EPA's New PMN Review Process: Are Your Products Impacted?

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Irene Hantman (Moderator)

Irene Hantman is an attorney with Verdant Law. Her practice focuses on the domestic regulation of chemicals and has written extensively on these issues. Ms. Hantman advises clients on the practical implications of final and proposed state and federal legislation and regulations. Her practice also includes enforcement defense.

Current Review Process And Recommendations for Preparing PMNs

Ashish Deshmukh, PhD

Ashish Deshmukh, PhD, Senior Managing Consultant with Ramboll Environment and Health, advises clients on product safety and regulatory compliance issues. He provides strategic and technical advice for managing regulatory risk associated with industrial chemicals, food contact substances, and antimicrobials. His specialized experience includes regulatory approvals for products, and audits under EPA's Audit Policy. He has previously worked in the pesticide industry with responsibilities in product development, regulatory affairs, and general management.

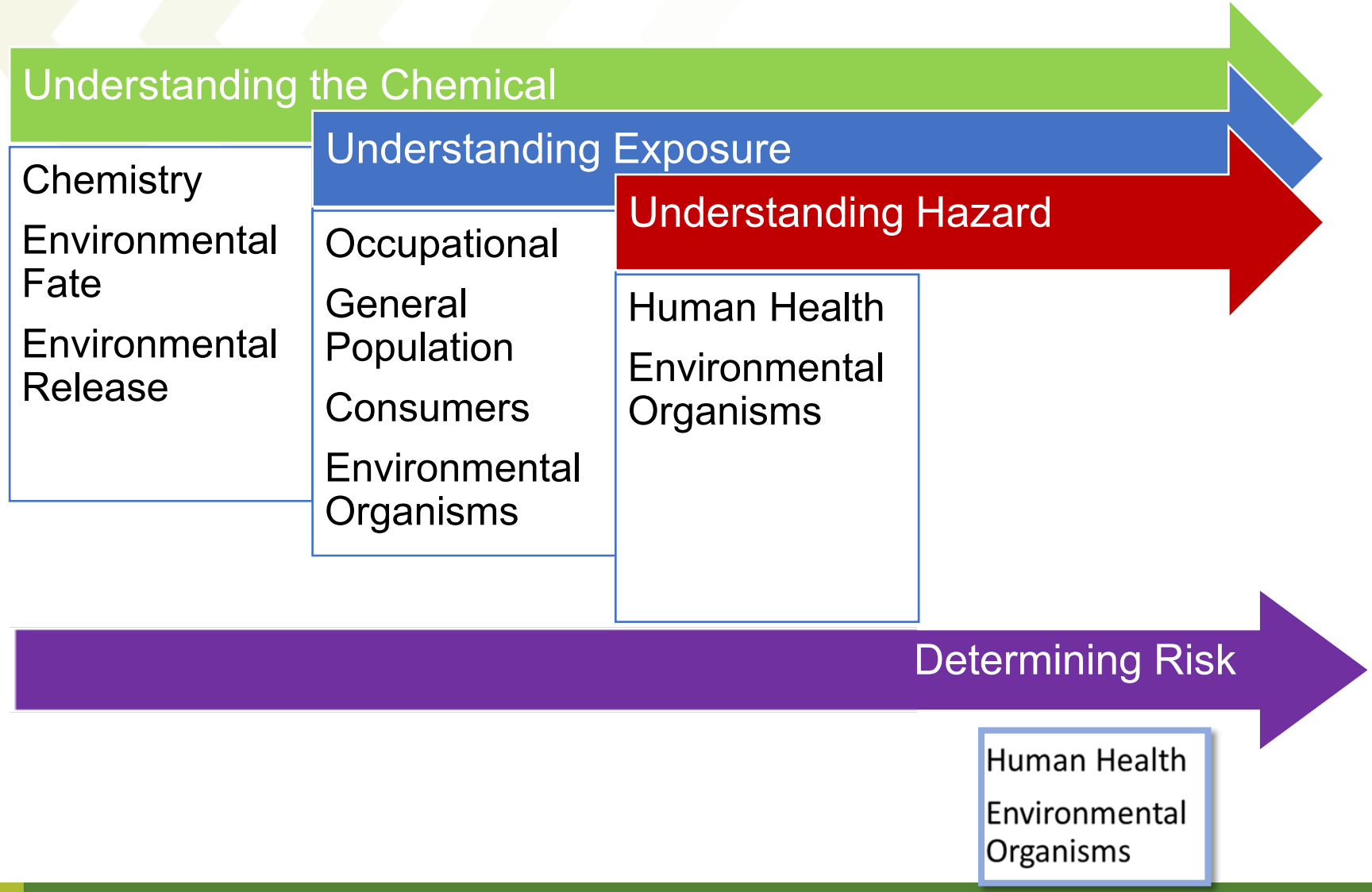
Background

- TSCA section 5 requires that any person planning to manufacture or import a non-exempt new chemical substance (i.e., a chemical not on the TSCA Inventory) must submit a premanufacture notice (PMN) to EPA.
- EPA's 90-day review period for PMNs is to assess the potential risks to human health and the environment of the chemical under the conditions of use.

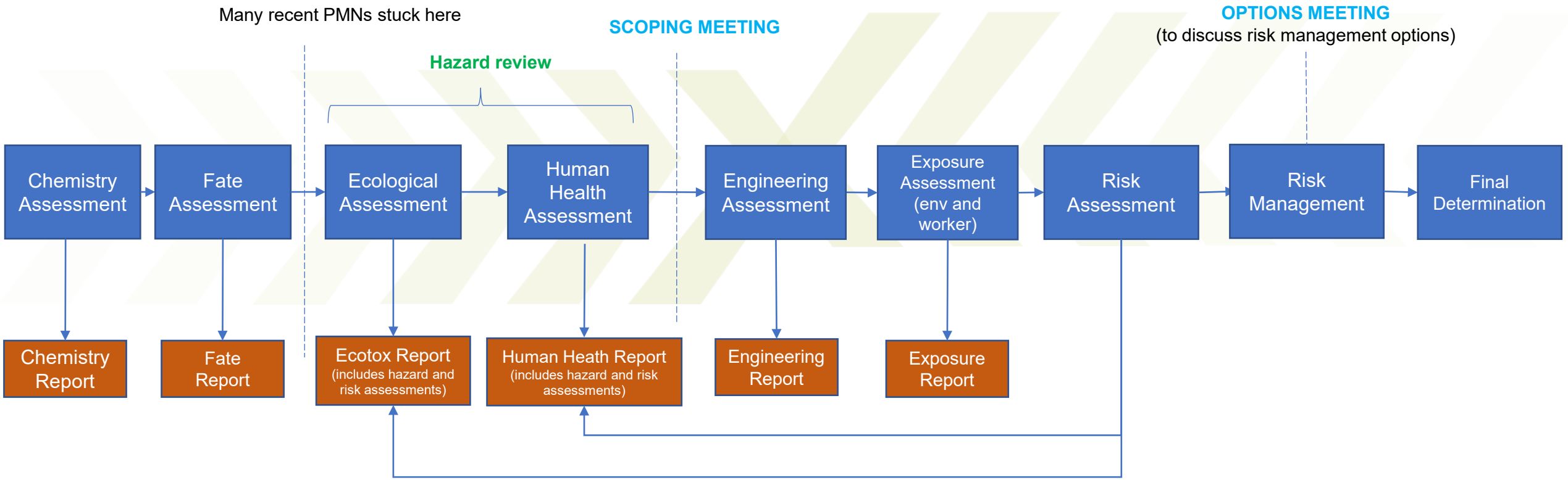
Changes Due to TSCA Reform

- On June 22, 2016, the Lautenberg Chemical Safety Act was signed into law.
- Previously, low hazard, low exposure conditions → no risk assessment
- Now, EPA is required to make an affirmative determination on whether each new chemical substance presents an *unreasonable risk* to human health or the environment under known, intended or reasonably foreseen conditions of use (considering potential exposures and releases).
- Where the chemical substance presents or may present an unreasonable risk, EPA must take action (risk management) to prevent those risks before the chemical can enter commerce, e.g., testing and restrictions.

Risk Assessment Overview



PMN Review Process



PMN Risk Management Overview

Presents an Unreasonable Risk

- Section 5(f) order: Restriction /prohibition of manufacturing, processing, or distribution
- Section 6(a) Proposed Rule: Restriction/ prohibition of manufacturing, processing, distribution, or disposal

Not Likely to present an unreasonable risk

- Determination Documents

Information is insufficient to permit a reasoned evaluation of the risk

- Section 5(e) – regulation pending more information
- Section 5(e) order

Insufficient information to permit a reasoned evaluation and **may present unreasonable risk**

- Determination Documents
- Section 5(e) order

Produced in substantial quantities and may reasonably be anticipated to enter the environment in substantial quantities or there may be significant or substantial human exposure

-Section 5(e) order

Delays in EPA's reviews

- EPA's reviews usually take much longer than 30-90 days.
- Severe delays over the past 2 years
- Several administrative reasons for the delays
- EPA has identified two main reasons for the delays:
  - The provided information is too generic
  - The most critical information is not provided until EPA asks for it, which leads to multiple iterations of the risk evaluation (rework)

Data/Information Hierarchy

- **Tier 1:** Experimentally-derived data/information on the new chemical substance (submitters or primary references)
- **Tier 2:** Experimentally-derived data/information on an analogous chemical substance
- **Tier 3:** Experimentally-derived data/information on the most prevalent and/or most toxic constituents of the new chemical substance
- **Tier 4:** Predicted (*in silico*) data/information on the most prevalent and/or most toxic constituents of the new chemical substance

Predictive models and tools

- EPA uses assessment methods, databases, and predictive tools to evaluate **environmental releases and human exposures**.
- Due to limited empirical hazard and exposure data, **EPA may need to predict over 150 attributes** for a chemical.
- EPA has computerized many of these predictive models and methods used to evaluate chemicals where data are lacking.
  - Physical/chemical properties,
  - Environmental transport and partitioning,
  - Environmental fate,
  - Environmental toxicity,
  - Engineering releases to the environment, and environmental concentrations
  - Human health effects
  - Human exposures

Chemistry

- Evaluate chemical category, if applicable:
  - Boundary conditions, e.g., Molecular weight, log Kow, water solubility
  - Review predicted hazard and fate properties and testing recommendations
- As much structurally descriptive information as possible for chemical substances of unknown or variable compositions, complex reaction products and biological materials (UVCB)
- Develop basic physicochemical properties data – Measured or modeled (EPISuite):
  - Water solubility, vapor pressure, melting point, boiling point, and octanol/water partitioning coefficient, particle size/droplet size distribution, fraction of ionized acid/base/salt
- Recommend a good analog to EPA
  - Preferably provide complete studies
  - Okay to provide robust summaries submitted under REACH

Production Volume and Use

- Maximum 12-month PV to be manufactured (includes both domestic production and import)
- Expected percentage for each category of use
- Specific concentrations (weight fraction) in all consumer applications
- The identities of all sites controlled by the submitter (manufacturing, processing and use sites)
- A process description of each site operation controlled by the submitter with potential release and exposure points
- Processing and use operations at sites not controlled by the submitter

Human health effects

- Determine if chemical (or metabolite or degradate) fits within a TSCA New Chemicals Program Chemical Category
- Available acute and chronic toxicity data (hazards and points of departure)
- Structural alerts (e.g., mutagenicity, oncogenicity, sensitization, and/or reproductive/developmental toxicity
- Available analogue data (AIM, OECD Toolbox)
- Relevant routes of exposure (dermal, inhalation, fish ingestion, drinking water)
- Absorption by relevant exposure routes – If no experimental data, EPA uses data on analogs or physicochemical properties (vapor pressure, water solubility, molecular weight, log K_{OW})

Environmental fate

- Available fate data
- Available analog data
- Model fate parameters (EPISuite)
- **Persistence**
  - **Partitioning processes** based on physicochemical properties (K_{AW}, $K_{OC,}$ K_d, K_{OW})
  - Biotic (aerobic and anaerobic) and abiotic (hydrolysis and photolysis) **degradation pathways**
  - Wastewater **treatment efficiency** based on degradation and partitioning processes
- **Bioaccumulation**
  - Information to address the **bioaccumulation potential** including *in vitro* fish metabolism studies and *in vivo* testing for fish bioconcentration factor (BCF)

Environmental Toxicity

- Determine if chemical (or metabolite or degradate) fits within a TSCA New Chemicals Program Chemical Category
- Available acute and chronic ecotoxicity data
- Available analogue data (AIM, OECD Toolbox)
- Use ECOSAR to estimate toxicity (three ecologically relevant organisms)
  - Refined if measured K_{ow}
- Low aquatic toxicity hazard if
  - log K_{ow} > 8
  - Water solubility < 1 ppb or if POD > 10X water solubility

Exposure and Release Assessments

- Engineering assessment
  - Worker exposures
  - Environmental releases
- General population exposures
- Consumer exposures
- Exposure to non-human receptors

Engineering Assessment

- Importing physicochemical property information into ChemSTEER
  - Mass balance/material flow model
  - PV and four basic physical-chemical properties: vapor pressure, molecular weight, density, and water solubility
- How the new chemical substance is managed from its creation (manufacturing), until it is no longer available for release or exposure in the occupational setting (use).

Occupational Exposure

- Production volume – Third year volume is used in risk evaluation
  - Throughput rate, number of days of production, and number of batches per day
- Provide process flow diagram (PFD) and describe activities leading to worker exposure
- Concentration in each category of manufacturing, processing, and use
  - One of the five possible input values used in the specific mass balance parameters within ChemSTEER
- Identification of any operations or activities that are conducted under non-standard temperatures or pressures
- If used as a solid or powder, measured data on particle size distribution
- Provide details of engineering controls and pollution control equipment
- Required PPE (gloves, goggles, respirator)
- Surrogate monitoring data for structurally similar chemical (analogue) used in a similar setting

Environmental Releases

- Details of equipment and transport container cleaning and frequency
- Amount released in kg/day or kg/batch
- Media of release, e.g., stack air, fugitive air, surface water, landfill, incineration, deep well injection, WWTP, POTW
- Efficiency of treatment and control technology
- Details of disposal practices (e.g., landfill type)
- NPDES (WWTP or POTW) and Clean Air Act Permit information

General Population, Consumer and Environmental Exposures

- Predicted using E-FAST
- Evaluated for PV > 100,000 kg/y regardless of hazard
- General population may be exposed due to releases to air, surface water, or landfills
  - Inhalation of ambient air or ingestion of drinking water or fish
- Consumers may be exposed through the use of household products (Consumer Exposure Module in E-FAST)
- Additional input parameters are gathered from the evaluations on human health hazard/toxicity, environmental fate, and aquatic (environmental) hazard/toxicity

Streamlined Approach for New Biofuels Review

David K. Liu, PhD

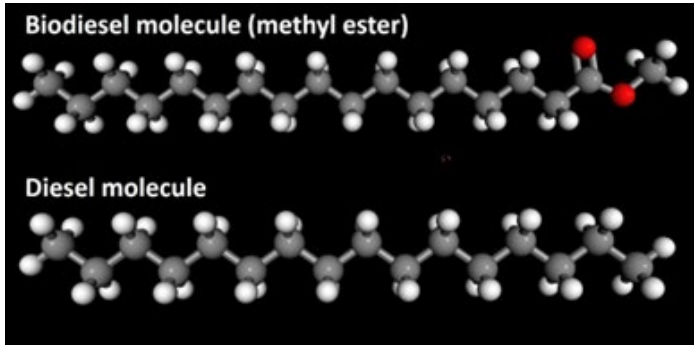
David K. Liu, PhD is a Principal with Ramboll Environment and Health with 30 years of experience in environmental and regulatory chemistry. The main focus of Dr. Liu's practice involves assisting clients with compliance with the Toxic Substances Control Act (TSCA), including conducting compliance and systems audits, building compliance management systems, training, new chemicals and other data submittals, supply chain management, and agency negotiations. Dr. Liu also assists clients with antimicrobial registration, California Proposition 65 compliance, FTC VOC-free paint claims, and litigation related to various product safety issues.

New Chemical Review Process for Biofuels

- What are biofuels?
  - Produced from *biomass sources* through thermal, biological, and chemical processes
  - EPA's Renewable Fuel Standard (RFS) program requires replacement of/reduction in quantity of *petroleum-based* transportation fuel, heating oil, or jet fuel by a certain volume of renewable fuels including:
    - Biomass-based diesel
    - Cellulosic biofuel
    - Advanced biofuel
    - Total renewable fuel
  - California Low Carbon Fuel Standard (LCFS) program

Types of Biofuels

- Biodiesel:
  - Produced by transesterification of fats and oils to form ***fatty acid methyl esters*** (***FAME***)
  - Approved for blending with petroleum diesel



- Renewable diesel:
  - Hydrotreating/isomerization of triglycerides and fatty acids to form ***paraffins (alkanes)*** with various carbon ranges and linear/branched structures
  - Chemically identical to petroleum diesel fuel and does not require blending with petroleum diesel

TSCA Inventory Status of Biofuels

- Companies who *manufacture* or *import* "new chemical substances" must ensure they are listed on the active inventory or exempt under Section 5 of the Toxic Substances Control Act (TSCA)
- EPA Issued Compliance Advisory in December 2020 "affirming that chemical substances used as fuels and fuel additives and distillates made with *either petroleum or renewable sources* are subject to TSCA"

Nomenclature of Biofuels

- Biofuels are unknown or variable composition, complex reaction products, or biological **(UVCB)** substances and may be described using:
  - **Natural Source Descriptors** for chemicals derived from animal or vegetable source; e.g., *fatty acids, soya*
  - Soap and Detergent Manufacturers Association **(SDA)** nomenclature for chemicals derived from natural fats and oils and their synthetic substitutes, e.g., *C10-C16 alkyl dimethyl amine*
  - **Alkyl Ranges using Cx-y Notation,** e.g., *Alkanes, C8-16, branched and linear*
  - **American Petroleum Institute (API) nomenclature** for refinery streams, e.g., *Fuels, diesel: A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C20 and boiling in the range of approximately 163°C to 357°C (325°F to 675°F)*

Renewable Diesel TSCA Listings

Product Name	Chemical Name	CASRN
Green Diesel R100 Renewable Diesel	Fuels, diesel, C9-18-alkane, branched and linear	1159170-26-9
REG 9000 Renewable Diesel	Fuels, diesel, C9-18-alkane, branched and linear	1159170-26-9
	Fatty acids, C14-18 and C16-18-unsatd., Me esters	67762-26-9
	Petroleum fuel oil	68476-30-2
	Diesel Oil C9-20	68334-30-5
NEXBTL Renewable Diesel Neste 100 % NEXBTL-Diesel Neste Green 100 -Diesel	Alkanes, C10-20, branched and linear	928771-01-1
Marathon Petroleum Biodiesel	Biodiesel (Fatty Acid, Methyl Ester)	68937-84-8
	No. 2 Diesel Fuel	68476-34-6
Biodiesel B100	Biodiesel	67784-80-9
No. 2 Diesel Fuel	Fuels, diesel, no. 2	68476-34-6
Diesel Fuel	Diesel Fuel	68476-34-6
Marathon Petroleum No. 2 Ultra Low Sulfur Diesel	No. 2 Diesel Fuel	68476-34-6
	Kerosine (petroleum)	8008-20-6
	Alkanes, C10-C20 branched and linear	928771-01-1

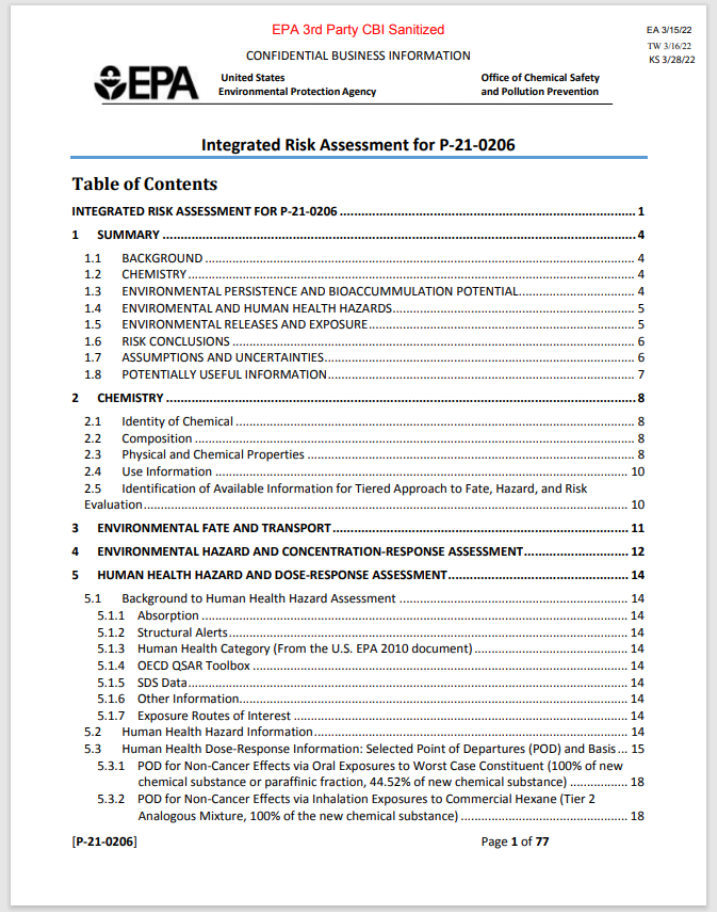
EPA's Integrated Approach for Biofuel PMN Review

- On January 21, 2022, EPA announced new effort under TSCA to enhance and streamline review of new chemicals that could be used to displace higher greenhouse gas-emitting transportation fuels
- New approach implements a robust, consistent and efficient process with several enhancements, including formulation of a dedicated team and development of an integrated risk assessment report
- Helps bring to market substitutes that use biobased or waste-derived feedstocks that are more climate friendly and support goals under EPA's Renewable Fuel Standards Program and 2021 Climate Adaptation Plan
- Currently, there are over 30 bio-based or waste-derived PMNs pending EPA review, and several have been completed under the new approach

Biofuel PMN Risk Assessment

- Ensures biofuel is chemically well characterized
- Refines engineering and hazard assessments
- Combines discipline-specific reports (e.g., chemistry, fate, hazard) into a single risk assessment document
- Provides a checklist of critical data to assist submitters in understanding the type of information that is useful to EPA when conducting risk assessment

Integrated Risk Assessment Report



EPA 3rd Party CBI Sanitized

EA 3/15/22
TW 3/16/22
KS 3/28/22

CONFIDENTIAL BUSINESS INFORMATION

EPA United States Environmental Protection Agency — Office of Chemical Safety and Pollution Prevention

Integrated Risk Assessment for P-21-0206

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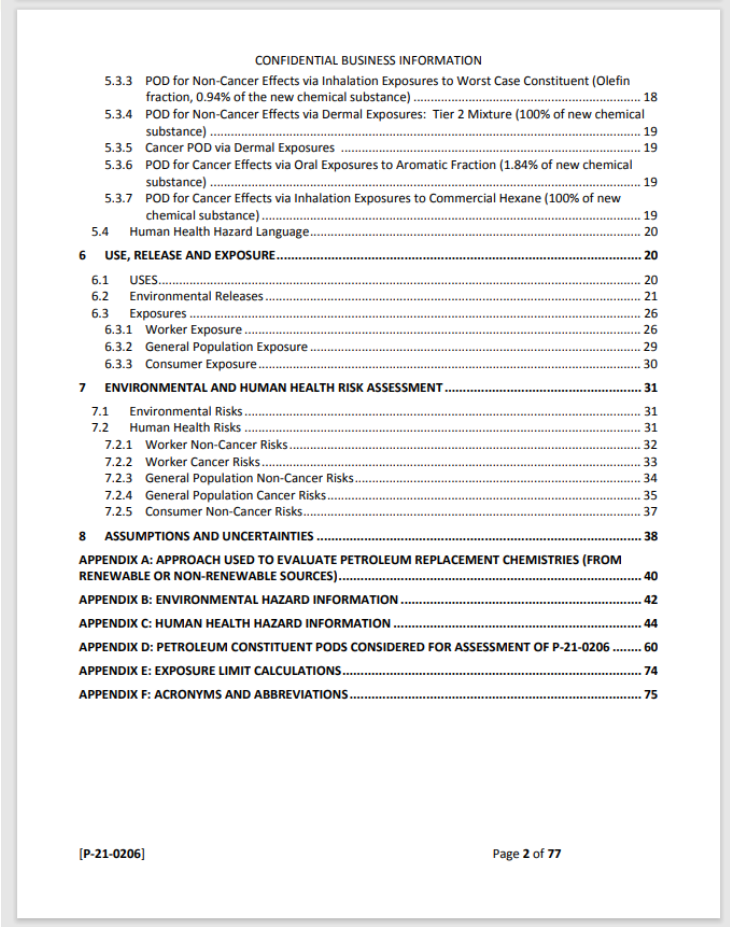

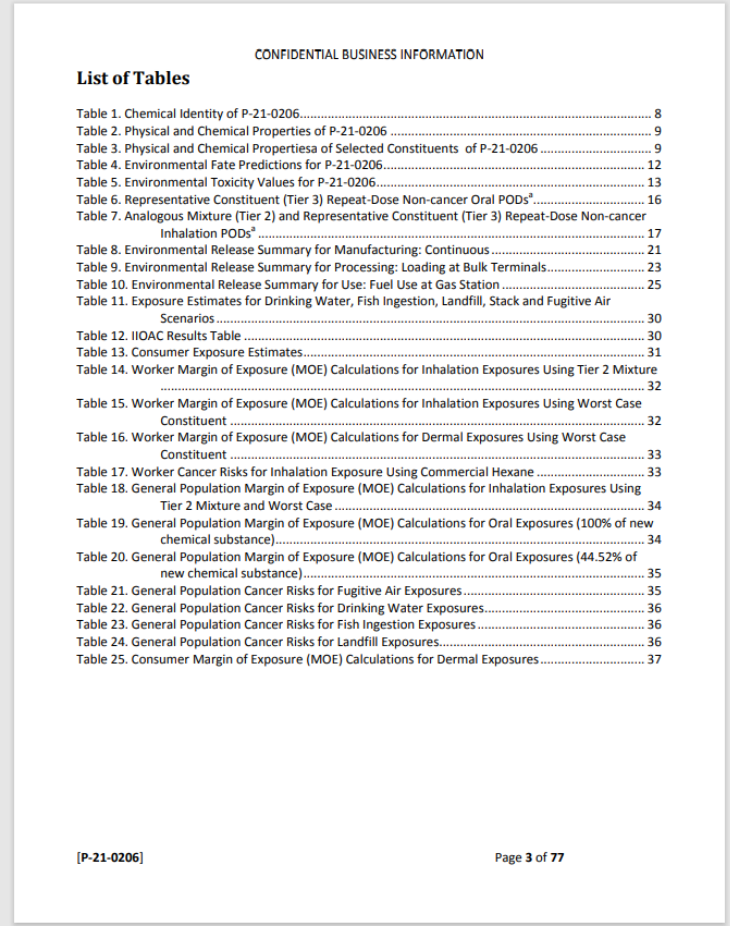

List of Tables

PMN Risk Management

- Risk management actions likely be similar given EPA's knowledge of these substitutes, and the conditions of use (i.e., blended into gasoline or diesel)
- Potential risk management includes a: "May present unreasonable risk…" determination and TSCA Section 5 consent order (CO) and significant new use rule (SNUR) with conditions familiar to industry under other EPA and OSHA regulations

PMN Risk Management Outcomes

- Recently issued biofuels order:
  - Finding: “May present an unreasonable risk…” determination
  - Regulatory outcome: Section 5 CO and follow-up SNUR will be issued
- Example Consent Order conditions:
  - Use only as a fuel or other use identified in PMN
  - If potential exposure of benzene, toluene, ethylbenzene, and xylenes (BTEX) exists, order will reference following OSHA requirements for monitoring and meeting those exposure limits
  - Order will reference complying with other applicable EPA and OSHA regulations for handling, storing, and disposal of products
  - If biofuel is imported, order will limit use to import as a fuel

Changes Coming to the New Chemicals Review Process

Phillip Moffat

Philip Moffat is the founder of Verdant Law. He is an attorney located in Washington, D.C. with a practice that focuses on the environmental regulation of products, including green marketing.

Update PMN Regulations

Proposed rule expected February 2023 (initially expected September 2022)

- Purpose: update procedural regulations to conform with the Lautenberg amendments

  (e.g., EPA now required to make affirmative determination on whether new chemical substance presents an unreasonable risk to human health or the environment under known, intended or reasonably foreseen conditions of use)
- Goals:
  - Align processes and procedures with the new statutory requirements
  - Increase the quality of information initially submitted in new chemicals notices
  - Improve the Agency's processes to reduce unnecessary rework in the risk assessment and, ultimately, the length of time that new chemicals are under review
- EPA is actively working on the rule which will …
  - Align regulations with *Points to Consider When Preparing a TSCA New Chemical Notification*
  - Provide guidance for what information should be included with PMN
  - Process for conducting risk assessments will not change

Update PMN Regulations

PART 720 - PREMANUFACTURE NOTIFICATION

Subpart A - General Provisions

Subpart C - Notice Form

Subpart D - Disposition of Notices

Subpart E - Confidentiality and Public Access to Information

Chemicals Used in Electric Vehicles, Semiconductor, Clean Energy Sectors

- On October 5th, 2022, EPA announced an effort to implement a streamlined and efficient process for risk evaluations on chemicals used in electric vehicles, semiconductor, and clean energy sectors
- The new process is for mixed metal oxides (MMOs), including new and modified cathode active materials (CAMs)
- Important for energy security of the country

New Chemical Reviews to Discontinue Use of Exposure Modeling Threshold

- Announced August 22, 2022
- Effective “as soon as feasible”
- Exposure Modeling Threshold Policy implemented in mid-1990s
  - At that time, Program believed that when chemicals were released in relatively small amounts to air or from landfills, that the risks posed by such releases would be small and would not likely be unreasonable – exposure release thresholds intended to limit use of resources to quantify associated risks
  - Now much less burdensome to complete these calculations
- Completing the modeling for all potential exposures (rather than only those above an established threshold) that may result from air releases (fugitive and stack from industrial/commercial sites) and releases to groundwater from landfills will allow for a more fulsome understanding of the potential risks to these to overburdened and vulnerable communities
  - “More comprehensive accounting of all potential air and water releases will help ensure any needed protections are in place before a new chemical can come to market”
- Implementing this change will involve minimal changes to the coding of the New Chemical Review application
- Agency anticipates that the change will have minimal impact on the amount of time needed to complete new chemical reviews

Effort to “Increase Transparency and Reduce ‘Rework’ in New Chemicals Program”

- Stakeholder Outreach
- Launched June 2022 (webinar July 27, 2022; future webinars planned)
- Discussion on
  - How Agency evaluates data in new chemical submissions under TSCA Section 5
  - Common issues that require EPA to reconduct new chemical assessments (“rework”), including submission of certain types of additional information after EPA has begun a risk assessment
    - Information on planned engineering controls, environmental release media and waste disposal methods, batch parameters (such as days of operation and mass of chemical produced), and planned production volume, as well as information on sites not under submitter control (such as downstream customer sites).

Modernizing the Process and Bringing Innovative Science to Evaluate New Chemicals Under TSCA

- https://www.regulations.gov/document/EPA-HQ-OPPT-2022-0218-0004
- Draft March 2022
- Effort to modernize and innovate the review of new chemical substances
- Multi-year research plan
- In collaboration with the Agency's Office of Research and Developing and other federal organizations, such as NIH's National Toxicology Program.
- Focuses areas:
  - Update and Refine Chemical Categories
  - Develop and Expand Databases Containing TSCA Chemical Information
  - Develop and Refine QSAR and Predictive Models for Physical-Chemical Properties, Environmental Fate/Transport, Hazard, Exposure, and Toxicokinetics.
  - Explore Ways to Integrate and Apply NAMs in New Chemical Assessments.
  - Develop a TSCA New Chemicals Decision Support Tool to Modernize the Process.

Conclusions

- Submitters can minimize delays in EPA's reviews of their PMNs/LVEs/SNUNs by developing and providing critical information required for EPA's risk assessment
- EPA is prioritizing and streamlining reviews of substances in certain chemical categories based on their importance to US national interest, e.g., climate change (biofuels), energy independence (MMOs, CAMs), and national security (aerospace and defense industry)
- EPA plans to release the new chemicals procedural regulations by February 2023

Questions?

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