Life Cycle Assessment of Borate Treated Structural Systems (TSS)

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Sustainable Development is a Borax strategy

- **Environmental**
  - **Product stewardship**
  - **Pollution prevention**
  - **Resource stewardship**
- **Social**
  - **Safety & human health**
  - **Stakeholder engagement & transparency**
  - **Communities**
- **Economic**
  - **Shareholder return**
  - **Economic contribution**

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We have 5 major objectives

- **Protect health & safety of employees & public**
- **Enhance human potential**
- **Maximize resource utilization while minimizing environmental impact**
- **Optimize our economic contribution to society**
- **Expand how our products contribute to sustainable development**

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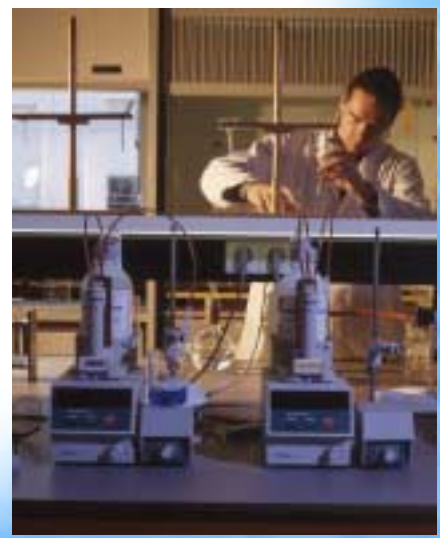
LCA work expands our knowledge of SD impact of our products

- **Borax has completed LCA on its products.**

- **Borax performing LCA on borate applications**



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TSS is a borate application that is undergoing LCA work

- **Treated Structural System (TSS)**
  - **Build the entire structure with borate treated wood for protection from termite, decay, and other wood destroyers.**
    - » **borate pressure treated lumber**
    - » **borate treated wood composites**

Wood Boring Beetle

Carpenter Ants

Formosan Termite

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The TSS value proposition mirrors SD values

- **Lower life cycle cost.**
- **Lower resource use.**
- **Lower energy use.**
- **Lower green house gases.**
- **More comfortable living space.**
- **Healthier indoor and outdoor environments.**

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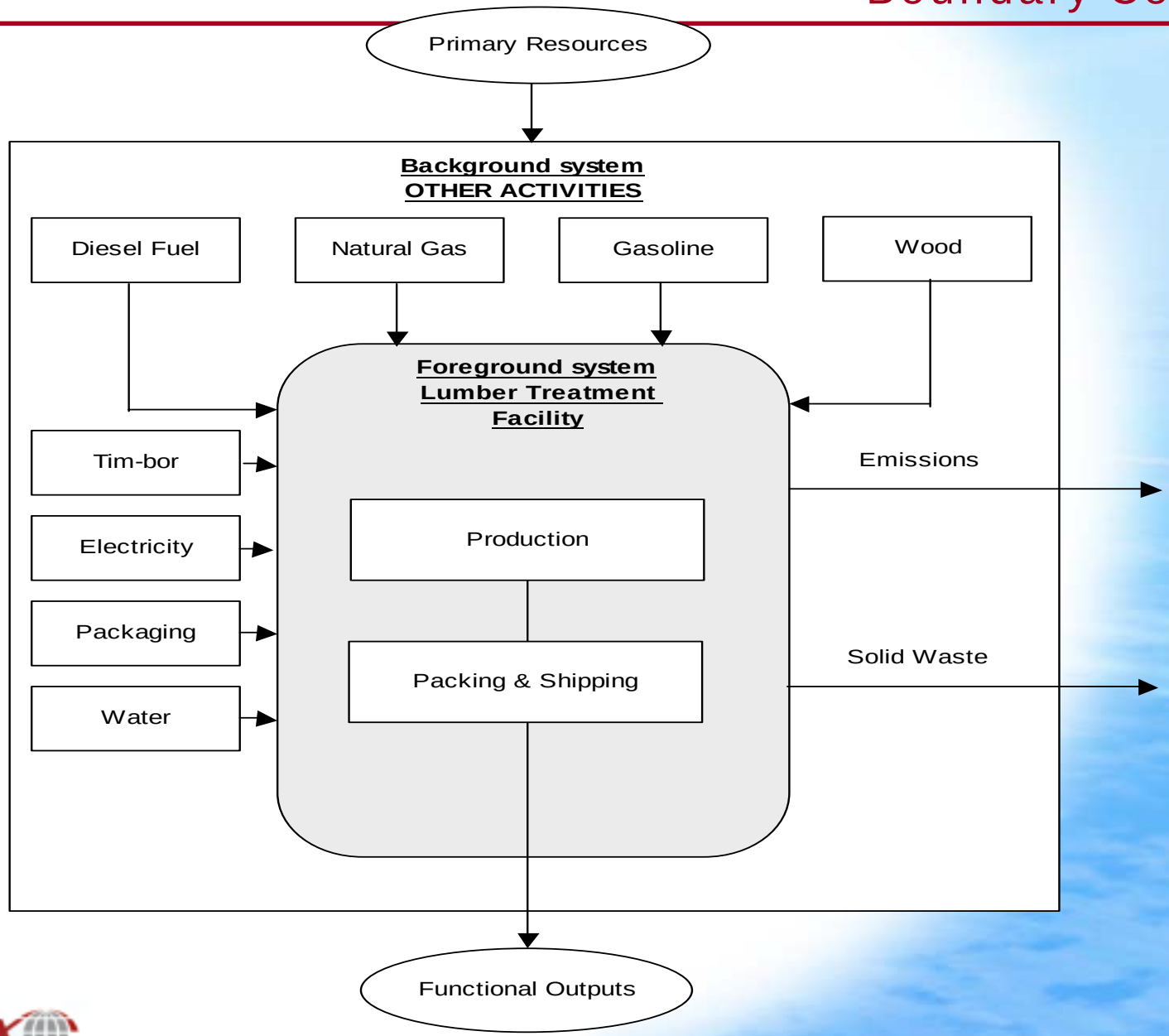
- **LCA can be, and is, used to support several initiatives in Borax:**
  - **Market Support**
  - **Process Improvements and New Technology Evaluation**
  - **ISO 14001**
  - **Product Profiles**
  - **SD Reporting**
  - **Product Innovation**

- **Goal: place data into authoritative databases such as BEES and ATHENA™ so that designers can better characterize the sustainability of using borate treated lumber and OSB in specific material and building product applications**
- **Study to be conducted in compliance with the ISO 14040 series of standards on Life Cycle Assessment**

- **Zinc borate treated OSB functional unit: 1000 board feet of OSB that is 7/16” thick treated with 0.75% zinc borate by weight**

- **Tim-bor treated lumber functional unit: 1000 board feet of lumber, treated with 0.42 lbs of Tim-bor per cubic foot of lumber**

Boundary Conditions



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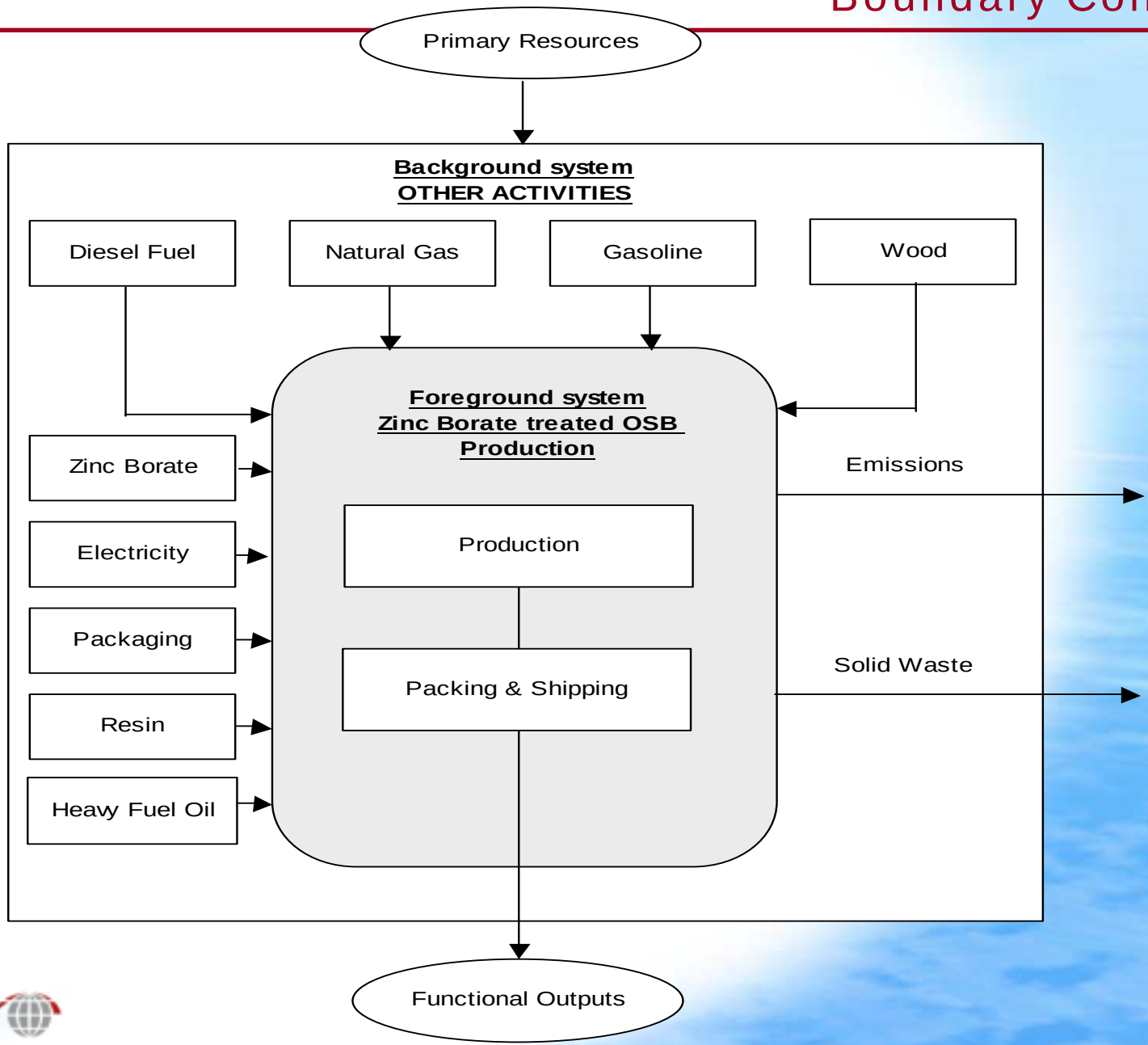
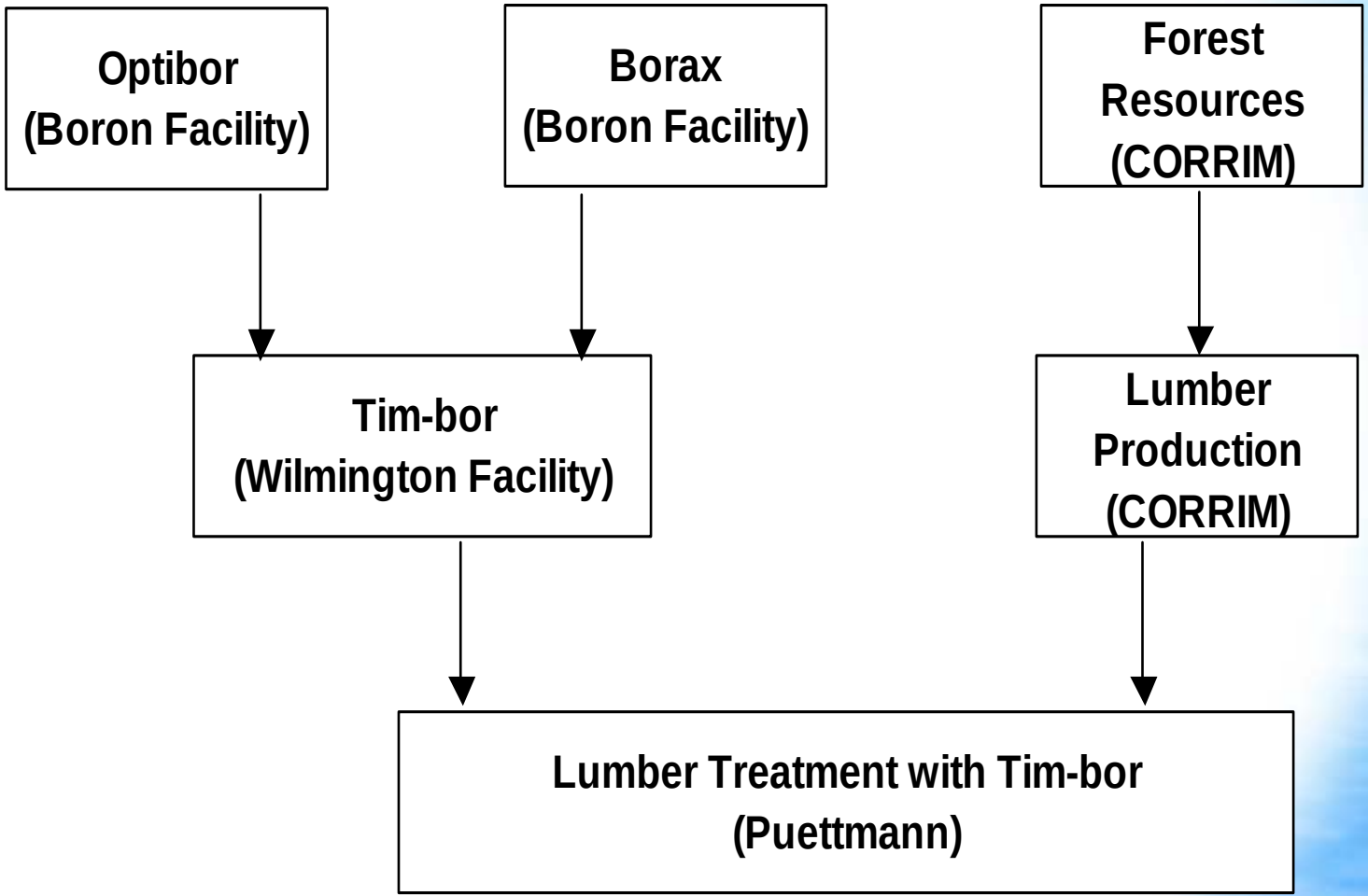


High-level Process Map



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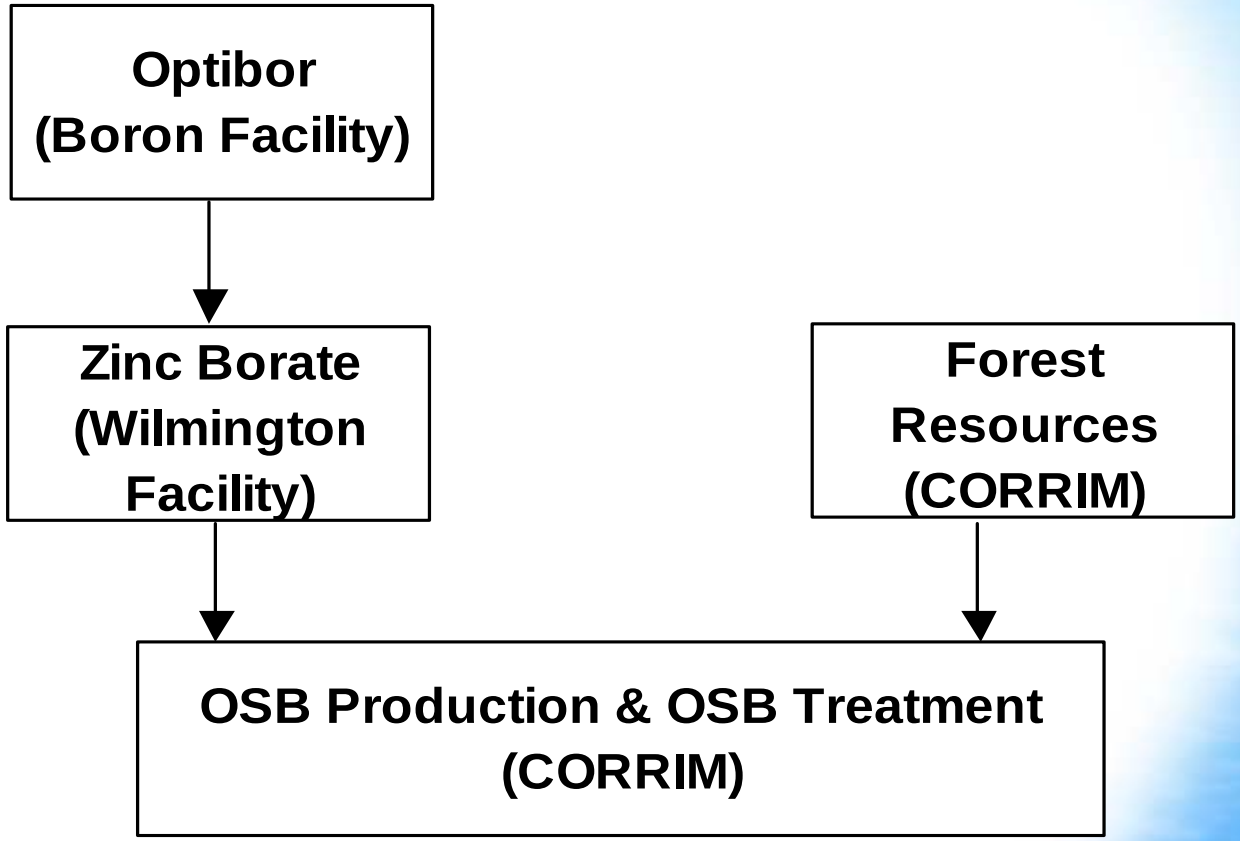

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- **Ran into roadblocks in data collection:**
  - **CORRIM data not published yet**
  - **Available data is dated and in some cases is not applicable**
- **Faced with challenge of abandoning original schedule or using data that does not meet the original needs as laid out in the Goal & Scope Definition**

Tim-bor

	Athena Lumber Data (including Forest Resources)	CORRIM Forest Resources and CORRIM Lumber Data	Comments
Date	1995	2001	
Wood Species	Spruce, pine and fir	Southern pine	Can use conversion factor to account for the difference in density
Geographic coverage	B.C, Alberta, Ontario and Quebec, Canada	Southeastern United States	Boundary conditions of study are U.S.
Other	Wood Harvesting – Energy inputs and air emission data only	Forest Resources – Fertilizer inputs in addition to energy inputs and air emissions	CORRIM more complete and more relevant overall

Borate treated OSB

	Athena Wood Harvesting Data and Athena OSB Data	CORRIM Forest Resources Data and CORRIM OSB Data	Comments
Date	Wood Harvesting 1980, OSB 1992	2001	
Wood Species	Aspen	73% southern pine, 27% hardwood (yellow poplar and other species)	Processing methods used for aspen vs. southern pine are quite different
Geographic coverage	B.C, Alberta, Ontario and Quebec, Canada	Southeastern United States	Boundary conditions of study are U.S.
Other	Wood Harvesting – Energy inputs and air emission data only	Forest Resources – Fertilizer inputs in addition to energy inputs and air emissions	CORRIM more complete and more relevant overall

Future actions for completing the study

- **Waiting for CORRIM data to be published - hopefully within the next few months**
- **This will enable study results to reflect the goal and scope initially set out and will provide high quality data sets for submission to Athena and BEES databases**

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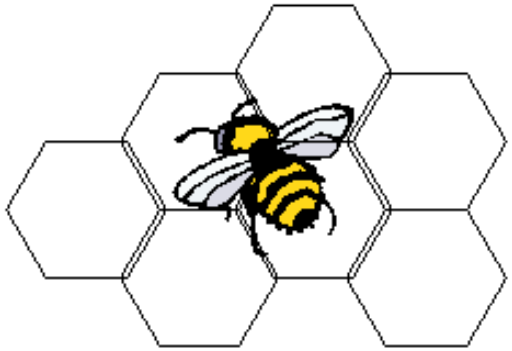

- **SD is a strategic initiative at Borax**
- **LCA on borate applications has a business value**
  - **Creates knowledge for Borax**
  - **Helps customers with product choices**
- **Data collection is pivotal to the LCA process**