01)
- Phase – I: 47 priority substances and substance groupings as listed in Table A of O.Reg.455/09
- Phase II: all substances on the current NPRI Notices and acetone

## Timing – Phase I

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- Annual reports including toxic substance quantification and tracking data due on June 1, 2011
- The tracking and quantification data would be based on the use and creation of toxic substances during the 2010 calendar year
- Toxic substance reduction plans and plan summaries due on December 31, 2012 (proposed), initially due by December 31, 2011.

## Timing – Phase II

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- Annual reports including toxic substance quantification and tracking data due on June 1, 2013
- The tracking and quantification data would be based on the use and creation of toxic substances during the 2012 calendar year
- Toxic substance reduction plans and plan summaries due on December 31, 2013

# Materials Accounting

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- Materials accounting includes the total inputs and outputs of the subject toxic chemicals for each production unit at the facility.
- Input Data (Toxic Substance Reduction)
  - Quantity of chemical used in the production unit.
- Output Data (NPRI, Reg 127, C of A etc.)
  - Quantity of chemical in the product.
  - Losses as byproduct.
  - Quantities treated on-site.
  - Quantities released to natural environment (air, land water).
  - Quantities transferred off-site (sewage, solid waste, hazardous waste).

# Why materials accounting?

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- Understand where and how toxic substances are used.
- Determine where and how much of the toxic substances are generated as byproducts.
- Identify where losses are occurring.
- Identify options to reduce use and generation of toxics.
- Basis for measuring progress of toxic reduction efforts at the facility.

# Material Use Information

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## Raw materials Use

- Purchasing and inventory records
- Vendor information
- Production logs
- Packaging material discarded
- Shipping and receiving logs
- Annual report

# Material Use Information

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## Waste Generated

- Waste Manifests
- TRI data
- Sewer records
- Permits/applications
- Flow diagrams
- Annual report
- Rejected product
- Environmental reporting
- Waste collection and storage
- Production logs
- Environmental violations
- Laboratory analyses
- Obsolete and expired stock
- Spill and leak reports

# Material Use Information

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## Production Mechanisms

- Operations manuals (SOP's)
- Vendor information
- Control diagrams
- Quality control guidebook
- Production logs
- Flow diagrams
- Product specifications

# Material Use Information

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## Process Interrelationships

- Product-to-raw material data
- Flow diagrams
- Quality control data
- Production logs
- Product specifications
- Facility layout
- Economic information cost accounting reports
- Operating costs for waste handling and disposal
- Pollution control costs
- Costs for products, utilities, raw materials, and labor

# Toxic Substance Content Data

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- MSDS's
- Vendor formulation data
- Byproduct and emissions data is generated using one of the following methods:
  - Direct measurements
  - Estimations
  - Engineering calculations
- Direct measurements
  - Continuous monitoring
  - Stack Test
  - Laboratory results
  - Extrapolation from periodic monitoring
  - Extrapolating from monitoring at a similar site

# Byproduct and Emissions Data

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- Estimation
  - Determine units of measure (Mass vs. Intensity)
  - Mass balance calculations such as the assumption that the amount otherwise used equals byproduct
  - Design calculation
  - Professional judgment
- Engineering calculations are based on
  - Engineering calculations using physical chemical and/or composition data found in MSDS
  - Facility determined emissions factors
  - Published emission factors, e.g. USEPA's AP 42

# Records Requirements

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- Description of every stage of the manufacturing operation at the facility that uses or creates the substance.
- Description of how each stage is divided into one or more processes that use or create the substance.

# Records Contd.

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- Process flow diagrams that,
  - i. give a visual representation of the movement of the substance through each process, including how it enters the process, whether it is created, destroyed or transformed during the process, how it leaves the process and what happens to it after it leaves the process, and
  - ii. show the relationships between the processes.

## Records Cont.

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- A record of the tracking and quantification of the substance for each calendar year.
- A record that describes the method or combination of methods used to track and quantify the substance in each process and explains why the method or combination of methods was chosen.

# Toxic Substance Reduction Plans

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- Description of each process
- Options for reducing use and creation
- Cost information
- Facility information
- Certification by highest ranking employee

# [ eco ] Elements of a Toxics Reduction Plan

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1. Policy Statement
2. Scope of the plan (executive summary)
3. Toxics Reduction (or P2) Team
4. Process Characterization
5. Process Flow Diagrams

# [ eco ] Elements of a Toxics Reduction Plan

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6. Identification of Toxic Reduction and P2 Options
7. Technical Feasibility Analysis
8. Financial Feasibility Analysis
9. Selected Options Implementation Plan
10. Implementation Schedule
11. Plan Update Timetable
12. Plan certification - Management

# Policy Statement

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- Demonstrate strong corporate commitment to Toxics Reduction by developing and adopting a policy statement
- The Policy statement should include:
  - Intention of the facility to pursue toxics reduction
  - Objectives of the policy
  - Measures employed to encourage toxics reduction
    - Numeric goals may be included

# Toxics Reduction Team

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- A cross functional team of employees responsible for the toxics reduction activities at the facility.
- Their names (or job titles) and contact information should be included.
- An effective team may include persons familiar with the company's products and production processes, an environmental engineer/representative, design engineer (s) and financial manager etc. (>2 <6)

# Process Characterization

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- Define production unit (s).
- Describe the purpose of the substance and the unit of product.
- Define the unit of product.
- Create process flow diagram.
- Develop materials accounting information for each production unit.

# Define a Production Unit

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- A production process is one or more activities that lead to the creation of product (s).
- Processes can either create a product directly, create an intermediate product or produce a result that is necessary for production to continue.
- For the purpose of the Plan the team should divide production activities into the simplest activity-product combinations called production units

# Production Unit

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- Dividing operations into simple production units prevents the risk of hiding toxic reduction opportunities inside the engineer's "black box".
- Byproduct measurements in particular are usually more accurate when processes are split up into several production units rather than grouped into one.

# Purpose of Toxic Chemical

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- The Plan should include a statement which explains the purpose the toxic chemical serves in the production process.
- Used as raw material or generated as a byproduct.
- The amount of toxic chemical used or generated per unit of product (production output) should be stated.
- This metric is used to track progress.

# Define Unit of Product

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- Unit of product is a measure or amount of work produced.
- An accurate unit of product allows a facility to measure progress in toxics reduction while correcting for changes in business activity.
- Examples
  1. Gallons of paint used per car produced.
  2. Gallons of paint used per weight of car produced.
  3. Gallons of paint per surface area of car produced.
- The third example constitutes the most accurate unit of product

# Define Unit of Product

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- The more closely the unit of product is related to chemical use, the more accurate the measure.
- Different units of product can be used for different processes.

# Process Flow Diagram (PFD)

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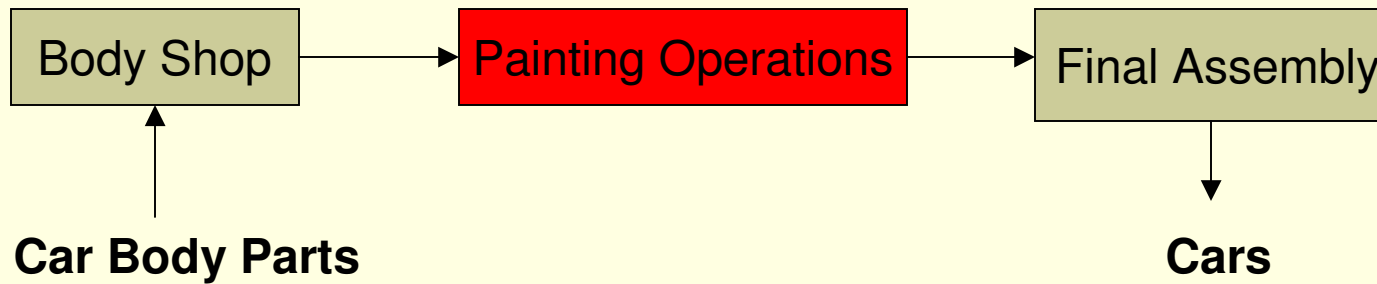
- A process flow diagram depicts the steps through which raw materials pass as they are transformed into products.
- The PFD must depict where the toxic chemicals enter and exit the process as products and byproducts.
- If several toxics are used in the same process they may all be shown on a single PFD.
- Best means to understand how toxics are used in-process.
- Effectively identifies opportunities for reductions in toxics use or byproduct generation.

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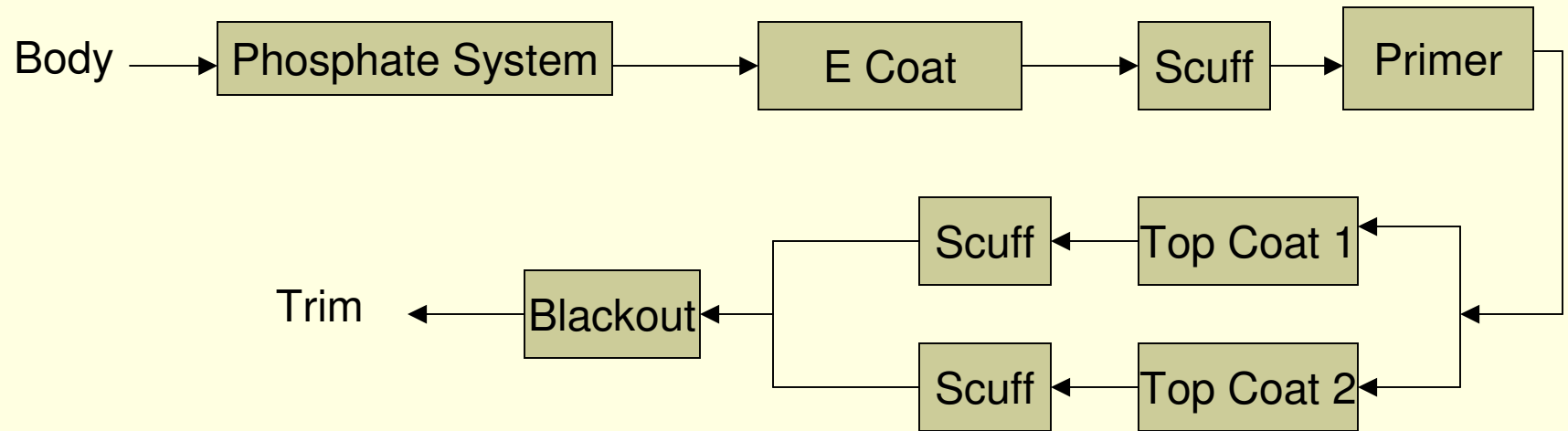
# PFD Example

## Automotive Assembly Plant

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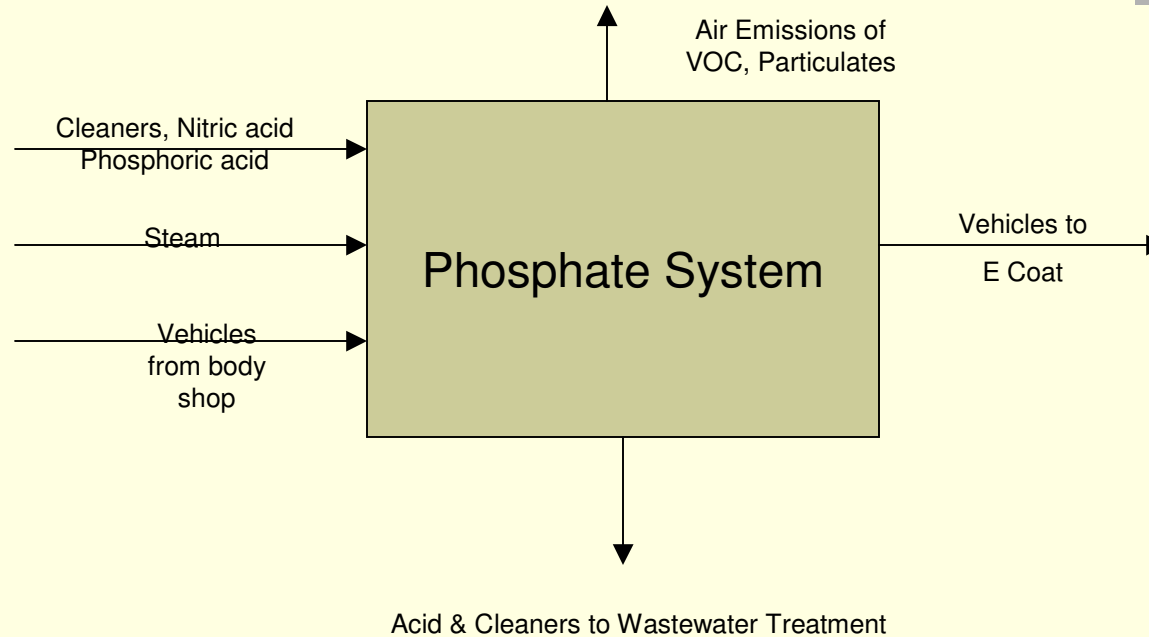


# Focus on Painting Operations



# Process Flow Diagram – Example

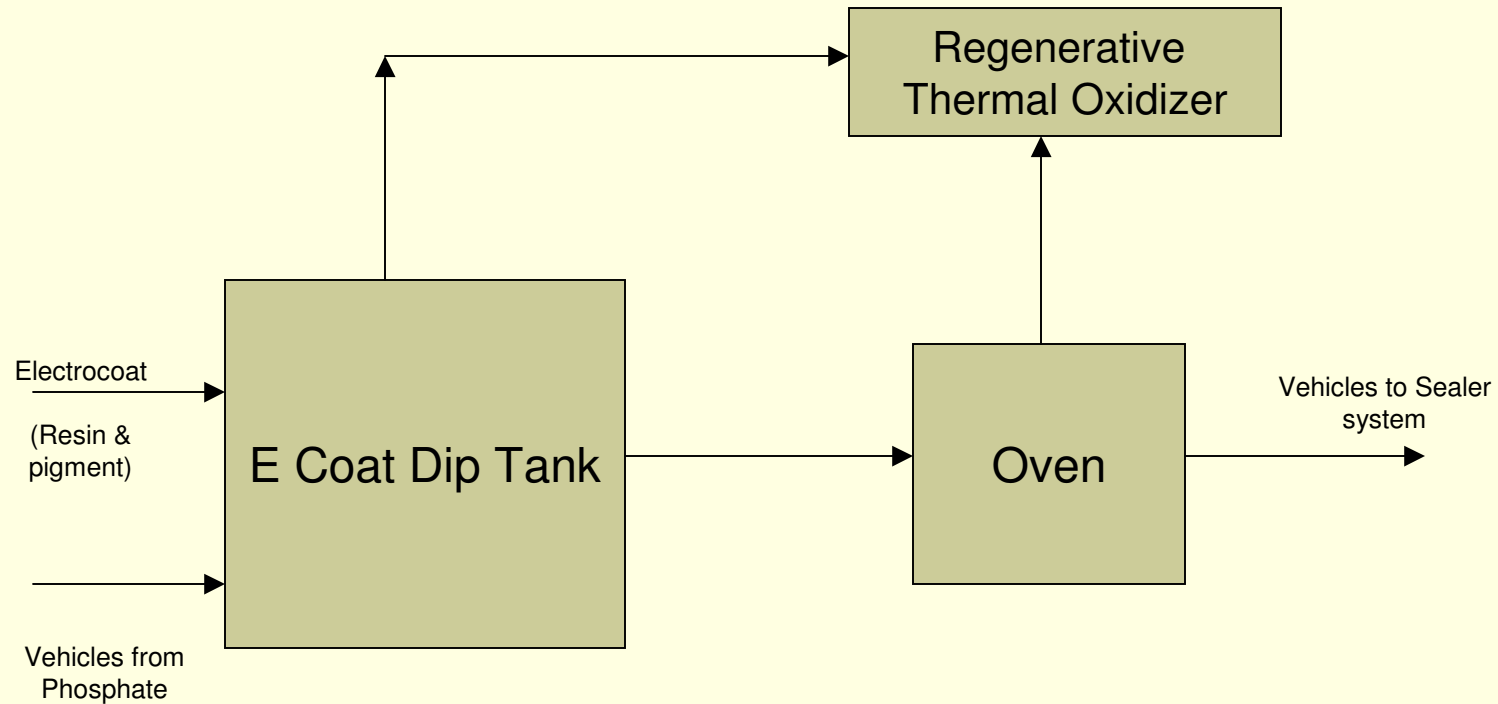
## Phosphate System (Paint Operation)



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# Process Flow Diagram – Example

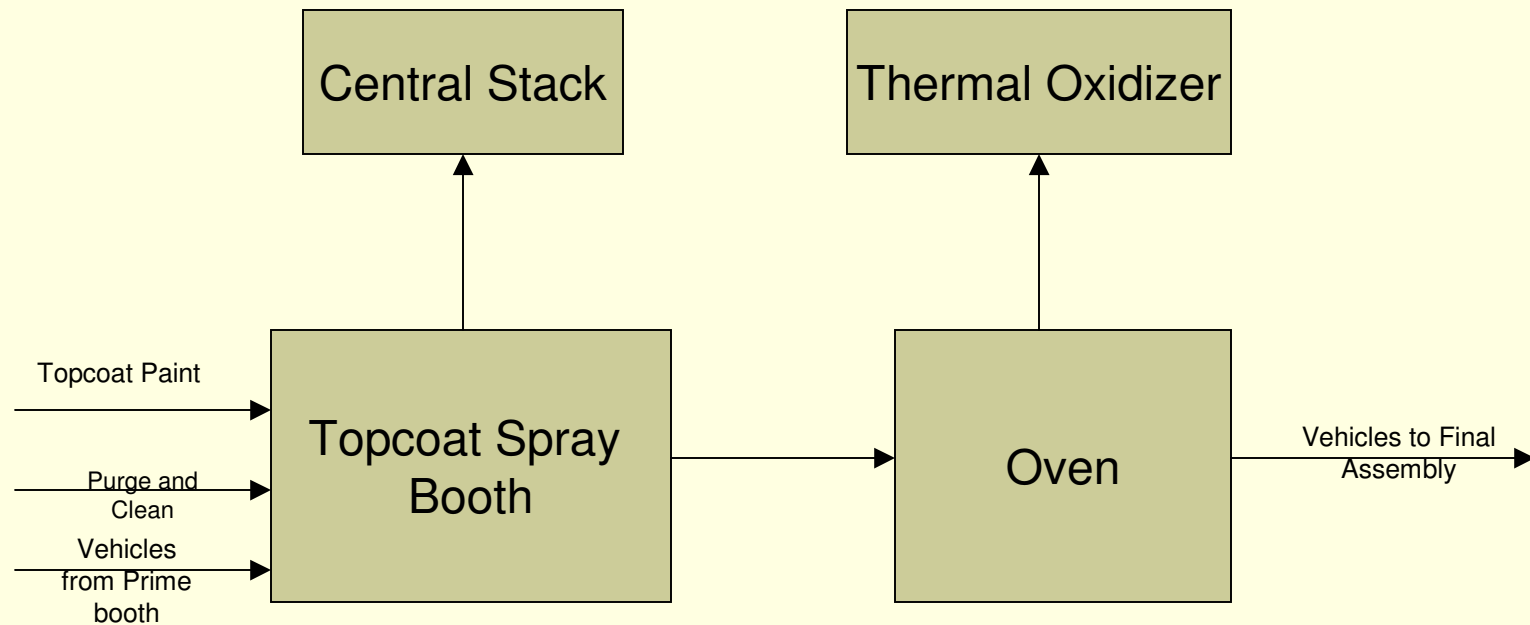
## E Coat System (Paint Operation)



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# Process Flow Diagram – Example

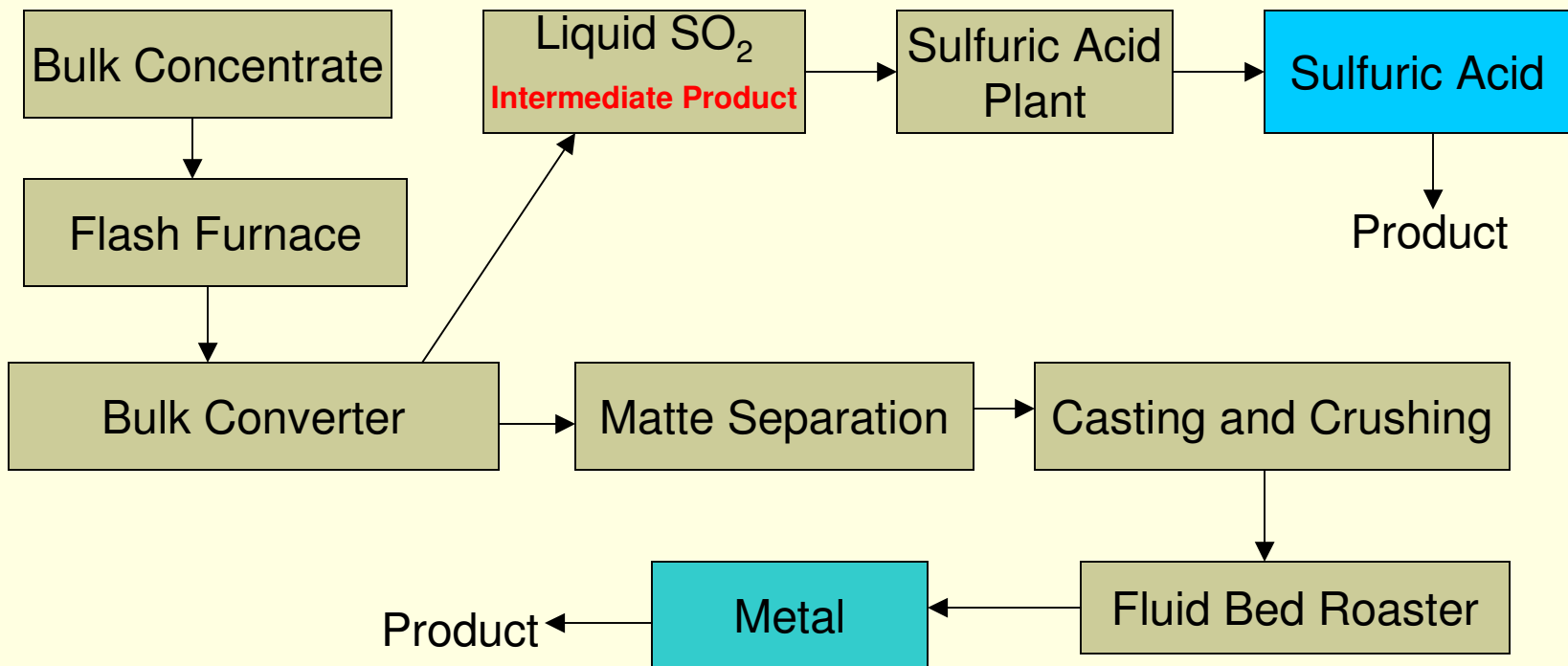
## Topcoat Spray Booth (Paint Operation)



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# Intermediate Product Example

## Metal Smelting



# [ eco ] Identification of Toxic Reduction and P2 Options

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- Facility should identify available options that could potentially achieve toxics reductions
  - Material substitutions
  - Process changes
  - Procedures
  - Training programs
- An options identification procedure should be included in the plan
  - Personnel involved (P2 Team)
  - Description of information sources consulted
  - Description of information gathering techniques
  - List of available options identified

# Technical Feasibility Analysis

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- The available options identified should be evaluated to determine if they are technically feasible.
- Technical feasibility analysis is facility specific and may include:
  - Effect on product quality
  - Space requirements
  - Utility requirements
  - Effect on employee health and safety
  - Effect on the environment
  - Toxic Reduction expected
- Technically infeasible options are eliminated from further analysis and implementation

# Financial Feasibility Analysis

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- Further evaluation of technically feasible reduction options may include economic feasibility.
- Incremental costs to implement reduction options may consider
  - Direct and indirect capital costs
  - Direct and indirect operation and maintenance costs
  - Cost savings if any due to implementation of technology

## Selected Options Implementation Plan

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- The facility should create a plan for implementing the selected reduction options.
- The strategy may include a prioritization of the options based on
  - Most toxics reduction achieved
  - Ease of implementation
  - Cost of implementation etc.

# Implementation Schedule

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- The toxics reduction plan should include an implementation schedule.
- Estimate length of time required to implement selected options.
- Estimate and project the reductions in toxic chemicals used and generated at the facility.
- Compare against baseline year to measure potential progress

# Plan Certification

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- A senior management representative of the facility (such as a Plant Manager), who has responsibility should certify the veracity of the plan.
- As of [*insert date*], I certify that I have read the toxic substance reduction plan for [*insert the toxic substance*] and am familiar with its contents, and to my knowledge the plan is factually accurate and complies with the *Toxics Reduction Act, 2009* and Ontario Regulation 455/09 (General) made under that Act. – O.Reg.455/09

# Plan Review

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- The Plan must be reviewed and updated
  - When an amendment has been made
  - Once every 5 years

# Plan Summary

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- Contents include:
  - Toxic substances used or created at the facility
  - A description of why the toxic substance is used or created
  - Options to be implemented to minimize use or creation and numerical estimates
  - Anticipated timelines for use or creation reduction

# Information to Public

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- Plan summary is made available to the public on the internet
- Copy provided to a member of the public upon written request
- Notice provided to employees of facility