Report on the National Pollution Prevention and Toxics Advisory Committee (NPPTAC): The HPV Data Screening Process

Characterizing Chemical in Commerce:
Using Data on High Production Volume (HPV) Chemicals
December 12, 2006

L. Twerdok, Ph.D, DABT
NPPTAC Member

HPV Data Screening Process

Purpose of Presentation

- NPPTAC Mission & Background
- Present the screening process and screening criteria
- Present process validation results screening 53 HPV chemicals

HPV Data Screening Process

NPPTAC Mission

- Provide advice & recommendations on overall policy and operations of EPA OPPT
  - Risk Management: HPV, VCCEP, RTK programs
  - Risk Communication: public RTK
  - Pollution Prevention: PBTs, Green Chemistry, DfE
  - Coordination of TSCA & P2 among EPA; Federal, State, Tribal, local gov’ts; NGO

HPV Data Screening Process

NPPTAC Background

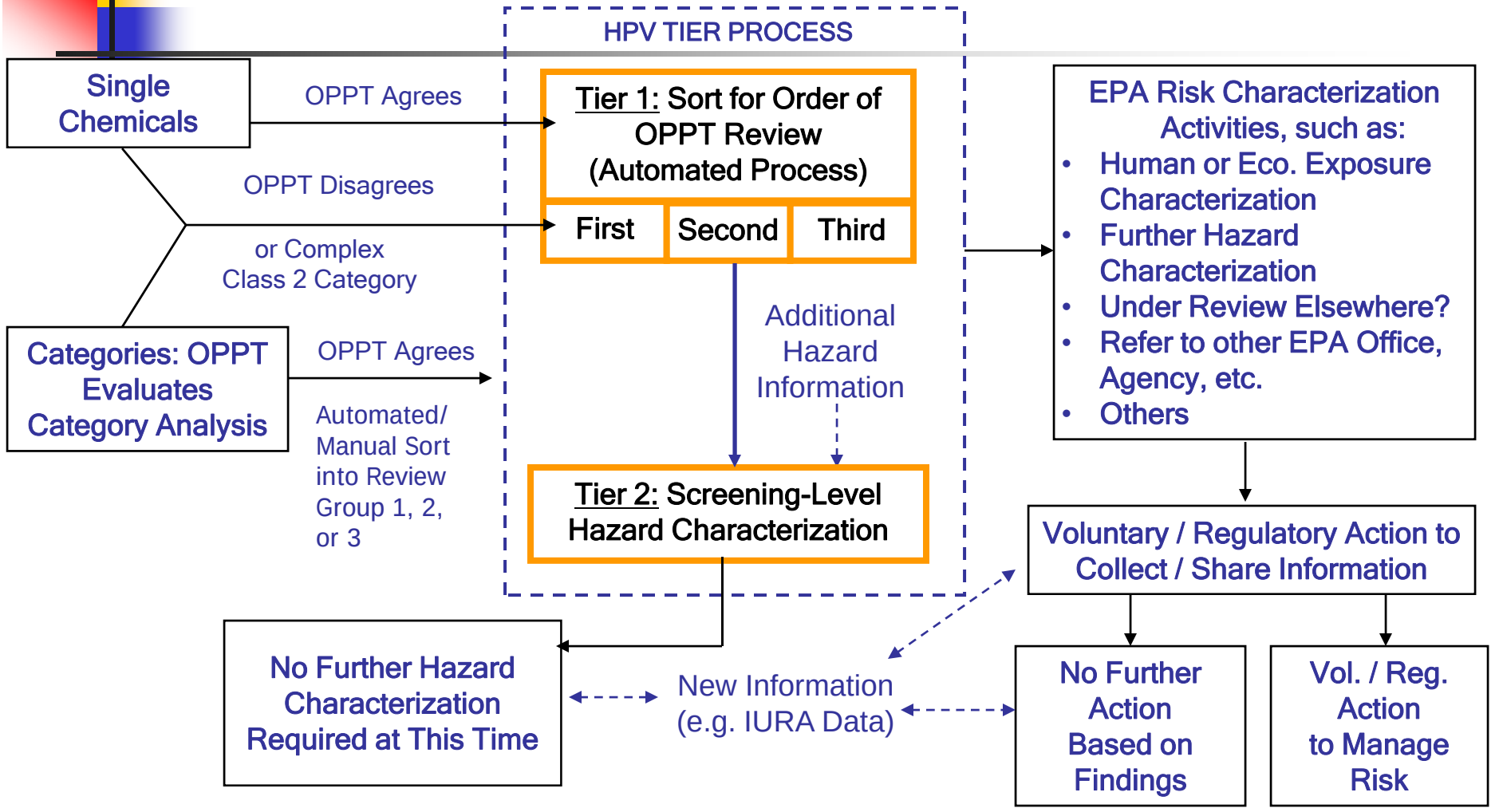
- NPPTAC formed under the Federal Advisory Committee Act
  - Chartered September, 2002
  - Multi-stakeholder representation
    - Academia/research
    - Industry
    - Non-governmental organizations
    - States
    - Tribes
  - OPPT & Federal Technical Advisors

HPV Data Screening Process

Screening Process Goals

- Issue
  - Data submissions on ~1,400 chemicals in U.S. HPV Challenge Program
- Requirements
  - Management tool to logically arrange review order of HPV submissions
  - Establish a review process for determining hazard potential based on data in HPV submissions
  - Conservative screening process

HPV Data Screening Process Flow



HPV Data Screening Process

Tier I Screening Criteria: Overview

- Screening uses a subset of HPV required health and environmental hazard endpoints (SIDS*)
  - → common starting point
  - → partially automated process
- Utilize much of OECD's GHS** criteria
- Tested with actual HPV data

* Screening Information Data Set

** Globally Harmonized System for Classification & Labeling of Hazardous Substances

HPV Data Screening Process

Tier I Screening Criteria: Application

- Chemicals sorted into first, second, or third group for OPPT review
- Chemicals assigned preliminary review group based on:
  - human health effects data
  - environmental effects data
- Highest preliminary review group is assigned as the final review group
- Now, walk through criteria

HPV Data Screening Process

Health Effects

- Primary endpoint → Repeat Dose Toxicity
- Repeat dose results modified by
  - Genetic toxicity (gene and chromosome)
  - Reproductive toxicity
  - Developmental toxicity
  - Positive results for any one will move up one or more review groups, e.g.
    - Third → Second
    - Third → First

HPV Data Screening Process

Health Effects

Primary Endpoint → Repeat Dose Toxicity

ROUTE OF EXPOSURE	UNITS	First Group	Second Group
Oral (rat)	mg / kg body weight/ day	≤10	10-100
Dermal(rat or rabbit)	mg / kg body weight/ day	≤ 20	20-200
Inhalation (rat) gas	ppm / 6h / day	≤ 50	50-250
Inhalation (rat) vapour	mg / litre / 6h /day	≤ 0.2	0.2-1.0
Inhalation (rat) dust/mist/fume	mg / litre / 6h / day	≤ 0.02	0.02-0.2

- Criteria applied to LOAEL (if only NOAEL provided, use NOAEL)
- Chemicals that do not meet first or second group criteria → third
- Criteria above for 90-day studies (tripled for 28-day studies)

LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level

HPV Data Screening Process

Environmental Effects

- Primary Endpoints → Toxicity to fish, aquatic invertebrate (Daphnia), and algae
- Rank based on GHS criteria for LC_{50} or EC_{50} :
  - First group < 1 mg/L
  - Second group 1 – 10 mg/L
  - Third group > 10 mg/L
- Final environmental group = highest received among the three endpoints
- At OPPT's discretion, environmental fate may further modify ranking
  - Log K_{ow} (octanol/water partition coefficient)
  - Biodegradation

LC_{50} or EC_{50} → median lethal (L) concentration or effective (E) concentration for 50% of the test population

HPV Data Screening Process

Examples of Using Screening Criteria

	Human Health		Ecotox	Exceeds Env. Fate Criteria?	FINAL
Submission No.	Repeat Dose	Final Health Effects			
8	2nd	1st	1st	No	1st
10	3rd	3rd	3rd	Both	1st or 2nd
18	3rd	3rd	3rd	No	3rd
39	2nd	3rd	3rd	Fail Biodeg.	1st
305	3rd	2nd	2nd	No	2nd

HPV Data Screening Process

Validation Based on 53 HPV Submissions

First Group	29 (55%)
Second Group	9 (17%)
First or Second Group	4 (8%)
Third Group	6 (11%)
Unable to Classify*	5 (9%)

*Unable to Classify because testing has been proposed, data are missing, or EPA and sponsor disagree about data

HPV Data Screening Process

Tier II: Purpose

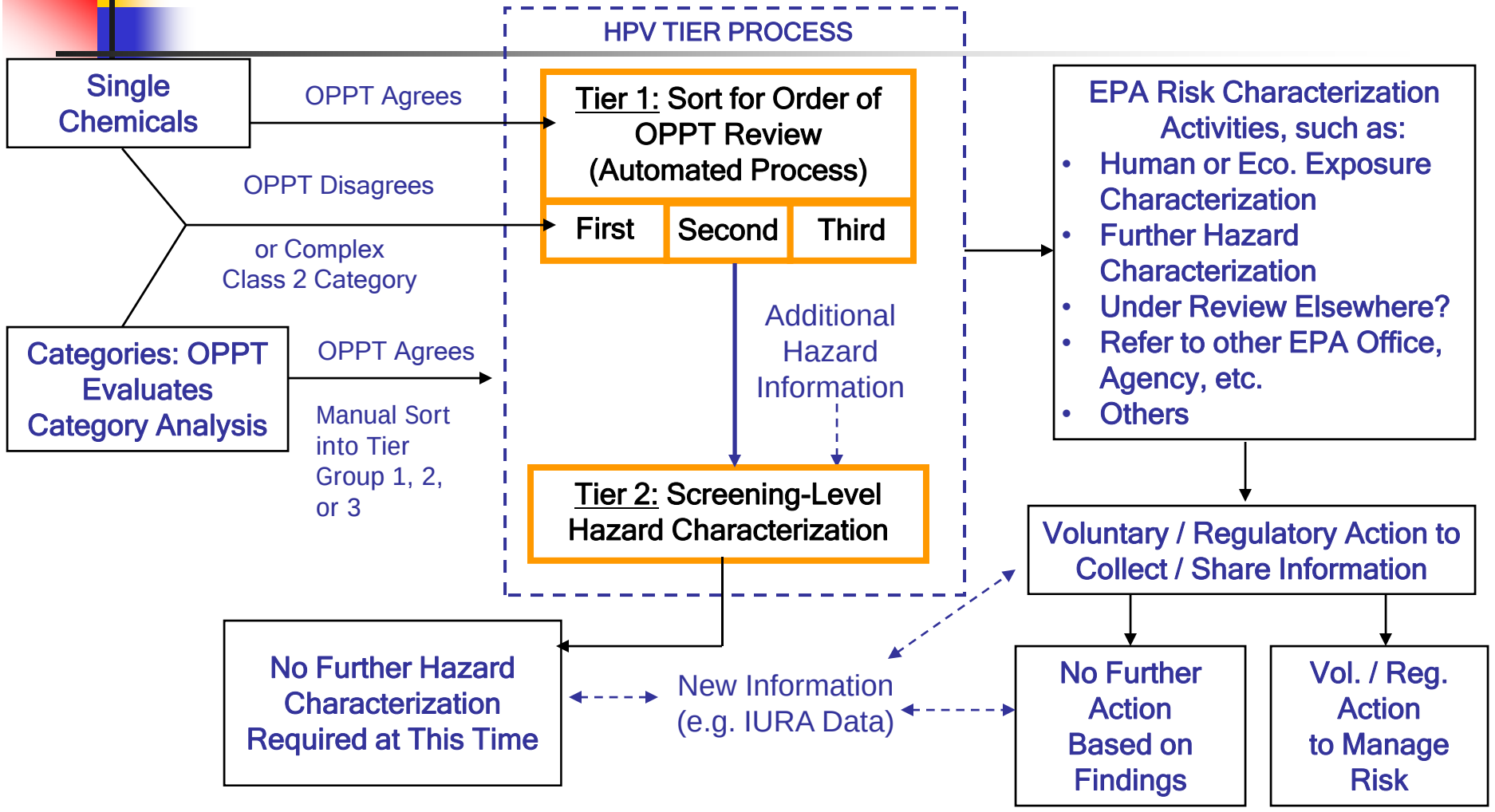
- EPA critically evaluates data in HPV Challenge Program submissions
  - Evaluate data quality and completeness
  - Data not accepted at face value as in automated Tier I screening process
  - Develop a screening-level hazard [not risk] assessment based on data provided by the sponsors
  - Hazard assessments are culmination of Challenge Program
- Inform sponsors and public of EPA findings

HPV Data Screening Process

Post-Tier II Activities

- Tier II screening level hazard characterizations will then lead back into normal OPPT chemical management activities
  - Chemical/category has low hazard potential; no further action required at this time
    - new information in future could warrant reevaluation
  - Chemical/category hazard potential is identified; OPPT options:
    - Identify existing voluntary/regulatory risk management programs and practices to determine adequacy
    - Require information gathering – hazard and/or exposure
    - Initiate EPA-lead risk assessment
    - Refer to more appropriate federal program for assessment
    - Decide after closer examination that no further action is needed at this time

HPV Data Screening Process Flow



Questions?

- For more information:
  - http://www.epa.gov/oppt/npptac/pubs/recommendationfeb2005.pdf (complete NPPTAC screening recommendation)
  - http://www.epa.gov/oppt/npptac/
  - http://www.epa.gov/HPV/
  - Lorraine Twerdok: letwerdok@comcast.net