

Greener Chemical Products and Processes Standard (NSF/GCI 355)

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The Standard does not get the ANSI designation until it completes the ANSI balloting process. Currently the designation is NSF/GCI 355.

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Outline

- **Why a Chemical Hazard Information & Chemical Process Information Standard?**
- **Current status of NSF/GCI 355**
- **Review status, schedule, & next steps**
- **Participate in the process**

Purpose of NSF / GCI 355

- **Provide the chemical enterprise with a voluntary and standardized way to define and report on:**
 - A chemical product's hazard profile
 - A chemical manufacturing process's impact
- **Clearly, consistently and transparently communicate this information to customers throughout the supply chain.**
- **Assist customers in evaluating the relative greenness of a chemical product and process over its life cycle.**
- **This standard was informed by:**
 - Green chemistry principles
 - Green engineering principles
 - ISO 14000
 - Global reporting initiatives
 - Many other existing programs

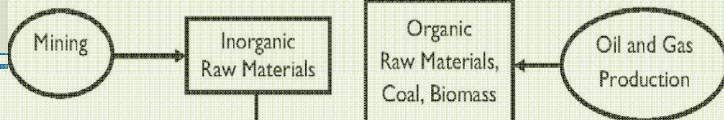


Drivers

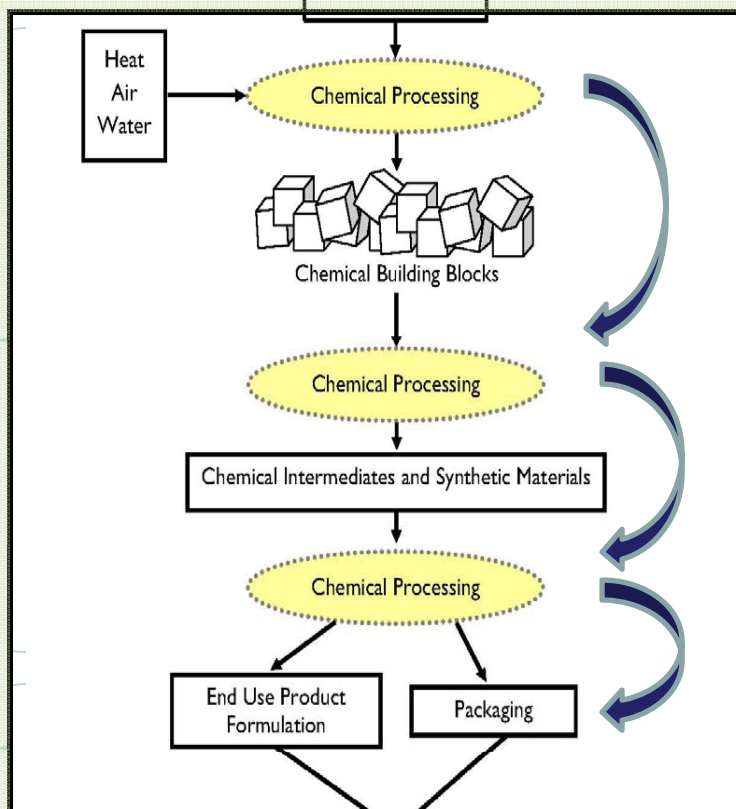
- **Manufacturers of chemicals**
 - Develop one report to satisfy many requests
 - Form a normalized framework for business to business communication
- **Users of chemicals**
 - Receive a standardized set of information about chemical product and process
 - Use this information as a foundation for informed decision-making

Focus for the ACS standard

A. Extraction

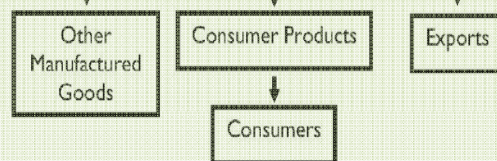


B. Molecular Transformation

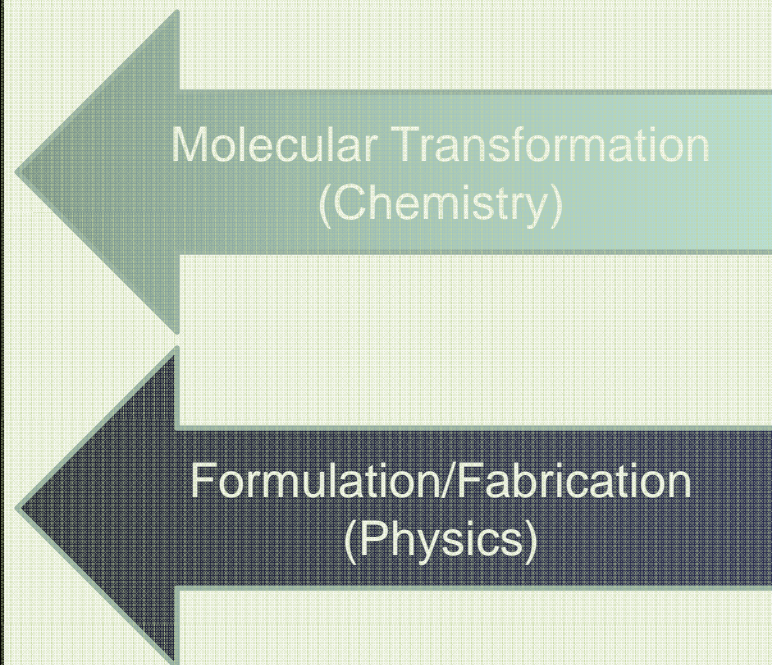


C. Downstream Fabricators & Formulators

D. Consumer Chain



E. End of Life



Overview of Standard

Chemical Characteristic

S

- Human Health Effects
- Ecological Effects
- Physical Properties

Not included

- Product performance
- Cost

Process Attributes

- Material chemical efficiency & waste prevention
- Water
- Energy

Corporate Attributes

- Social Responsibility
- Chemical Process Safety Record

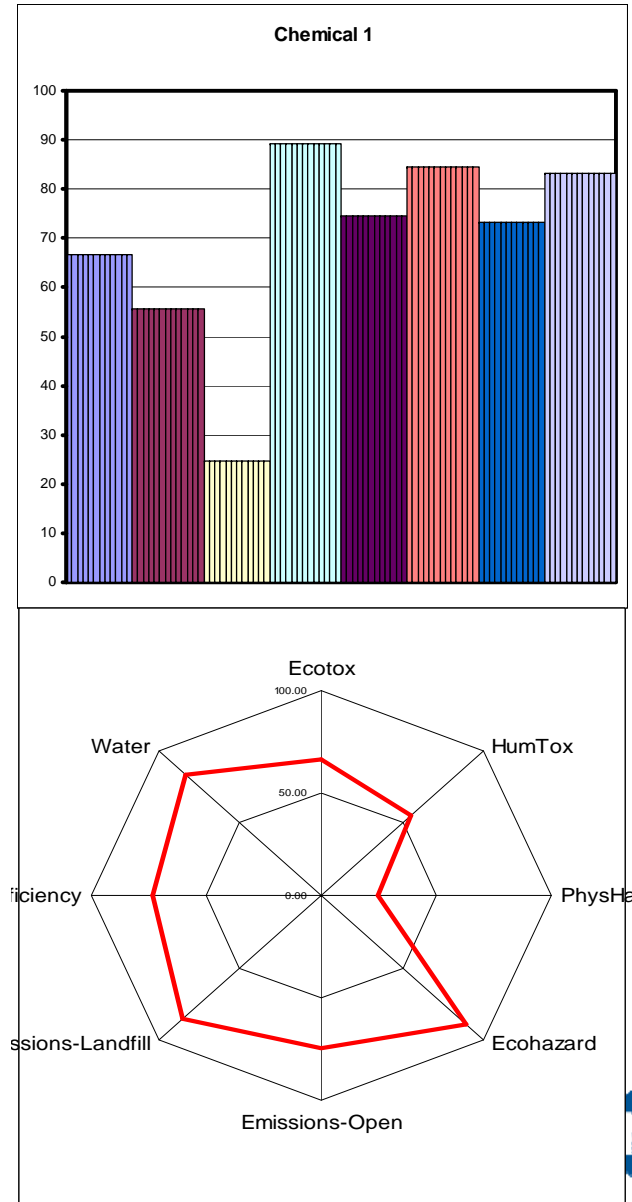
Building on Existing Programs

- **Chemical Characteristics:**
 - Build upon existing measurements/tests commonly reported in GHS, HPV, SIDS, transportation, etc.
- **Process Attributes:**
 - Use modified version of Process Mass Intensity
 - Use industry accepted methods of reporting energy and water use
 - Allow flexibility to report hazardous waste as defined by each country.
- **Corporate Attributes:**
 - Use metrics in Responsible Care®, ChemSteward, CCPS, Global Reporting Initiative and others

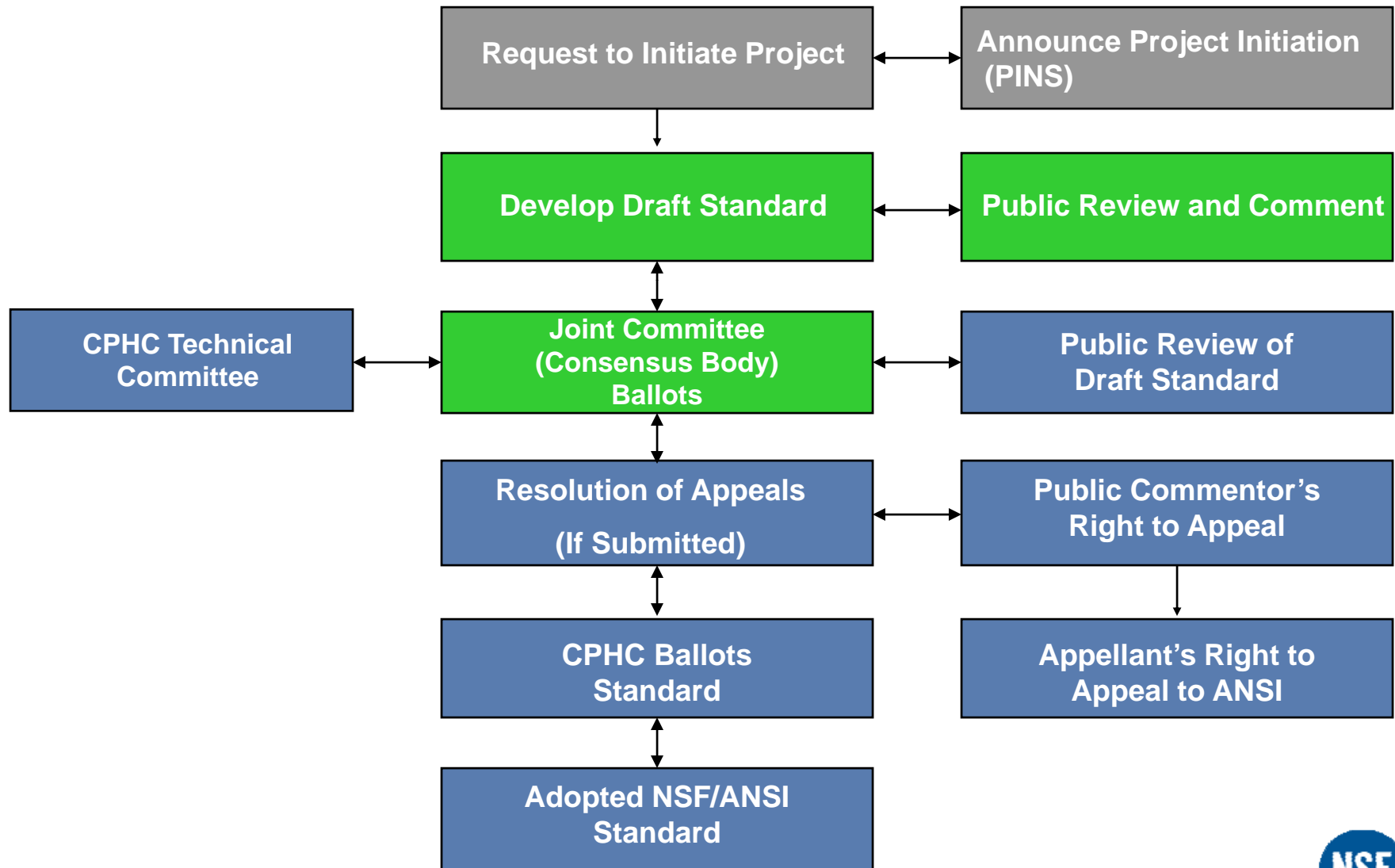


Reporting Formats: TBD

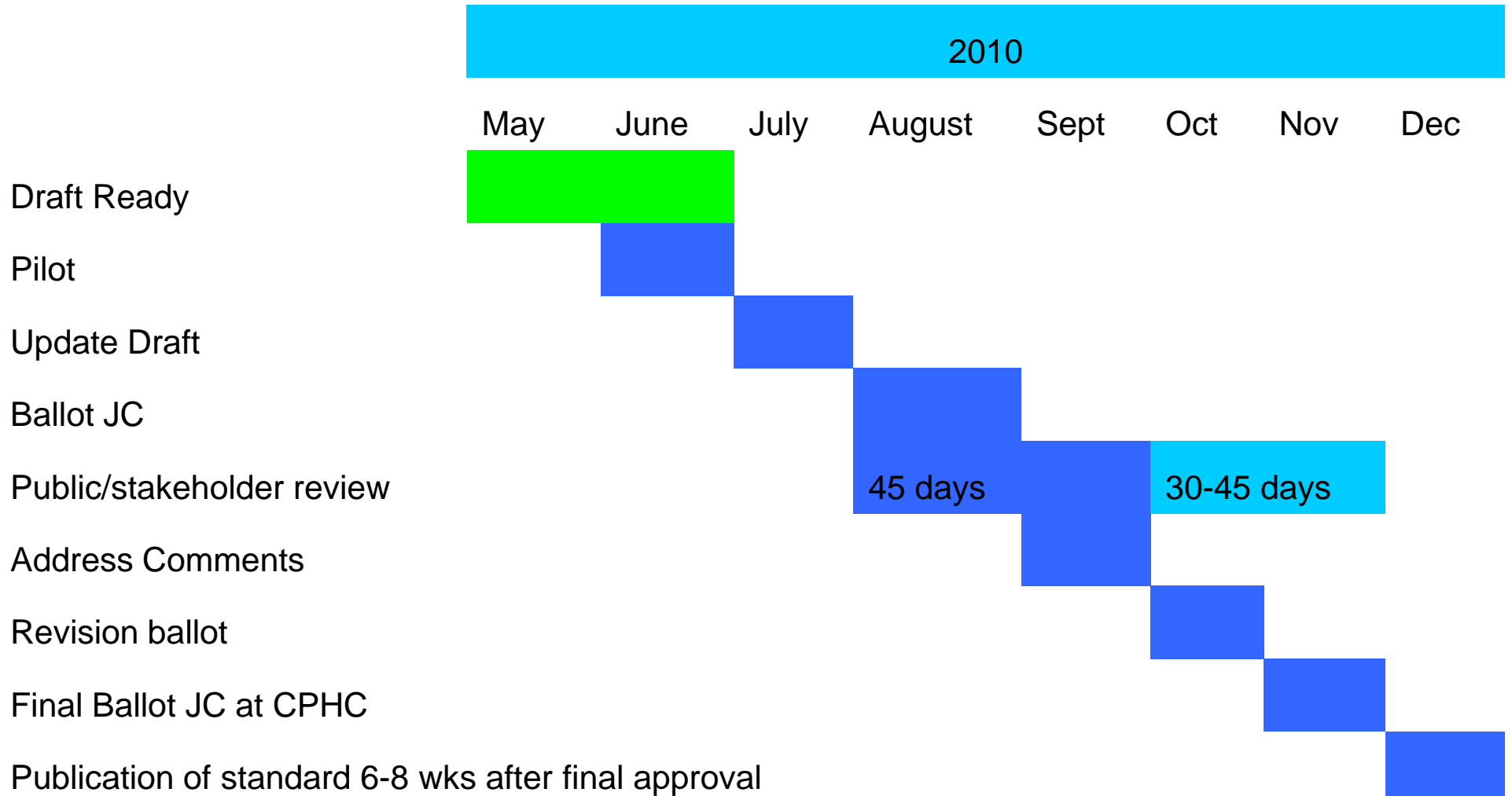
- **Goals**
 - Standardized – easy to compare to make better choices
 - Simple
 - Flexible
 - Transparent
- **Possible formats**
 - Nutrition label
 - Spider Diagram
 - Bar charts



The NSF Standards Process



Next Steps



Your Role

You can help shape this standard every step of the way!

- **Check out the latest Draft of the Standard:**
 - http://standards.nsf.org/apps/group_public/workgroup.php?wg_abbrev=greener_chemical_prod_and_proc
- **Participate in Committee meetings!**
 - Contact Mindy Costello: MCostello@nsf.org, 734-827-6819
- **Participate in Pilot**
 - Contact Mindy Costello: MCostello@nsf.org, 734-827-6819
- **Review Draft & Provide Comments before & during public comment period.**
 - Sign up for email updates at <http://standards.nsf.org>

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I can give you the link to the public area of our website where all the teleconferences are listed.

I would provide my contact information instead of saying NSF...if that is ok.

I can give you the public comment link as soon as it goes to ballot.

mcostello, 3/23/2010

Current “Reporting” format for 355: Chemical Characteristics

- **Human Health**
 - Acute inhalation
 - Acute dermal
 - Acute Oral
 - Skin/Eye Irritation & Corrosion
 - Skin/Respiratory Sensitization
 - Subchronic toxicity: 28d or 90d
 - Reproductive effects
 - Developmental effects
 - Neurotoxicity
 - Mutagenicity
 - Carcinogenicity
- **Ecological Effects**
 - Persistence
 - Biodegradation
 - Photolysis
 - Hydrolysis
 - Partitioning factors
 - Air
 - Soil
 - Water
 - Bioaccumulation
 - Acute aquatic toxicity
 - Fish
 - Daphnia
 - Algae
 - Chronic Ecological Toxicity


Chemical Characteristics 2

- **P-Chem Properties**

- ODP
- Photochemical Smog Potential
- Acidification Potential
- Eutrophication Potential
- ThOD/COD
- Groundwater mobility factor
- Flashpoint
- Boiling Point
- Explosivity
- Corrosive to metal
- Oxidizer
- Water reactive
- Radio active
- Threshold Odor Concentration
- Odor index

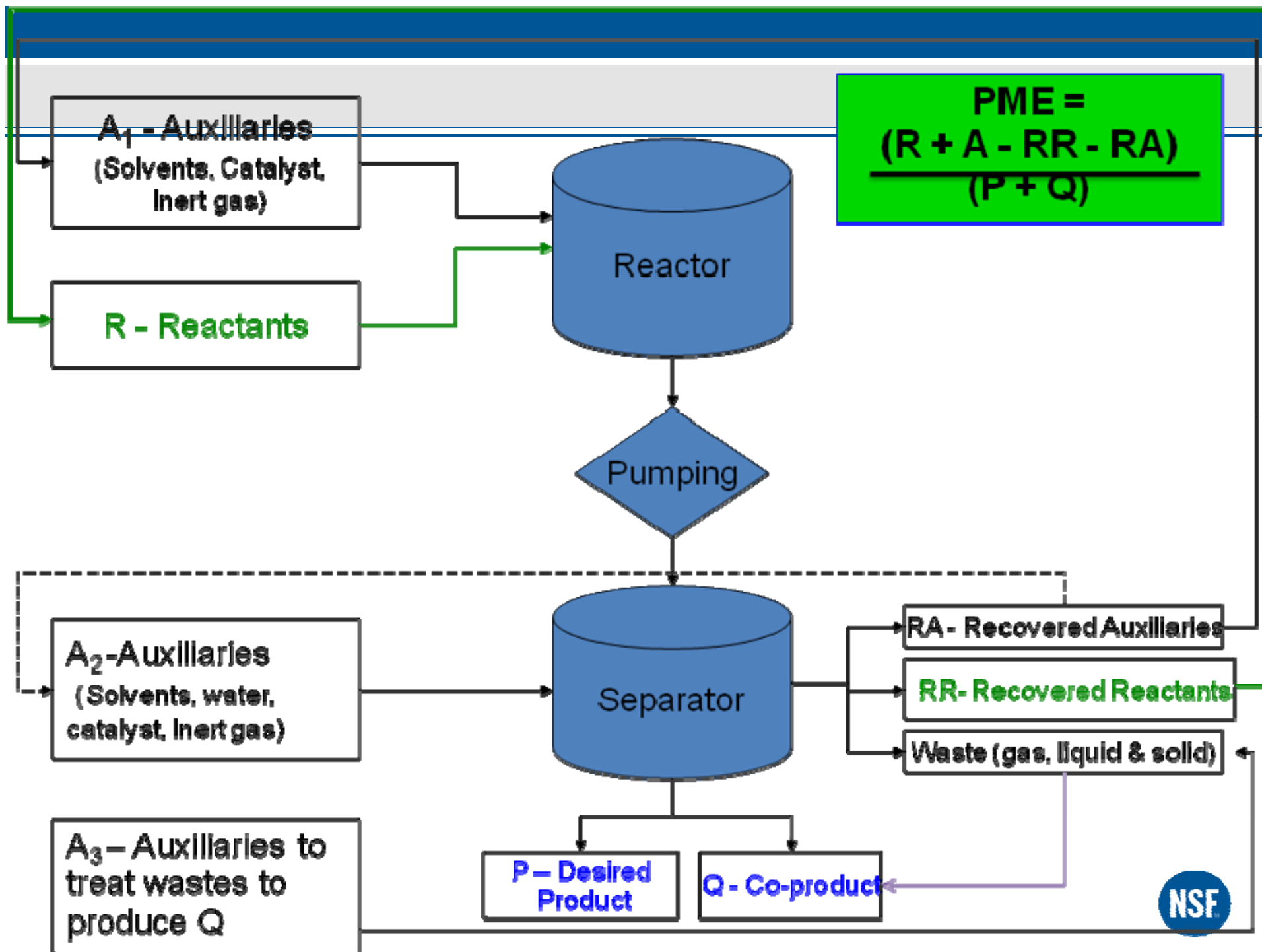
Tier II

- Endocrine Disruption

Duration & Pathway	Parameters	Report Value	Interpretation Guidance (Classification Criteria, if available)
Human Health Effects			
	Report at least one of the following parameters. If information is available for other parameters, it should be reported.		
Acute Inhalation	•Immediately Dangerous to Life and Health (IDLH)	•Report revised NIOSH IDLH in appropriate units (ppm, mg/m ³ , etc.)	NIOSH http://www.cdc.gov/niosh/idlh/insertid4.html
	•TLV/Short-term Exposure Limit (STEL)	•Report in appropriate units (ppm, mg/m ³ , etc.) per time for short term exposure	ACGIH
	•Inhalation, Lethal Concentration (LC ₅₀) or acute inhalation toxicity estimate (LD ₅₀ /LC ₅₀)	•For gases: ppmV; classified as GHS category X [insert] •For vapor, dust, or mist: mg/l; classified as GHS category X [insert] •Not classified •Not relevant route of exposure •No data	GHS 3.1.2
	Report information for the relevant route(s) of exposure. [If available, provide information on other routes of exposure.]:		
Acute Dermal	•Dermal, Lethal Dose (LD50) or dermal acute toxicity estimate (LD50/LC50)	•mg/kg bodyweight; classified as GHS category X [insert] •Not classified •Not relevant route of exposure •No data	GHS 3.1.2
	•Dermal (Skin) Irritation	•Yes, corrosive, GHS category X (insert 1 or 2) •Yes, skin irritant, GHS category X (insert 2 or 3) •Not classified as corrosive or irritant •Not a relevant route of exposure •No data	GHS 3.2.2
	•Eye Irritation	•Yes, serious/severe eye damage, GHS category 1 •Yes, eye irritant, GHS category 2 •Not classified •Not a relevant route of exposure •No data	GHS 3.3.2
	Report information for the relevant route(s) of exposure. [If available, provide information on other routes of exposure.]:		
			

Current Reporting format for 355: Chemical Processes

- Water:
 - Use of freshwater
 - Water discharge (incl. treated & untreated process water)
 - Impact adjusted water use per quantity production
 - Water discharge quality
- Material efficiency & waste
 - Process mass efficiency (PME) = $\frac{M_{\text{input}}}{M_{\text{P+Q}}}$
 -
 - Waste:
 - Some waste is classified as hazardous or dangerous by applicable regulations (y/n)
 - Is any waste recovered for use as fuel? (y/n)
 - Inputs:
 - Do you take any steps to reduce virgin input of chemicals? (y/n)



Current “Reporting” format for 355: Chemical Processes (2)

- Process Safety:
 - Your company participates in voluntary industry performance std? (y/n)
 - Your company tracks & makes available to the customer Process safety event rates? (y/n)
 - Your company has a policy for improving process safety? (y/n)
 - Your facility has a program to manage and minimize risk for this product’s process. (y/n)

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The other thing I think reporting at the product level will do is create new ways to do so without releasing CBI for the next version of the Standard.

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Current “Reporting” format for 355: Chemical Processes (3)

- Energy:
 - Process Energy Efficiency =
 - $PEE = (eR + eTD - eRR) / (P + Q)$
 - eR = energy inputs used into the process, excluding the energy bound up in the product or co-product. eR is represented as either BTU, MJ, carbon dioxide equivalents, or some energy unit per time, *i.e.*, year, consistently applied in the equation.
 - eTD = energy used for treatment/disposal associated with waste handling from this product’s process.
 - eRR = recovered/recycled energy used in this process. This includes co-generated energy or recovered and/or recycled energy generated within or external to this process.
 - P = Mass of the product
 - Q = Mass of co-product(s)
 - Company or facility has a procedure for measuring CO2 eqs (data and narrative)
 - This facility uses renewable, recycled, co-generation, nuclear, or other electricity sources or purchased CO2 offsets. (Narrative)

- **Social Responsibility (Corporate):**
 - Human Rights
 - Freedom of association and collective bargaining
 - Child labor
 - Forced and compulsory labor
 - Non-discrimination
 - Society Performance Indicators
 - Corruption
 - Compliance