GREEN AMERICA
CLEAN ELECTRONICS PRODUCTION NETWORK
A project of the Center for Sustainability Solutions

Procedure: Selection of Priority Chemicals

Version 2.0 April 2025

This procedure is for the selection of process chemicals to be prioritized for elimination or substitution in electronics manufacturing. Figure 1 provides a flowchart of the chemical nomination and evaluation process, while Figure 2 shows an overview of the Priority Chemical selection process and decision steps.

1. Priority Chemical Nomination Process

1.1. CEPN staff compile available information for chemicals, including MRSLs, aggregated and anonymized data from the PCDC Tool and/or RBA's Chemical Platform, and other available information.

1.2. CEPN members determine focus area(s), if any, of the Priority Chemical round.

1.3. CEPN staff solicit other chemical nominations within the selected focus area(s), from CEPN members, NGO Advisors, Technical Review Board members and other interested stakeholders.

2. Evaluation of Nominated Chemicals

2.1 CEPN staff and/or technical support personnel conduct research, working with the Technical Review Board, and screen nominated chemicals for:

2.1.1 The technical purpose(s) (e.g. solvent, adhesives, etc.), to the extent practical, and chemicals for consideration are screened against the focus area(s), if any.

2.1.2 CEPN's High Hazard Criteria; those chemicals meeting the criteria (high hazard) are evaluated further. CEPN's High Hazard Criteria are summarized in the following chart, with further details provided in Appendix A.

CEPN's High Hazard Criteria	A chemical is considered High Hazard if *any one or more* of the following are met:
California Proposition 65	
GreenScreen	LT-1 or BM-1 *
GHS Health Hazard End Point	Harmonized GHS Category
Acute toxicity (oral, dermal, gases, vapours, dust and mist)	1, 2 or 3
Respiratory or skin sensitization	1A
Germ cell mutagenicity	1A or 1B
Carcinogenicity	1A or 1B
Reproductive Toxicity	1A or 1B
Specific target organ toxicity (STOT) single dose	1
Specific target organ toxicity (STOT) repeated dose	1
ChemFORWARD Hazard Band	F *
* *GreenScreen LT-1 or BM-1 and ChemFORWARD Hazard Band F ratings will be excluded if those rankings are based solely on ecotoxicity hazards.*	

2.1.3 Use as a process chemical[1] in the electronics industry

2.1.4 The chemical's inherent properties relevant to potential worker exposure such as vapor pressure/volatility

2.1.5 Availability of potentially viable safer alternatives

Research will be recorded in Chemical Evaluation Forms (or similar) to provide a record on each nominated chemical (see Appendix B).

2.2 CEPN staff and/or technical support personnel assign the nominated chemicals into four categories (see Figure 1 and Appendix C for more details):

- **Priority Chemicals**, to be prioritized for elimination and substitution
    - **Specific Conditional Use Cases** allowed for essential application(s) of Priority Chemicals only when no potentially viable safer alternatives exist
- **Watch/Candidate List**, for chemicals of concern that require future research and assessment
- **Legacy/Archive List**, for high hazard chemicals with no indication of current use, to prevent (re)introduction into supply chains

[1] **Process Chemicals:** Chemicals (individual chemicals or mixtures) used during the manufacture and/or finishing of a product and/or maintenance of related production equipment that are not intentionally fully incorporated into the product. Examples of process chemicals include cleaning agents, lubricants, photochemicals, plating agents, refrigerants, hydraulic fluids, and solvents, including volatile chemicals emitted from adhesives, inks and coatings during manufacturing.

- **Nominated but Not Selected,** for chemicals evaluated but not selected for any of the above categories due to screening in 2.1

2.3 Chemicals previously selected for any list (Priority Chemical, Specific Conditional Use, Watch/Candidate, Legacy/Archive and Nominated but Not Selected) are re-evaluated at regular intervals or when new hazard or usage information becomes available, with the potential for reclassification.

3. Technical Review Board Review

3.1 The Technical Review Board includes technical experts, e.g., certified toxicologists with applied experience and research background, as well as representatives from electronics brands and suppliers, chemical suppliers, NGOs and certifiers (see *CEPN Technical Review Board: Roles & Responsibilities*, April 2022).

3.2 Technical Review Board reviews information on nominated chemicals including but not necessarily limited to Chemical Evaluation Forms and recommends chemicals for inclusion into the categories above (section 2.2) to CEPN Design Team. (Note: this is an iterative process with CEPN staff and/or technical support personnel)

3.3 CEPN staff documents Technical Review Board discussions and decisions.

4. Design Team Ratifies

4.1 Design Team approves/ratifies the chemicals on the recommended Priority Chemical List, Watch/Candidate List and Legacy/Archive List or sends back to Technical Review Board for further work.

4.2 Once ratified, the Design Team requests CEPN members' review for provisional affirmation of the chemicals on the Priority Chemical List, Watch/Candidate List and Legacy/Archive List.

5. CEPN Member Review

5.1 CEPN Members review and provide provisional approval of the chemicals on the Priority Chemical List, Watch/Candidate List and Legacy/Archive List.

6. Broader Consultation

6.1 The Design Team, in consultation with the Technical Review Board, determines if a broader consultation is needed.

6.2 If broader consultation is needed:

6.2.1 CEPN staff, in coordination with the Design Team, design and execute a stakeholder consultation process.

6.2.2 Input from the stakeholder consultation process is provided to the Technical Review Board for consideration.

7. CEPN Member Affirmation

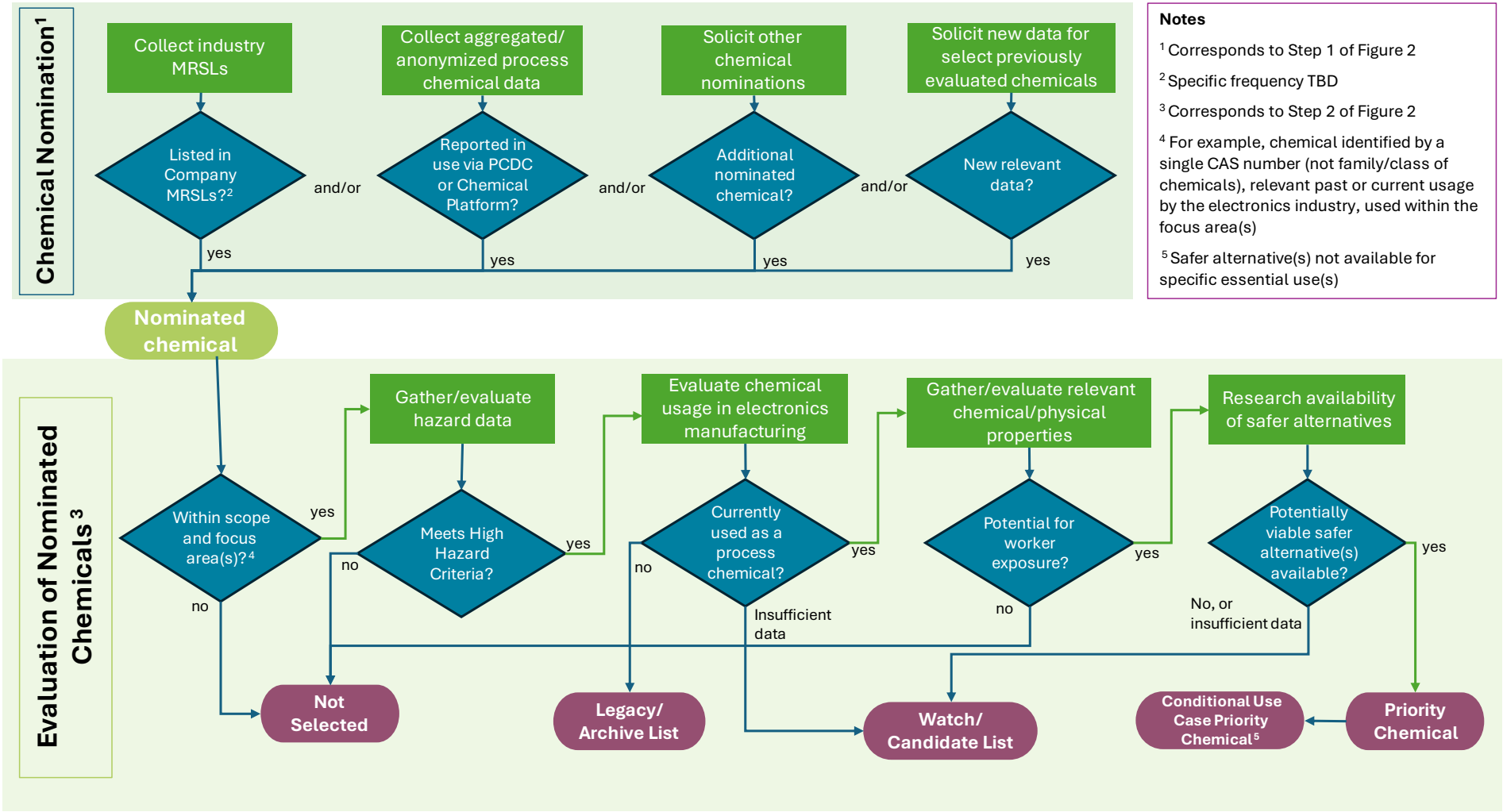
7.1 If a broader consultation is conducted, the proposed Priority Chemical List, Watch/Candidate List and Legacy/Archive List, with considerations from the Technical Review Board, is provided to the CEPN members for review and affirmation.

8. Design Team Approval

8.1 Design Team approves the Priority Chemical List, Watch/Candidate List and Legacy/Archive List.

9. The overall decision-making process for selection of Priority Chemicals is shown in Figure 2.

Figure 1. Chemical Nomination and Evaluation Process



Notes

[1] Corresponds to Step 1 of Figure 2

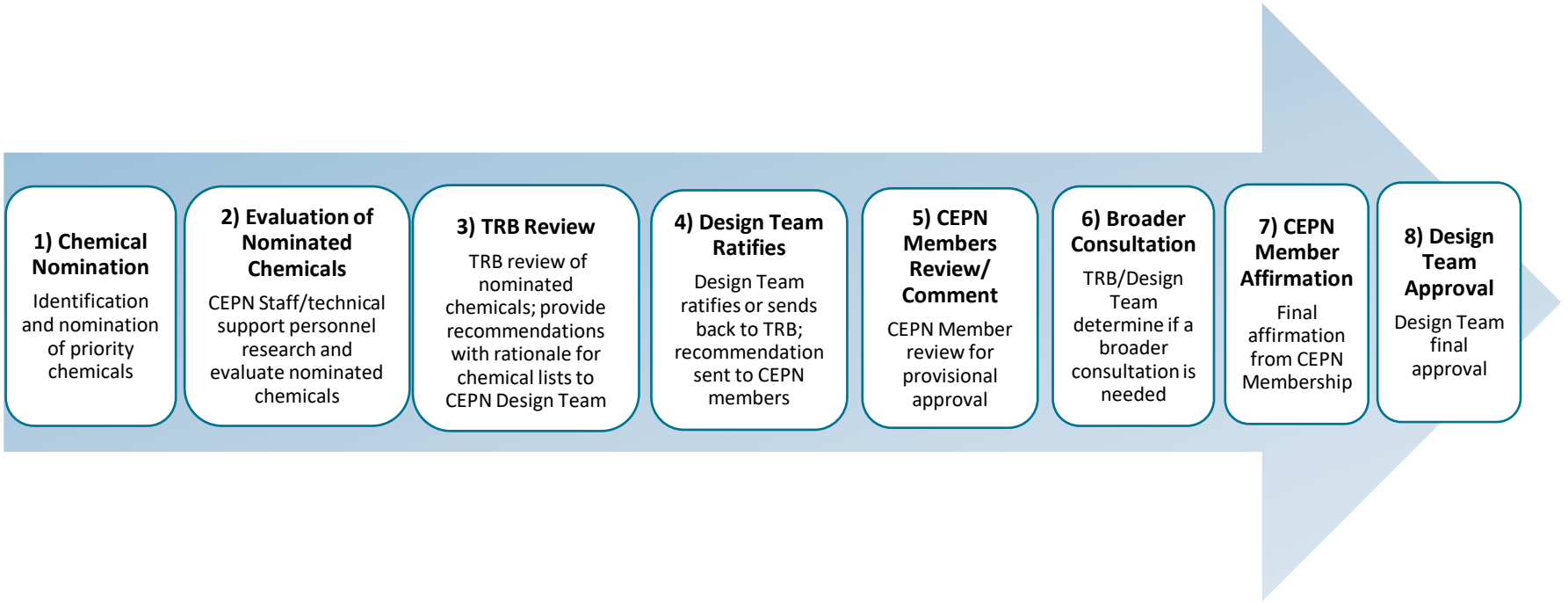
[2] Specific frequency TBD

[3] Corresponds to Step 2 of Figure 2

[4] For example, chemical identified by a single CAS number (not family/class of chemicals), relevant past or current usage by the electronics industry, used within the focus area(s)

[5] Safer alternative(s) not available for specific essential use(s)

Figure 2. Overview of Priority Chemical Selection Process and Decision Steps



Appendix A – CEPN High Hazard Criteria Hazard Endpoint Mapping

CEPN High Hazard Criteria	Relevant Hazard Endpoint(s) Covered	Notes
California Proposition 65	• Carcinogenicity • Reproductive Toxicity • Developmental Toxicity	
GreenScreen for Safer Chemicals BM-1 **GreenScreen List Translator LT-1**	• Carcinogenicity – High Hazard • Mutagenicity/Genotoxicity – High Hazard • Reproductive Toxicity – High Hazard • Developmental Toxicity – High Hazard • Endocrine Activity – High Hazard • PBT – High Persistence + High Bioaccumulation + [Very High Ecotoxicity or Group II Human] OR [High Group I or II* Human][1] • vPT – Very High Persistence + [Very High Ecotoxicity or Group II Human] OR [High Group I or II* Human] • vBT – Very High Bioaccumulation + [Very High Ecotoxicity or Group II Human] OR [High Group I or II* Human] • vPvB – Very High Persistence + Very High Bioaccumulation	Endocrine Activity High Hazard – requires evidence of endocrine activity and related human health effect Neurotoxicity and Respiratory Sensitization captured in combination with Persistence and Bioaccumulation Neurotoxicity (repeat exposure) and Respiratory Sensitization are Group II* Human endpoints Neurotoxicity (single exposure) is a Group II Human endpoint Chemicals with LT-1 scores meet BM-1 criteria based on information/data in GreenScreen Authoritative Lists

ChemFORWARD Hazard Band F	• List-Based:
	  • Chemicals of Regulatory Concern based on national and international regulations and treaties, and restricted substances lists restricting chemicals with a high level of human or environmental hazard (CMRs, PBTs, SVHC, Stockholm POPs, toxic metals, C2CC RSL)
	• CHA-Based:
	  • Carcinogenicity – RED adjusted hazard classification
		Neurotoxicity captured in combination with Persistence and Bioaccumulation

[1] These are the criteria for organic chemicals; PBT, vPT and vBT criteria differ for inorganic chemicals and vPvB is not a criterion for inorganic chemicals.

CEPN High Hazard Criteria	Relevant Hazard Endpoint(s) Covered	Notes
	• Mutagenicity –RED adjusted hazard classification • Reproductive Toxicity – RED adjusted hazard classification • Developmental Toxicity – RED adjusted hazard classification • Endocrine Activity/Disruption – RED adjusted hazard classification • PBT - Combined Persistence & Bioaccumulation score of RED or PURPLE + any adjusted human or environmental hazard classification is RED (except irritation or sensitization) • vPT - Persistence score of PURPLE + any adjusted human or environmental hazard classification is RED (except irritation or sensitization) • vPvB - Combined Persistence & Bioaccumulation classification of PURPLE	
GHS Health Hazard End Point	• Acute toxicity (oral, dermal, gases, vapors, dust and mist) – GHS Category 1, 2 or 3	
	• Respiratory or skin sensitization – GHS Category 1A	
	• Germ cell mutagenicity – GHS Category 1A or 1B	
	• Carcinogenicity – GHS Category 1A or 1B	
	• Reproductive Toxicity – GHS Category 1A or 1B	Effects on the endocrine system may be considered under GHS when evaluating reproductive toxicity
	• Specific target organ toxicity (STOT) single dose – GHS Category 1	Under GHS, neurotoxicity is considered under Specific Target Organ Toxicity (STOT)
	• Specific target organ toxicity (STOT) repeated dose – GHS Category 1	Under GHS, neurotoxicity is considered under Specific Target Organ Toxicity (STOT)

Appendix B – Chemical Evaluation Form Template

Chemical Name		CAS #							
1. General Information & CEPN Hazard Criteria									
Nomination	**Used in Electronics Manufacturing Process (Y/N)**	**GHS Health Hazard Classification**	**Green Screen LIst Translator Score**	**California Prop 65 listing (Y/N)**	**ChemFORWARD Hazard Band**	**Vapor Pressure**	**Does Chemical Meet Selection Criteria of Use in Electronics Manufacturing and High Hazard? (Y/N)**		
(e.g. CEPN member MRSL listed compound)									
2. Regulatory Restrictions, Requirements and Standards									
US ACGIH	**Cal OSHA**	**EU ECHA**	**Other**	**Regulatory Restricted List**	**Other- Restricted Substance List**				
3. Electronics Industry Use/Applications									
Known Electronics Industry Use/Applications	**Application(s) in Scope of Evaluation**	**Is Chemical Critical to Electronics Manufacturing Process?**	**Estimated Volume of Chemical Used Annually (lbs/kg) within Electronics Supply Chain (if quantitative information is not available, provide a qualitative assessment)**	**Estimated # of Electronics Workers Handling Chemical (if quantitative information is not available, provide a qualitative assessment)**	**Process Description**	**Potential for Exposure**	**Notes**		
4. Viable Alternatives									
Viable Alternative	**List Case Studies and/or Alternative Assessments for this Alternative**	**Are Known Viable Alternative Chemical Substitutions Available for this Application in Scope?**	**If Yes, List GHS Health Hazard Classification**	**If Yes, is it on CA Prop 65 List?**	**If Yes, is it Green Screen LT-1?**	**If Yes, Document Available Information on Availability**	**If yes, Document Available Information on Cost**	**If yes, Document Available Information on Time to Transition**	**Other**
Alternatives Researched but Not Accepted									
5. Chemical Prioritization Recommendation:									

Appendix C - Summary of Nominated Chemical Designations

Nominated Priority Chemicals are sorted into the following four categories:

1. **Priority Chemicals List** – Chemicals selected for inclusion in the current round of Priority Chemicals
    - Used within the selected focus area(s), if any
    - Meets CEPN High Hazard Criteria
    - Some indication of use as a process chemical within the electronics industry
    - Potentially viable safer alternatives available

    1.1 **Specific Conditional Use Case** – for specific essential uses of Priority Chemicals where no potentially viable safer alternatives are currently identified. These chemicals remain under review for future phase-out, with conditional use allowed for essential applications until phase-out is possible.
        - Used within the selected focus area(s)
        - Meets CEPN High Hazard Criteria
        - Some indication of use within the electronics industry
        - No potentially viable safer alternatives available for essential use(s)
        - Further research is needed on use and/or safer alternatives

        For conditional use, an Occupational Exposure Limit (OEL) will be determined based on the lowest global published regulatory limit and any other required protective measures.

    Note: A chemical can be classified as a Priority Chemical while also being designated under 'Specific Conditional Use Allowed' for certain essential applications.

2. **Watch/Candidate List** – Chemicals requiring further research and assessment before classification as Priority Chemicals in a future round.
    - Includes chemicals of concern with insufficient information on use or availability of safer alternatives for definitive selection
    - May include chemicals without potentially viable safer alternatives
    - Chemicals on this list may transition to Priority Chemicals if sufficient data supports their prioritization for phase-out
3. **Legacy/Archive List** – Chemicals that were nominated, but not currently under consideration for the Priority Chemical List due to lack of evidence of their current use as process chemicals in the electronics industry. These chemicals meet CEPN's High Hazard Criteria, and as such they would not qualify as safer alternatives; they are included in the Legacy/Archive List to prevent (re)introduction into supply chains.

- Used within the selected focus area(s)
- Meets CEPN High Hazard Criteria
- No indication of current use as a process chemical within the electronics industry

4. **Nominated/Not Selected -** Chemicals evaluated but not selected for any of the categories above