Reviewing New Chemicals under the Toxic Substances Control Act

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Overview

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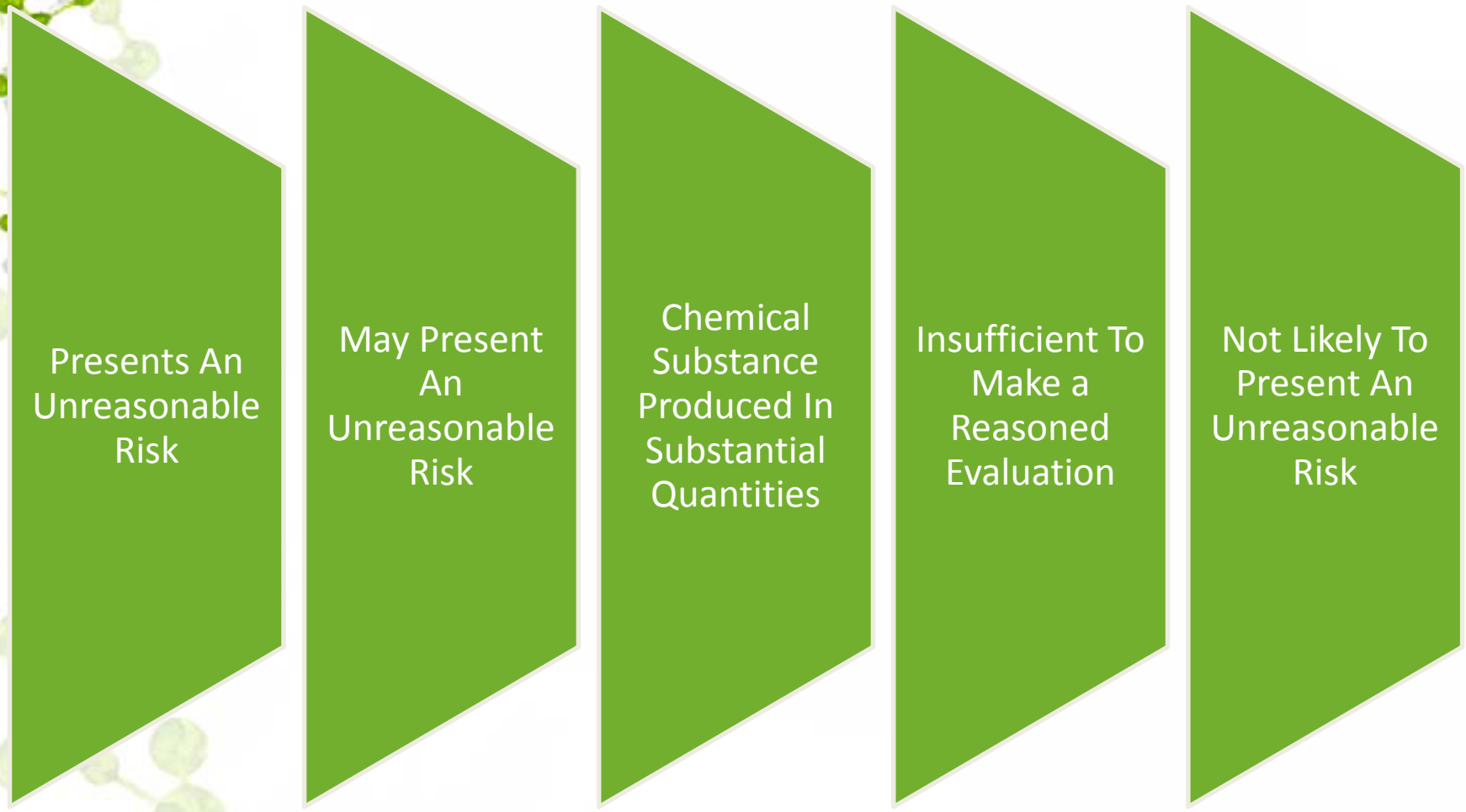
Background

- Mandated by section 5 of the Toxic Substances Control Act (TSCA), EPA's New Chemicals program helps manage the potential risk to human health and the environment from chemicals new to the marketplace.
- Section 5 of TSCA requires anyone who plans to manufacture (including import) a new chemical substance for a non-exempt commercial purpose to provide EPA with notice before initiating the activity.

Types of Determinations



Section 5 Review and Determination

- Presents an unreasonable risk
  - that the relevant chemical substance or significant new use presents an unreasonable risk of injury to health or the environment, without consideration of costs or other nonrisk factors, including an unreasonable risk to a potentially exposed or susceptible subpopulation identified as relevant by the Administrator under the conditions of use,
- in which case the Administrator shall take the actions required under subsection (f);

Section 5 Review and Determination

- May present an unreasonable risk
  - In the absence of sufficient information to permit the Administrator to make such an evaluation, the manufacture, processing, distribution in commerce, use, or disposal of such substance, or any combination of such activities, may present an unreasonable risk of injury to health or the environment, without consideration of costs or other nonrisk factors, including an unreasonable risk to a potentially exposed or susceptible subpopulation identified as relevant by the Administrator
- in which case the Administrator shall take the actions required under subsection (e)

Section 5 Review and Determination

- Chemical substances produced in substantial quantities
  - Such substance is or will be produced in substantial quantities, and such substance either enters or may reasonably be anticipated to enter the environment in substantial quantities or there is or may be significant or substantial human exposure to the substance
- in which case the Administrator shall take the actions required under subsection (e)

Section 5 Review and Determination

- Insufficient to permit a reasoned evaluation
  - The information available to the Administrator is insufficient to permit a reasoned evaluation of the health and environmental effects of the relevant chemical substance or significant new use
- in which case the Administrator shall take the actions required under subsection (e)

Section 5 Review and Determination

- Not Likely to Present an Unreasonable Risk
  - The relevant chemical substance or significant new use is not likely to present an unreasonable risk of injury to health or the environment, without consideration of costs or other nonrisk factors, including an unreasonable risk to a potentially exposed or susceptible subpopulation identified as relevant by the Administrator under the conditions of use
- In which case the submitter may commence manufacture of the chemical substance or manufacture or processing for a significant new use

Types of Outcomes

- Presents an unreasonable risk
  - Regulation under section 5(f) – Protection Against Unreasonable Risks
    - Section 5(f) order or section 6(a) proposed rule
    - Restriction or prohibition of manufacturing, processing, distribution in commerce, or disposal of chemical substance or specific use of chemical substance to the extent necessary to protect against the unreasonable risk
- May present an unreasonable risk
  - Regulation under section 5(e) – Regulation Pending the Development of Information
    - Section 5(e) order - Typically a consent order with limitations to the extent necessary to protect against the unreasonable risk
    - Commercialization only in compliance with order
    - Testing generally due at a specified point after commercialization of the chemical substance, unless risks cannot be mitigated then testing needed before commercialization of the chemical substance
- Chemical Substance Produced In Substantial Quantities
  - Regulation under section 5(e) – Regulation Pending the Development of Information
    - Section 5(e) order -- Typically a consent order
    - Commercialization only in compliance with order
    - Testing generally due at a specified point after commercialization of the chemical substance

Types of Outcomes

- Insufficient To Make a Reasoned Evaluation
  - Regulation under section 5(e) – Regulation Pending the Development of Information
    - Section 5(e) order -- Typically a consent order
    - Testing generally required before commercialization of the chemical substance can occur
- Not Likely To Present An Unreasonable Risk
  - Commercialization of the chemical substance can commence after determination is made, notwithstanding any remaining portion of the review period
    - Section 5(g) – Statement on Administrator Finding publication in Federal Register

Considerations: Presents An Unreasonable Risk

- The chemical substance or significant new use presents an unreasonable risk of injury to health or the environment
- The level of uncertainly in the risk assessment is relatively low, *e.g.*, the level of uncertainty is similar to that in a section 6 determination
- Note: The section 5(h) exemptions are based on a determination of "will not present an unreasonable risk". This has a similar low level of uncertainty in the unreasonable risk determination

Considerations: May Present An Unreasonable Risk

- In the absence of sufficient information to permit such an evaluation, the manufacture, processing, distribution in commerce, use, or disposal of such substance, or any combination of such activities, may present an unreasonable risk
  - Human health and/or environmental risks associated with the manufacture, processing, distribution in commerce, use, or disposal of the chemical substance from either the scenarios described in the PMN or under other conditions of use
    - Based on information provided in the PMN, information on analogs and other pertinent data

Considerations:
May Present An Unreasonable Risk

- Before manufacture can proceed, EPA must issue an order under 5(e) to impose restrictions on the manufacture, processing, distribution in commerce, use, and/or disposal of the chemical substance. This will generally be a consent order
- Testing will be required to reduce the uncertainty in the risk estimates
  - Before commercialization if the estimated risk cannot be controlled through the consent order or because the uncertainty in the hazard and the indication of potential hazard are both significant
  - At a certain production volume or by a certain date if the estimated risk can be controlled
  - Will be required only if the consent order changes.
    - Typically used if exposure which would lead to a potential risk is not expected, e.g., no inhalation exposure, under the PMN scenario

Considerations: Exposure-Based

- Produced in substantial quantities, and
  - either enters or may reasonably be anticipated to enter the environment in substantial quantities or
  - there is or may be significant or substantial human exposure to the substance
- Exposure-based guidelines apply to all PMN chemical substances with estimated production volumes greater than or equal to 100,000 kilograms per year, and
  - Include specific exposure/release criteria
    - (such as > 10,000 kg/year total release to environmental media or >70 mg/yr exposure via air).
- Exposure-based testing is usually required via a section 5(e) consent order

TSCA Section 5(e) Exposure-Based Policy Criterion

Exposure Parameter	***TSCA 5(e) Exposure-Based Policy Criterion***
Production Volume	100,000 kg/yr
Significant or Substantial Human Exposure: High Number of Workers Exposed	> 1,000 workers
Significant or Substantial Human Exposure: Acute Worker Exposure, Inhalation	> 100 workers exposed to > 10 mg/day
Significant or Substantial Human Exposure: Chronic Worker Exposure, Inhalation	> 100 workers exposed to 1-10 mg/day for > 100 days/yr
Significant or Substantial Human Exposure: Chronic Worker Exposure, Dermal	> 250 workers exposed by routine dermal contact for > 100 days/yr
Significant or Substantial Human Exposure: Consumer	Presence in consumer product where exposures are likely
Significant Human Exposure: Ambient General Population	> 70 mg/year exposure via drinking water, air, or groundwater
Substantial Human Exposure: Ambient General Population	> 10,000 kg/yr release to environmental media
Substantial Environmental Release	> 1,000 kg/yr total release to surface water calculated after wastewater treatment

Exposure based policy developed in 1988. See www.epa.gov

Considerations: Insufficient Information

- Information available is insufficient to permit a reasoned evaluation of the health and environmental effects of the relevant chemical substance or significant new use
  - There is no or insufficient information on the chemical substance and there is insufficient information on an appropriate analog; or
  - There is an indication of hazard but there is not a benchmark that can be used with the information on exposure to assess the risk
  - Reasoned evaluation
    - There is sufficient information for EPA to determine if exposures will result in risks, and thus if these risks are unreasonable

Considerations: Not Likely To Present An Unreasonable Risk

- Not likely to present an unreasonable risk including an unreasonable risk to a potentially exposed or susceptible subpopulation under the conditions of use
- Low toxicity
  - The chemical substance has a low potential for human health toxicity
  - The chemical substance has a low potential for environmental toxicity
  - The chemical substance is **not both** persistent and bioaccumulative
  - Exposure is considered but is not expected to result in risks
- Toxicity is higher and all exposure scenarios do not present unreasonable risks
- The chemical substance may have the potential for higher toxicity but the physical-chemical properties of the chemical substance mitigate the potential for exposure

Considerations: Conditions of Use

- Conditions of use means the circumstances as determined by the Administrator, under which a chemical substance is intended, known, or reasonably foreseen to be manufactured, processed, distributed in commerce, used or disposed of
- EPA uses the information on the chemical substance, including information provided by the submitter, information in the literature, attributes of the chemical substance (e.g., physical-chemical properties)
- EPA also uses information on analog(s) for the chemical substance, including available data, information in the literature, attributes of the analog (e.g., physical-chemical properties) and any difference in these attributes from the subject chemical substance
- Information on downstream processing and use of the chemical substance and analogs

Overview of EPA Assessments

- TSCA requires new chemical manufacturers to submit only studies or data in their possession or control (*i.e.*, no minimum set of toxicity or fate studies are required)
- Because no test data are required to be submitted with a notification, predictive models/technical tools and professional judgement are used by EPA to assess potential risks
- Evaluation of risks from new chemical substances are considered throughout their product life-cycle
- EPA focuses on exposure to workers, site-specific assessment of environmental and general population exposure, and consumer exposure

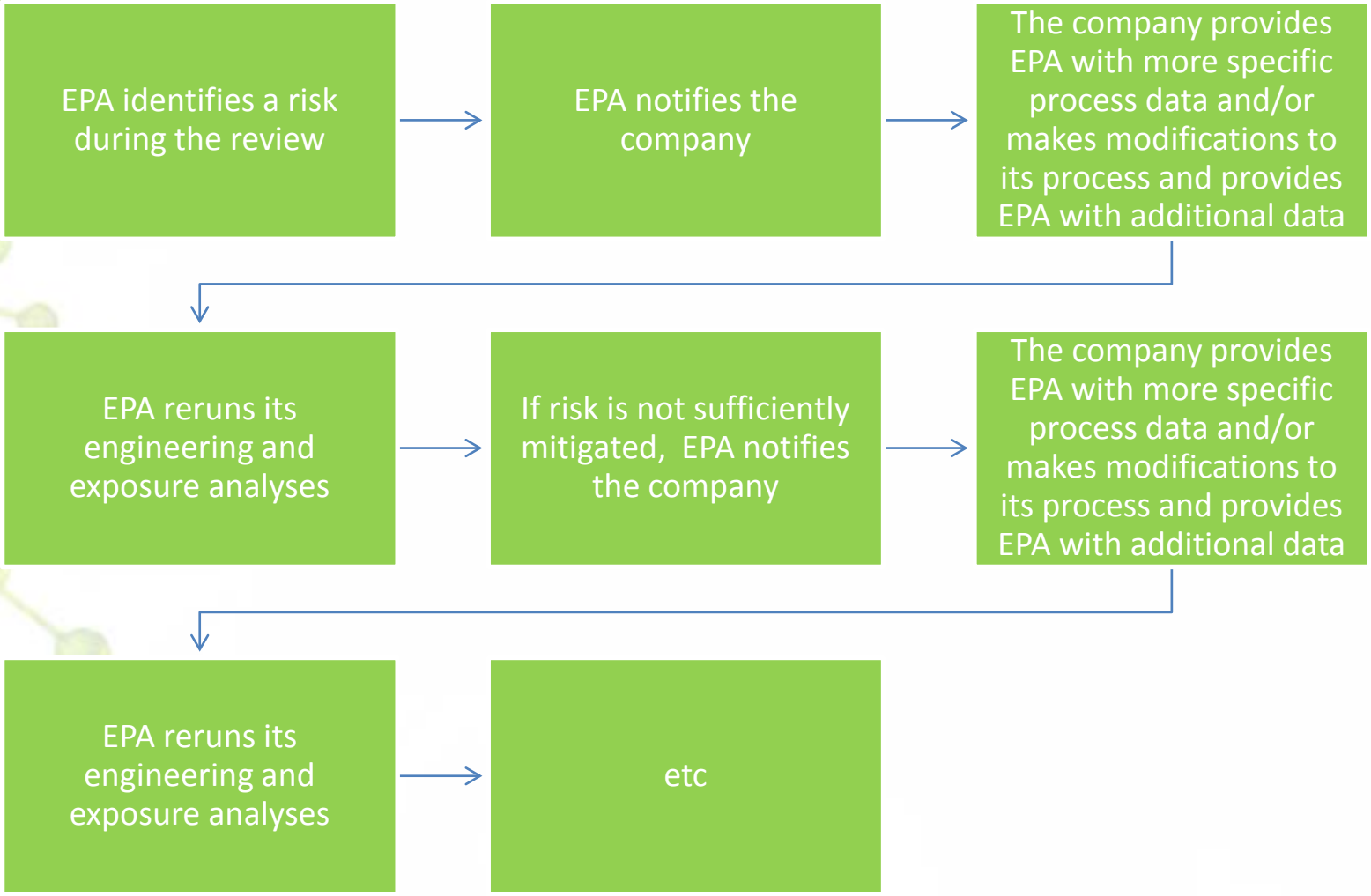
PMN Review Process

- Chemical Review/Search Strategy Meeting (Day 8-12)
- Structure Activity Team (SAT) Meeting (Day 9-13)
  - PMN data, analog data Structure Activity Relationship (SAR) analysis is used to assess hazard and environmental fate
- Development of Exposure/Release Assessments (Day 10-19)
  - Exposure assessment models are used to estimate worker, general population, and consumer exposures using both default scenarios and case-specific adjustments (when provided in the PMN or based on other credible information)
- FOCUS – Initial Risk Management Preliminary Decision Meeting (Day 15-20)
  - Hazard, environmental fate, exposure, conditions of use considered
- Further assessment, if needed (Day 21-85)
  - Short questions, "Standard Review"
- Final risk management decision meeting

PMN Review Process
Factors That Affect the Length of Review

- Identification and mitigation of risk
  - Depending on the chemical substance, after risks are identified, a more detailed assessment may be necessary
  - Even for chemicals that do not undergo a more detailed review, the desire to provide more information to address the estimated risk may require more analysis

PMN Review Process
Factors That Affect the Length of Review



PMN Review Process
Factors That Affect the Length of Review

- Information on downstream use
  - If EPA identifies a risk associated with downstream processing and use, the submitter may wish to gather additional information. EPA would rerun its engineering and exposure assessments
- Information on analogs
  - After a hazard or risk is identified, the submitter may inform EPA of data on an analog. If the analog is an appropriate analog, EPA would reassess the chemical substance
- Submitting this type of additional information with the initial submission would increase the efficiency of the process

PMN Review Process
Action Letters

- For most chemicals other than those that are not likely to present an unreasonable risk, an "Action Letter" will be sent to the submitter
- The Action Letter
  - Identifies the interim determination for the chemical substance
  - Identifies the company's options for the submission
  - For the section 5(e) order option, the Action Letter will identify the tentative provisions of the order including restrictions and testing
  - Provides the company with 30 days to decide on an option and respond to EPA
  - The Action Letter identifies the need for a 60-day suspension so that EPA and the company can negotiate the final terms of the consent order

PMN Review Process
Consent Orders

- One outcome of EPA's review of a PMN for a new chemical substance is the issuance of an order pending development of information under section 5(e) of TSCA.
- Most TSCA section 5(e) orders issued by EPA are Consent Orders that are negotiated with the submitter of the PMN
- Unless a chemical substance that is the subject of a PMN is found “not likely to present an unreasonable risk of injury to health or the environment”, then the chemical substance will be the subject of a section 5(e) order

PMN Review Process
Consent Orders

- A Consent Order typically contains some or all of the following requirements as conditions:
  - Testing for toxicity or environmental fate once a certain production volume or time period is reached
  - Use of worker personal protective equipment
  - New Chemical Exposure Limits (NCELs) for worker protection
  - Hazard communication language
  - Distribution and use restrictions
  - Restrictions on releases to water, air and/or land, and
  - Recordkeeping

PMN Determination: Example 1

- A PMN is submitted for a chemical substance. Manufacture, processing and use described in the PMN will result in worker exposure and releases to water. Other foreseen uses will also result in water releases
- The chemical substance has a production volume of greater than 1 million pounds. There are releases to water of greater than 5,000kg/yr calculated after wastewater treatment
- The chemical substance is toxic to aquatic organisms with an estimated chronic concentration of concern of 10 ppb.
  - There were no data submitted with the PMN on the environmental toxicity of the chemical substance
  - EPA estimated the environmental toxicity using predictive models
  - Without controls, water releases are expected to exceed the concentration of concern for environmental toxicity
- Based on the chemical structure, the chemical substance is expected to be of concern for cationic binding in the lung. There is no data for the chemical and there is not a good analog with a benchmark value.
  - EPA cannot determine whether the exposures to the workers present an unreasonable risk.
  - EPA cannot determine the level of risk management to protect for the risk since EPA cannot determine the risk

PMN Determination: Example 1

- The chemical substance is produced in substantial quantities and enters the environment in substantial quantities
- The chemical substance may present an unreasonable risk to the environment
  - Releases to water result in levels greater than the concentration of concern for ecotoxicity, thus presenting an unreasonable risk
- The information is insufficient to permit a reasoned evaluation of the health effects of the chemical substance
    - EPA cannot determine if exposure to workers may present an unreasonable risk

PMN Determination: Example 1

- EPA would regulate the chemical substance under section 5 with a consent order
  - Testing
    - Testing would be required before commercialization could commence based on the insufficient information
      - 90-day inhalation study with a 60-day hold
      - In the Action Letter, EPA is providing companies with an option to suspend for 6 months while EPA gathers information on cationic binding and other lung effects for which there is concern but no benchmark value
    - Testing due at production volumes identified in the consent order
      - Aquatic toxicity testing
      - Testing based on the chemical substance being produced in substantial quantities and entering the environment in substantial quantities.
  - Restrictions
    - Releases to water will be restricted so that releases do not exceed the concentration of concern for ecotoxicity
    - Depending on the results of either the inhalation study and/or EPA's analysis of the existing data on lung effects, there may be restrictions on worker exposure

PMN Determination: Example 2

- A PMN is submitted for a chemical substance. The PMN chemical substance is made with a reactive moiety which has been shown to cause a variety of adverse effects including respiratory effects. These chemicals may be sensitizers after either inhalation or dermal exposure. Sensitization results from very low exposures
- The PMN substance is made in such a way that there are no "free" reactive moiety in the chemical substance. However, once on the TSCA inventory the chemical substance can be made in a way in which there will be "free" reactive moieties. This use is foreseen given the information on chemicals with this reactive moiety
- Manufacture, processing and use associated with the foreseen uses will result in worker and consumer exposure

PMN Determination: Example 2

- The chemical substance may present an unreasonable risk to health based on foreseen uses
- EPA would regulate the chemical substance under section 5 with a consent order which would include restrictions and would require testing. The chemical substance can be commercialized
  - Restriction
    - There would be a restriction in the consent order of no greater than 0.1% “free” reactive moiety
  - Testing
    - Testing would be required only if the company changes its process to make the chemical substance with “free” moiety. (The consent order would need to be re-negotiated to accommodate the change in process, and thus potential risk)

PMN Determination: Example 2

- If the PMN chemical substance were made resulting in greater than 0.1% “free” reactive moiety after a change in the consent order
  - Testing would be required
  - Personal protective equipment would be required
    - Respirator
    - Gloves

PMN Determination: Example 3

- A PMN is submitted for a chemical substance. Manufacture, processing and use described in the PMN will result in worker exposure and releases to water.
- The chemical substance is to be used as a colorant in industrial paints. Foreseen uses are use in other industrial coatings and consumer paints
- Human Health
  - While no human health data for the chemical substance was provided in the PMN submission, EPA concludes there is low concern for human health hazard for the chemical substance based on comparing it to structurally analogous chemical substances for which there is information on human health hazard.
- Environmental Toxicity
  - There was no data on environmental toxicity provided in the PMN submission. EPA used predictive models to calculate a chronic concentration of concern for environmental toxicity of 15 ppb. Based on the information provided in the PMN, EPA estimated that releases to water result in concentrations of the chemical substance in surface waters exceeding this level of concern. There is a significant risk to the environment
  - During the review process EPA worked with the submitter on process modifications resulting in a large decrease in releases to water of the chemical substance. This decrease eliminates the estimated risk. As long as releases to water are maintained at this level, there will not be an unreasonable risk

PMN Determination: Example 3

- EPA would regulate the chemical substance under section 5 with a consent order. The chemical could be commercialized
  - Restriction
    - The consent order would specify that releases to water must be limited so that the concentration of concern in surface waters would not exceed 15 ppb
  - Testing
    - Testing for aquatic toxicity would be required to be submitted at a specific production volume

PMN Determination: Example 4

- A PMN is submitted for a chemical substance. Manufacture, processing and use described in the PMN will result in worker exposure and releases to water.
- The chemical substance is to be used as a pigment dispersant for the deflocculation of pigments in industrial coatings. The chemical substance can also be used as a paint and coating additive.
- There is low potential for these chemical substances to volatilize into the air and a low potential for these chemicals to migrate into ground water. Removal of the substances in wastewater treatment is likely.

PMN Determination: Example 4

- EPA estimates that the chemical substance is very persistent but has a low potential to bioaccumulate
- EPA concludes there is low concern for human health hazard for the chemical substances.
  - EPA estimated the human health hazard of these chemical substances based on their estimated physical/chemical properties and by comparing them to structurally analogous chemical substances for which there is information on human health hazard.
- Based on predictive models for this type of chemical substance, EPA estimates that the environmental toxicity is low
- EPA did not estimate the exposure because EPA determined that the chemical substances present both low human health hazard and low environmental hazard.
  - Due to low hazard, EPA believes that these chemical substances would be unlikely to present an unreasonable risk even if exposures were high.

Other Considerations for the PMN Review Process

- EPA has been assessing its new chemicals review process to identify areas for improvements
- Focus on improvement in
  - Process
  - Assumptions used in technical reviews
  - Category refinement
  - Assumptions used in risk management
- Changes are being made to address these opportunities