United States Environmental Protection Agency

# Module 7:
# Byproducts and Chemical Data Reporting

Office of Chemical Safety and Pollution Prevention

# PREFACE

**Welcome to *Training Module 7: Byproducts and Chemical Data Reporting***

This is the last in EPA's series of seven Training Modules created to assist you in complying with the requirements of the Chemical Data Reporting (CDR) rule. This Training Module will provide additional guidance related to the reporting of byproducts.

Additional information about reporting byproducts is available on EPA's website at www.epa.gov/cdr. A detailed list of documents is provided at the end of this Training Module.

This Training Module does not substitute for the CDR rule and does not impose legally binding requirements on the regulated community or on the U.S. Environmental Protection Agency.

# Training Agenda: Module 7

- Introduction
- What is a Byproduct?
- How is a Byproduct Identified?
- When is a Byproduct Subject to the CDR Rule?
  1. Did you manufacture a byproduct for "commercial purposes"?
  2. Is your byproduct then used for a separate commercial purpose?
  3. Is your byproduct exempt from reporting because its only commercial purpose is (a) to burn the byproduct as a fuel; (b) to dispose as a waste, including in a landfill or for enriching soil; or (c) to extract a component chemical substance from the byproduct for commercial purposes?
- Is There Special Reporting for Byproducts?
- Other Reporting Requirements: Resource Conservation and Recovery Act (RCRA) and Toxic Release Inventory (TRI)
- Specific Byproduct Examples

# Introduction

Reporting requirements for byproducts have been in place since 1986, when the Chemical Data Reporting (CDR) rule was first promulgated as the Inventory Update Reporting (IUR) rule. Although the CDR rule does not modify the requirement to report byproducts, EPA believes that the reported CDR data will be improved by additional clarification of the byproduct-related reporting.

This module is specifically designed to provide information on byproduct reporting requirements. For general information on CDR rule reporting guidance, you can review the following modules:

- Module 2: Reporting Requirements for the 2016 Chemical Data Reporting
- Module 3: Completing Form U for 2016Chemical Data Reporting

# What is a Byproduct?

- **Byproduct is defined under 40 CFR 704.3 to mean:**

  …a chemical substance produced without a separate commercial intent during the manufacture, processing, use, or disposal of another chemical substance(s) or mixture(s). (*See 40 CFR 704.3*)

- If the byproduct is manufactured (including imported) in a volume of 25,000 lbs or more at a single site during the principal reporting year, then it is potentially subject to reporting under CDR.
- Byproducts are not required to be reported under some conditions.

The next seven slides help you determine how to identify your byproduct.

*Slide 12 presents a decision logic diagram to assist you in determining if your byproduct is subject to the CDR Rule. This decision logic can be a substitute for Step I, Question A. Is your chemical substance manufactured for commercial purposes?*

*See Module 2: Reporting Requirements for the 2016 Chemical Data Reporting*

# How Is A Byproduct Identified?

Generally, EPA considers each combination of substances resulting from a reaction to be either:

1. A mixture, composed of two or more well-defined chemical substances to be named and listed separately; or
2. A reaction product, to be listed as a single chemical substance, using one name that collectively describes the products or the reactants used to make the products.
   - Complex chemical substances are listed on the Toxic Substance Control Act (TSCA) Inventory as chemical substances of Unknown or Variable composition, Complex reaction products and Biological materials ("UVCB") chemical substances)

*It is important to correctly characterize your byproduct in order to determine your reporting obligations under CDR. The following slides provide additional discussion related to how to determine if your byproduct is a mixture or a UVCB substance.*

# How Is A Byproduct Identified?

**Characterization as a mixture for purposes of CDR:**

- Byproduct chemical substances may sometimes be considered mixtures if all potentially reportable component chemical substances are unambiguously identified and form each time the reaction is run.
- In certain circumstances it may be appropriate to treat a product combination as a mixture of chemical substances (rather than as a single UVCB chemical substance) even though there are uncharacterized components to the mixture.
  - When the submitter has a factual basis to reasonably conclude that the uncharacterized components are exempt from CDR irrespective of their chemical identity, a lack of information about the chemical identity of those exempt components is not an obstacle to treating the remainder of the product combination as a mixture for CDR purposes.
  - Thus, for example, where a submitter reasonably concludes (after considering all the facts known and reasonably ascertainable) that the uncharacterized components of a byproduct will not be used for commercial purposes after they are manufactured (or if the only commercial purpose is for one of the uses listed in 40 CFR 720.30(g)), for CDR purposes the submitter may treat the byproduct as a mixture of the remaining components.

# How Is A Byproduct Identified?

**Characterization when your byproduct is a complex combination of chemical substances:**

- Byproduct chemical substances are often chemical combinations of variable or complex composition
  - A complex combination of chemical substances can be listed on the TSCA Inventory as a single chemical substance of Unknown or Variable composition, Complex reaction products and Biological materials ("UVCB" substance).
  - The complex combination of chemical substances can be identified as single UVCB chemical substance that represents the process stream; the volumes of the individual chemical substances that comprise it does not need to be determined.
- The TSCA Inventory includes listings for UVCB chemical substances.

# How Is A Byproduct Identified?

Like other chemical substances, byproducts that have been listed on the TSCA Inventory are subject to the CDR rule.

Byproducts that are not listed on the TSCA Inventory are subject to TSCA's pre-manufacture notice requirements.

# How Is A Byproduct Identified?

- It is important to properly identify a byproduct chemical substance to determine whether it is listed on the TSCA Inventory.
- Guidance documents are available to help you identify when a combination of chemicals is a UVCB chemical substance and not a mixture and determine the appropriate name for a UVCB chemical substance. See slide 29.
- UVCB chemical substances may have a TSCA Inventory definition to further describe them, for example:

  Electrolytes, copper-manufg., spent
  Chemical Abstracts Service Registry Number (CASRN) 69012-54-0
  Definition: Spent copper sulfate electrolyte consisting of copper sulfate and sulfuric acid resulting from the electrolytic refining of copper

# How Is A Byproduct Identified: Byproduct vs. Coproduct?

**Byproduct**

The chemical is a byproduct if is manufactured without any separate commercial intent (i.e., no commercial intent other than the intent to manufacture, process, use, or dispose of some other chemical substance or mixture).

**Coproduct**

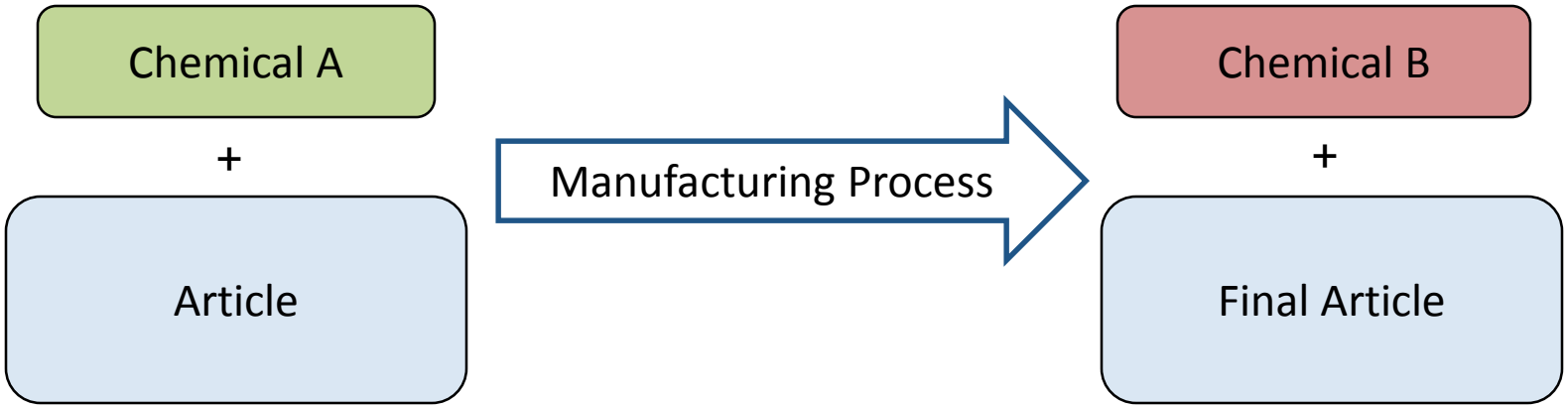
The chemical is a coproduct if it is manufactured with a separate commercial intent (i.e., coproduct was intended to be manufactured in addition to the manufacture of some other chemical substance or mixture.)

Note: Both coproducts and byproducts are required to be listed on the Toxic Substance Control Act (TSCA) Inventory unless otherwise exempt, and both are subject to the CDR requirements.

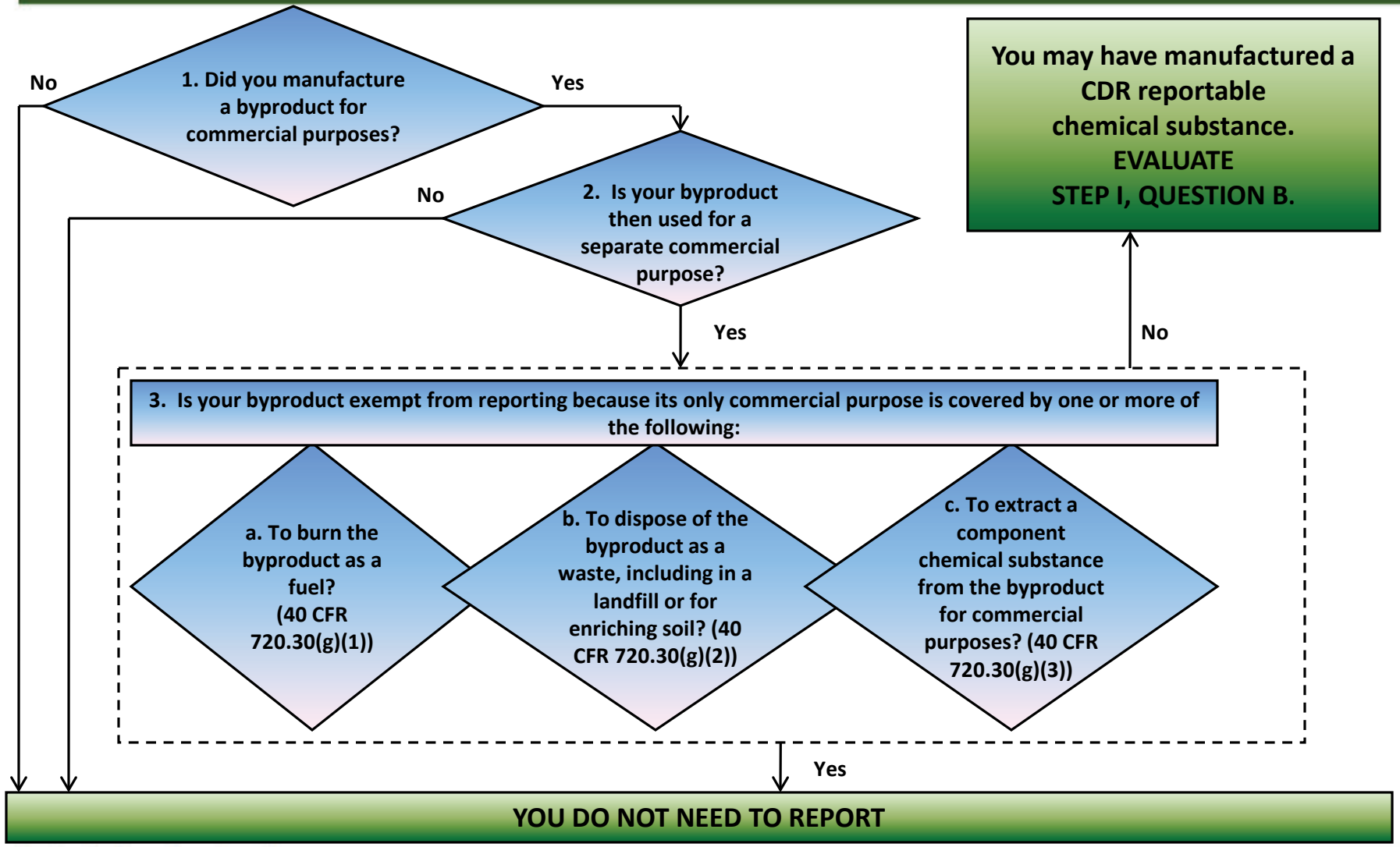
# How Is A Byproduct Identified: Article Manufacturing

You may be manufacturing a byproduct.

- In the example below, Chemical A is used on an article, resulting in the generation of Chemical B with the final article.
- If Chemical B is manufactured coincidentally but was not intended, then it is a byproduct. If Chemical B was intended to be manufactured along with the final article, for a separate commercial purpose, it is a coproduct.



# When is a Byproduct Subject to the CDR Rule?



# When is a Byproduct Subject to the CDR Rule?

1. **<u>Did you manufacture a byproduct for commercial purposes</u>?**

- ***Manufacture*** includes
  - "the extraction for commercial purposes, of a component chemical substance from a previously existing chemical substance or complex combination of chemical substances" (40 CFR 711.3)
- ***Manufacture for commercial purposes*** also applies to
  - "chemicals that are produced coincidentally during manufacture, processing, use, or disposal of another substance or mixture, including both byproducts that are separated and impurities that remain in a substance or mixture." (40 CFR 704.3)
- Byproducts may or may not, in themselves, have commercial value. They are nonetheless produced for the purpose of obtaining a commercial advantage because they are part of the manufacture of a chemical product for a commercial purpose.
  - Chemical substances that are the byproducts of the manufacture, processing, use, or disposal of another chemical substance or mixture, are subject to CDR reporting if they are listed on the TSCA Inventory, and not otherwise exempt.

# When is a Byproduct Subject to the CDR Rule?

**2. <u>Is your byproduct then used for a separate commercial purpose?</u>**

- The fact that a byproduct does not have a separate commercial purpose at the time it is manufactured does not affect whether **the byproduct can be used subsequently for a non-exempt commercial purpose.**
  - For example, if you send the byproduct, which you may consider a waste, to another person or site, and that other person or site uses your byproduct in such a manner that it has a commercial purpose, then you are subject to CDR for the byproduct.
- For scenarios to help understand how to determine if your byproduct is used for a separate commercial purpose, read:

  *Chemical Data Reporting: Byproduct and Recycling Scenarios*

# When is a Byproduct Subject to the CDR Rule?

3. **Is your byproduct exempt from reporting because its only commercial purpose is covered by one or more of the following exemptions:**

   a. To burn the byproduct as a fuel? *(40 CFR 720.30(g)(1))*

   b. To dispose of the byproduct as a waste, including in a landfill or for enriching soil? *(40 CFR 720.30(g)(2))*

   c. To extract a component chemical substance from the byproduct for commercial purposes?* *(40 CFR 720.30(g)(3))*

   *Note that this last part of the exemption only applies to the byproduct, and not to the extracted component chemical substance.

*The next few slides explain a, b, and c, and provide some examples.*

# When is a Byproduct Subject to the CDR Rule?

**3.a. <u>Exemption for burning of byproduct as fuel</u>** 40 CFR 720.30(g)(1)

For CDR purposes, it is not necessary to distinguish between byproducts that are burned for energy recovery and byproducts that are incinerated solely for destruction.

This is because there are reporting exemptions for either case. The CDR rule:

- Exempts byproducts for which the "only commercial purpose" is burning as a fuel; and
- Exempts byproducts that are "not used for commercial purposes" (this would include incineration solely for destruction).

# When is a Byproduct Subject to the CDR Rule?

**3.b. <u>Exemption for byproduct disposed of as a waste, including in a landfill or for enriching soil</u>**

Disposal of the byproduct as a waste for purposes of enriching the soil is exempt. 40 CFR 720.30(g)(2)

Note: Although the manufacture of a byproduct is not reportable if the byproduct is subsequently disposed of as a waste for purposes of enriching the soil (e.g., to change the soil properties in a desirable way, such as by serving as a filler to make the soil less dense or enhancing the moisture retention), a substance used as a fertilizer is not necessarily an excluded byproduct. For instance, if the substance's ordinary manner of use is as a fertilizer, then the substance is not a byproduct in the first place, and the provisions at 40 CFR 720.30(g) are inapplicable.

# When is a Byproduct Subject to the CDR Rule?

**3.c. <u>Exemption for extracting a component chemical substance</u> ***

Heat or chemical reactions can be used to extract a component chemical substance, but the component chemical substance extracted must be left chemically unchanged by the extraction process for the byproduct manufacturer to claim a CDR exemption under 40 CFR 720.3(g)(3).


Note that individual component chemical substances extracted from a byproduct are reportable substances <u>if they are extracted for a commercial purpose</u>, even if the manufacture of the byproduct itself is not reportable.

**Extraction applies to separating a chemical substance from another chemical substance (e.g., a UVCB substance) and does not apply to the separation of chemical substances in a mixture.*

# Is There Special Reporting for Byproducts?

- Once you have determined that your byproduct is subject to the CDR rule, you will eventually complete a Form U for that byproduct (assuming production thresholds are met and no other exemptions apply).
- In addition to basic manufacturing information, you also must report for the principal reporting year:

  "whether the chemical substance is being recycled, remanufactured, reprocessed, reused, or otherwise used for a commercial purpose instead of being disposed of as a waste or included in a waste stream." (40 CFR 711.15(b)(3)(vi))

- Indicating that a chemical substance, such as a byproduct, is to be recycled, remanufactured, reprocessed, or reused does not affect the reporting requirements associated with any chemical substance manufactured from the byproduct.

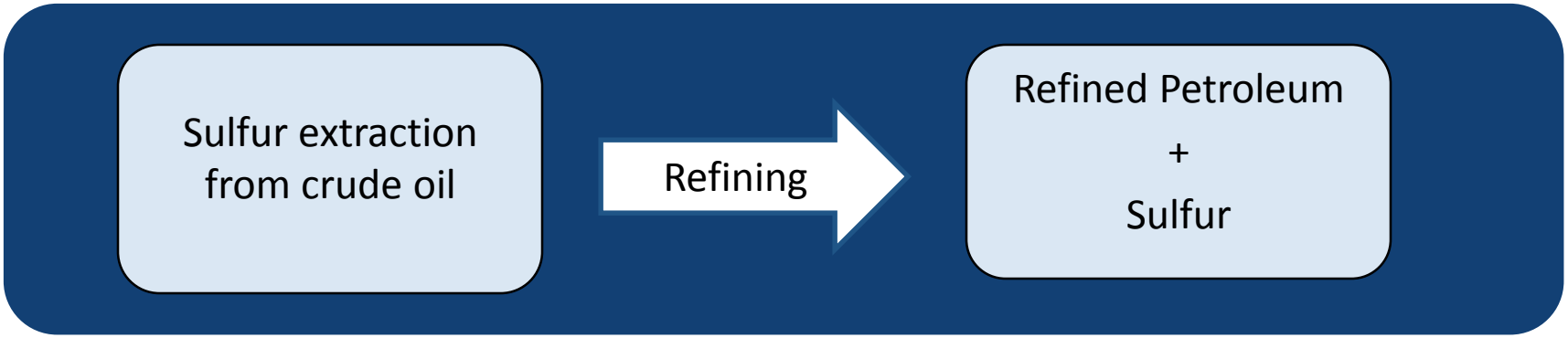
# Other Reporting Requirements: RCRA and TRI

- The CDR is focused on chemicals in commerce and RCRA* is focused on waste and waste minimization. TRI** is focused on toxic chemical substance releases and waste management for a small subset of chemical substances in commerce. RCRA exemptions (or exclusions) in most cases are not relevant to TSCA reporting obligations.

- Finding a commercial use for a substance that would otherwise be considered a waste under RCRA can relieve the manufacturer of that substance from some RCRA requirements, but may consequently subject that manufacturer to TSCA reporting requirements.

*RCRA = Resource Conservation and Recovery Act
**TRI = Toxic Release Inventory

# Example 1: Petroleum Refinery




**Extracted sulfur is: (1) used as an intermediate or (2) removed from the crude oil and disposed of as waste in a landfill. Is sulfur CDR-reportable?**

**(1): Answer: YES!**

Sulfur is a byproduct of petroleum refining. When it is further used as an intermediate for a non-exempt commercial purpose, then it is reportable under the CDR rule. Only the volume of sulfur used as an intermediate is reportable.

**(2): Answer: NO!**

Conversely, if the sulfur byproduct is not further used and is removed from the crude oil and disposed as waste (e.g., landfill), the portion disposed of as waste does not need to be reported under CDR.

# Example 2: Ore Refining

At Site B, an ore (e.g., bauxite) is refined to create a product (e.g., alumina). The ore contains another metal compound or salt, which is reduced to the elemental metal, removed from the product during processing, and (1) used for a non-exempt commercial purpose or (2) disposed of as waste.

**Should the elemental form of this metal be reported under the CDR rule?**

**(1): Answer: YES!**

If the elemental metal byproduct is used for a non-exempt commercial purpose (e.g., sold for use as a chemical feedstock) the exemption provision will not apply and it is subject to CDR reporting.

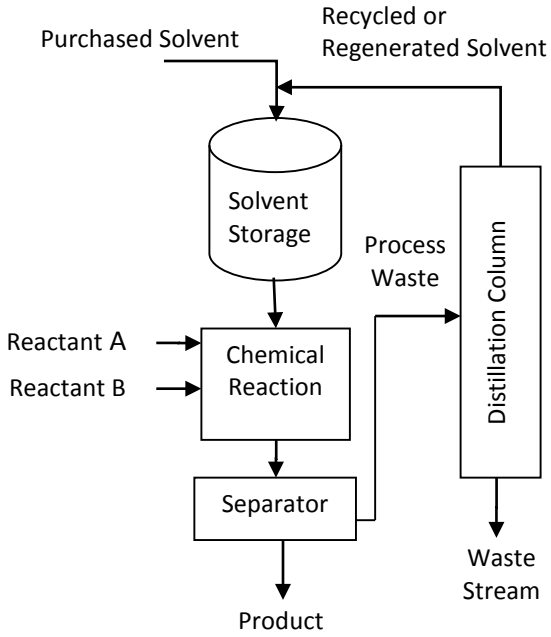
**(2): Answer: NO!**

Reporting is not required if the metal byproduct is disposed of as a waste.

# Example 3: Solvent Recycling

A solvent is used in a chemical reaction between Reactant A and Reactant B. The reaction results in a commercial product stream and a process waste stream that are separated. The process waste stream is further distilled to regenerate solvent that is recycled to the same reaction process.

## Is the recycled solvent reportable under CDR?




**Answer: It Depends!**

1) If the manufacturer considers the process waste stream a single UVCB substance, then it is a byproduct manufactured for a commercial purpose that is reportable under CDR. However, in this case, the UVCB substance is exempt under 720.30(g) because its sole purpose is to extract recycled solvent. Note that the recycled solvent is considered manufactured and subject to the CDR rule.

2) If the manufacturer considers the process waste stream a mixture, it is not reportable under CDR. See slide 6 to determine whether the process waste stream can be considered a mixture. Note that the distillation of the mixture to separate components, such as solvent, is processing and is also not reportable under CDR; however, components of the mixture are reportable if they were manufactured as a result of the chemical reaction between Reactants A and B.

# Example 4: Secondary Aluminum

(1) In the secondary aluminum process, scrap is re-melted to recover aluminum alloy recycled ingot (RSI).

(2) Aluminum scrap is imported for further processing.

**Is the recovered aluminum reportable in either of these two cases?**

**(1): Answer: NO!**

Scrap containing RSI is considered a mixture. Therefore, the separation of aluminum without chemical alteration* is considered processing rather than manufacturing. Processing does not trigger reporting under CDR.

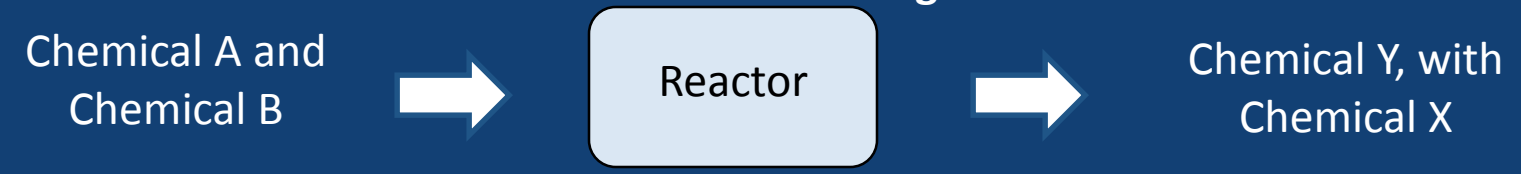
(*assumes no chemical reaction occurs during metal recovery)

**(2): Answer: YES!**

If you import aluminum scrap for further processing, the import of the alloy components in the aluminum scrap is reportable under the CDR rule. This is because import for commercial purposes is reportable as manufacturing under CDR.

# Example 5: Process Impurity

**Chemical Y Manufacturing Process**




*The manufacturer is aware that Chemical X is present in its product, and markets Chemical Y without attempting to remove Chemical X. Separation is not attempted because: (1) Separation is unwarranted given the limited impairment in product performance from Chemical X . (2) Chemical X improves the performance of Chemical Y.*

**Is Chemical X reportable under CDR in either of these cases?**

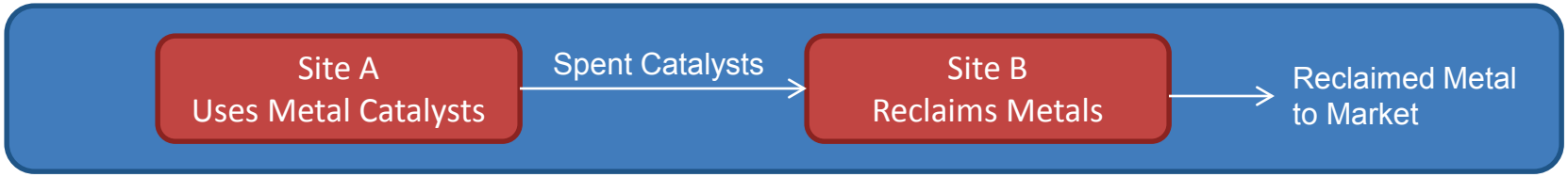
**(1): Answer: NO!**

Chemical X unintentionally present with Chemical Y, and is therefore an impurity exempt from IUR.

**(2): Answer: YES!**

Chemical X is considered to be intentionally present, because it contributes a separate commercial purpose to the product (it improves the performance of Chemical Y). Chemical X does not qualify for the impurity exemption and would be reportable under the CDR rule unless another exemption applies.

# Example 6: Metal Catalyst




**Are the spent metal catalysts reportable under the CDR rule?**

**Answer:**

The spent catalyst is a byproduct of Site A's process.

1) If Site B's metal reclamation process uses a chemical reaction to convert a substance present in the spent catalyst into a different chemical substance that is then extracted from the spent catalyst (e.g., metal compound to elemental metal), then Site A reports the manufacture of the Spent Catalyst. Site B would also report the manufacture of elemental metal.
2) If Site B's metal reclamation process physically extracts chemical substances that are already present in the catalyst (e.g., extracts metal compounds from the catalyst) and discards as a waste the rest of the Spent Catalyst, then Site A's manufacture of the Spent Catalyst is exempt from reporting. Site B would report the manufacture of the metal compounds it extracts.

# Example 7: Utility Coal Ash

An electric utility power plant burns coal to generate power. The process results in the production of coal ash.

The coal ash can be (1) disposed in a landfill, or (2) provided for a beneficial use as mine fill.

**Is the coal ash reportable?**

**(1): Answer: NO!**

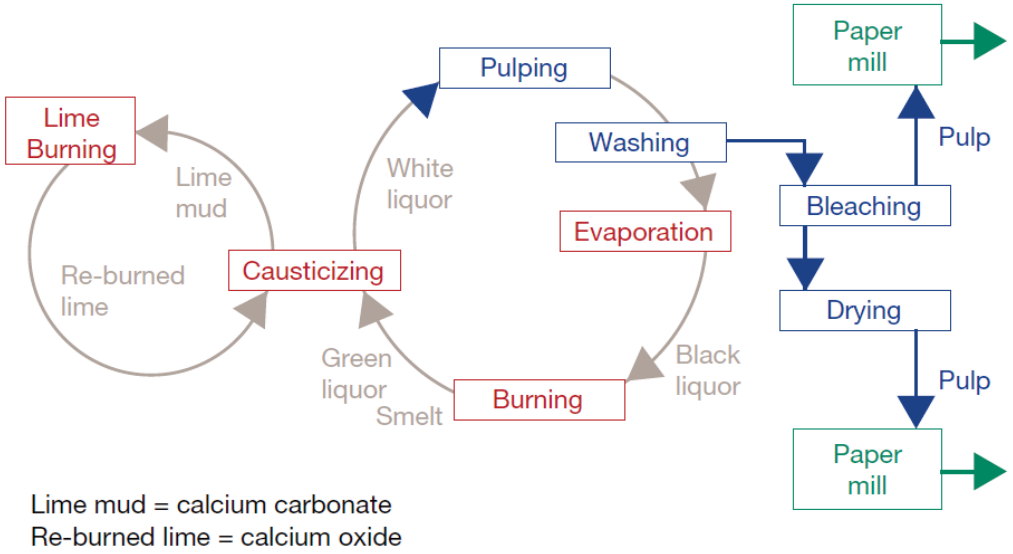
The quantity of coal ash that is disposed as a waste, including in a landfill, is exempted from CDR reporting requirements.

**(2): Answer: YES!**

The coal ash is considered a byproduct of coal burning which is used for a non-exempt commercial purpose (i.e., for mine fill). The volume that is used for mine fill is reportable under the CDR rule.

# Example 8: Paper Pulping Liquors

The paper pulping process involves a recycling loop for the pulping chemicals. The spent pulping liquors (black liquor) is a byproduct of the pulping process. The black liquor is burned to produce power, and the resulting smelt is recovered to begin the process to make white liquor.




**The black liquor is used as a fuel; is it reportable under the CDR rule?**

**Answer:**

While the black liquor is a byproduct burned as a fuel, it is also used to manufacture smelt (and ultimately, white liquor). The black liquor byproduct undergoes a chemical change to become smelt, which is then used to manufacture white liquor. Thus, the black liquor byproduct that is burned for fuel is also being burned for a non-exempt commercial purpose. Because the black liquor byproduct has a non-exempt commercial purpose, it is reportable under the CDR rule.

# Helpful Documents and References

*Instructions for Reporting 2016 TSCA Chemical Data Reporting Rule*

*Chemical Data Reporting Byproduct and Recycling*

TSCA CDR Fact Sheets:

- *Byproducts Reporting for the Printed Circuit Board Industry*
- *Reporting for Electricity Generating Sites*

*Frequently Questions*

Useful TSCA Inventory Policy and Guidance Documents:

- *Chemical Substances of Unknown or Variable Composition, Complex Reaction Products and Biological Materials: UVCB Substances*
- *Combinations of Two or More Substances: Complex Reaction Products*

# Training Modules for CDR Rule

Seven Training Modules have been developed for the CDR Rule. The Training Module you have just completed is highlighted below in the list of all seven Training Modules.

Module 1: New Requirements for 2016 Chemical Data Reporting

Module 2: Reporting Requirements for the 2016 Chemical Data Reporting

Module 3: Completing Form U for 2016 Chemical Data Reporting

Module 4: Registering with CDX for Chemical Data Reporting

Module 5: Using the e-CDRweb Reporting Tool

Module 6: Joint Submissions for Chemical Data Reporting

**Module 7: Byproducts and Chemical Data Reporting**