# Environment and Natural Resources Trust Fund
# 2015 Request for Proposals (RFP)

**Project Title:** **ENRTF ID:** **061-B**

Replace Chemical Hazards in Products; Reduce Emerging Contaminants

**Category:** B. Water Resources

**Total Project Budget: $** 1,039,600

**Proposed Project Time Period for the Funding Requested:** 3 years, July 2015 - June 2018

**Summary:**

Studies show chemical hazards in products are released to become environmental contaminants. Grants to Minnesota product developers will accelerate safer alternatives in products that market forces are slow to address.

**Name:** Alister Innes

**Sponsoring Organization:** Minnesota Pollution Control Agency

**Address:** 520 Lafayette Rd N

St. Paul MN 55155

**Telephone Number:** (651) 757-2457

**Email** alister.innes@state.mn.us

**Web Address** www.pca.state.mn.us

**Location**

**Region:** Statewide

**County Name:** Statewide

**City / Township:**

**Alternate Text for Visual:**

The visual depicts products containing chemical hazards which are focal points of the proposed project; which are used by and found in people, and; which then move into and affect their environment, especially water resources.

| | | | |
|---|---|---|---|
| _____ Funding Priorities | _____ Multiple Benefits | _____ Outcomes | _____ Knowledge Base |
| _____ Extent of Impact | _____ Innovation | _____ Scientific/Tech Basis | _____ Urgency |
| _____ Capacity Readiness | _____ Leverage | | _____ TOTAL |

**Environment and Natural Resources Trust Fund (ENRTF)**
**2015 Main Proposal**
**Project Title:** Replace chemical hazards in products; Reduce emerging contaminants

## I. PROJECT STATEMENT

Studies show chemical hazards in products are released to become environmental contaminants. Grants to Minnesota product developers will accelerate safer alternatives in products that market forces are slow to address.

*RESEARCH HAS REVEALED CONTAMINATION* - Recent monitoring of chemicals in Minnesotans and their environment shows the prevalence of priority chemical contaminants such as endocrine-disrupting plasticizers, and flame retardants, and ecotoxic antibacterials and surfactants. Additional research connects these chemical contaminants to environmental and human health harms, even at low concentrations. Among others are:

- Bisphenol A (BPA) - toxic, endocrine-active, and "pseudo-persistent" due to large amounts in and released from a wide variety of plastic and resin products
- Nonylphenol (NP) – degradation product of widely-used surfactants; are toxic, endocrine-active, and persistent/bioaccumulative/toxic
- Phthalates – softeners and stabilizers in plastics and personal care products; are endocrine-active

*PROBLEM* - However, relatively few private resources or public funds are directed at driving replacement of the high-volume product chemistries which are the root cause of these environmental and health impacts.

*NOW, ACTION IS NEEDED* - This project aims to fill that gap. Replacing hazardous product chemistries can, over time, prevent reproductive, developmental, and genetic impairments of ecosystems by eliminating the source of these hazards that end up in water, sediment, and soil.

*ADDED BENEFIT* - State investment in this effort will help in the MPCA's effort, working with the U.S. Environmental Protection Agency and other national partners, to establish a regional hub of the National Network for Manufacturing Innovation (NNMI: http://manufacturing.gov/nnmi.html) focused on product design for environmental and human health, and using green chemistry and engineering principles.

**GOALS:** Primarily, to replace hazardous chemicals in products sold in Minnesota with safer alternatives in order to protect human health and the environment. Additional project goals include:

1. Reduce pollution in Minnesota's water, soil and sediment;
2. Support Minnesota companies' development of new products, safer product market share, and jobs.

**OUTCOMES:** The primary outcomes of the project are:

1. Two market-ready safer replacements of targeted priority chemicals, chosen from a menu of these products:
   a. BPA: can linings for acidic foods and drinks, developers in thermally-printed papers, polycarbonates
   b. Nonylphenol ethoxylates: where used as surfactants in crop pesticides which degrade to nonylphenol
   c. Priority phthalates: in personal care products, or as plasticizers in polyvinyl chloride
2. Analysis of human health and environmental results, and next steps for wider investment.

**METHOD**: This project will establish grants to fund Minnesota academic or company researchers to develop or test the safety and performance of replacements of priority chemicals in products.

## II. PROJECT ACTIVITIES AND OUTCOMES

**Activity 1: Two grantees conduct research and/or development** **Budget: $1,000,000**

Grantees will undertake one or more of the following possible Stages of development:

| 1. Develop & verify new chemistry | 2. Test performance and/or safety | 3. Test in product applications | 4. Plan and scale up supply chain and production |
|---|---|---|---|
| TIME: 2+ years | TIME: up to 1 year | TIME: 3 to 12 months | TIME: 1 year to pilot, then plan |

Depending on a technology's Stage of conceptualization or development, projects could vary according to the starting point and the Stage(s) undertaken, and cost would vary accordingly. Minnesota developers are believed

to be through Stage 1 with safer candidates in some of the target products, enabling projects to start in Stage 2.

| Outcome | Completion Date |
|---|---|
| 1. Final research and development plans set | July 30, 2015 |
| 2. 1-month check-ins with project managers, with adjustments to work plan as necessary | Monthly |
| 3. First Stage of work complete (in each granted project) | December 31, 2016 |
| 4. Second Stage of work complete (in each granted project | December 31, 2017 |
| 5. Long-term plan for follow-on investment and further seed funding complete | June 30, 2018 |

**Activity 2: Bid, manage and facilitate implementation of grant projects** **Budget: $39,600 (+ $84,942 in-kind)**

Use a competitive process to award 2 grants for high-priority projects. Manage project awards, collect data and generate 6-month and final project reports, and distribute learning and progress via web and networks: life-cycle safety improvements and burden reduction; the status of the new technology in terms of applications, market testing, performance and economic feasibility; and capital, supply chains, facilities, and equipment necessary for commercialization. As necessary, negotiate intellectual property agreements with grantees while maximizing public information to allow technology transfer. Facilitate follow-on capital investment and licensing. Work with an Advisory Group of agencies, research institutions, states, and companies, to develop strategies for distribution of results, next-stage research priorities, and a long-term collaborative research plan.

| Outcome | Completion Date |
|---|---|
| 1. Two grant awards executed with recipients | January 1, 2016 |
| 2. Progress reviews and reports; web and other distribution | Every 6 months |
| 3. Two intellectual property agreements; tech transfer to greatest extent possible | June 30, 2018 |
| 4. Specific follow-on investment plan for each grantee | June 30, 2018 |
| 5. Long-term multi-state collaborative research and funding plan | June 30, 2018 |

## III. PROJECT STRATEGY

### A. Project Team/Partners

In addition to successful applicants, an Advisory Group will be partners throughout the project. Their time will be donated. All have been involved in the field of green chemistry or chemicals monitoring for many years. More experts from the Minnesota Green Chemistry Forum will be added, but at this time, confirmed are:

University of Minnesota, Center for Sustainable Polymers: Marc Hillmyer, Director
University of Minnesota, Water Resources Center: Deb Swackhamer, Co-Director
University of Massachusetts-Lowell, Center for Sustainable Production: Joel Tickner, Director
Washington Department of Ecology: Alex Stone, Senior Chemist
Interstate Chemicals Clearinghouse: Topher Buck, Coordinator

### B. Project Impact and Long-Term Strategy

This project is designed as a demonstration of the ability and scale of public investment needed to successfully drive product research and development to eliminate chemical contaminants of concern. There is no explicit follow-on funding planned from existing State sources at this time. If this demonstration is successful, it will be used to provide input on future State and Federal priorities for research funding.

### C. Timeline Requirements

A 3-year timeframe is presented, to provide the maximum adaptability to projects and researchers' matching capacity, yet at the same time to drive the researchers to achievable progress goals. MPCA staff understand that safer chemistry candidates are through Stage 1, so projects should be able to start at Stage 2. Using the time estimates for each Stage under Activity 1 above, a 3 year timeframe should be sufficient to move from Stage 2 through Stage 4.

# 2015 Detailed Project Budget

**Project Title: Replace chemical hazards in products; Reduce emerging contaminants**

**IV. TOTAL ENRTF REQUEST BUDGET: 3 years**

| BUDGET ITEM | AMOUNT |
|---|---|
| **Personnel:** 0.10 of existing FTE at MPCA for each of 3 years, primarily to negotiate technology transfer/public information, intellectual property protection, and new product licensing<br>• Salary $10,000 X 3 years = $30,000 total<br>• Fringe (32%) $3,200 X 3 years = $9,600 total | $ 39,600 |
| **Grant contracts: 2 @ $500,000 each**<br>• 2 research organizations - could be researchers and technology development and transfer experts at Minnesota academic institutions or Minnesota companies with demonstrable research, development, and business planning capacity<br>• Contracts will primarily fund additional personnel resources necessary to make the R&D and business development envisioned happen | $ 1,000,000 |
| **Nondurable Equipment/Tools/Supplies:** Will be parsed out as necessary within Contracts, above, and following "Guidance on Allowable Expenses", p. 13 | $ - |
| **TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =** | $ 1,039,600 |

**V. OTHER FUNDS** *(This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)*

| SOURCE OF FUNDS | AMOUNT | Status |
|---|---|---|
| **Other Non-State $ To Be Applied To Project During Project Period: NA** | NA | |
| **Other State $ To Be Applied To Project During Project Period: NA** | NA | |
| **In-kind Services To Be Applied To Project During Project Period: Project Management - 0.33** FTE/year<br>• Salary $21,450 X 3 years = $64,350<br>• Fringe (32%) $6,864 X 3 years = $20,592 | $ 84,942 | Secured |
| **GRANTEE 1 (Anticipated, but unknown at this time)**<br>• Any durable capital equipment necessary will be purchased by grantee, not from state funds | $ - | Pending |
| **GRANTEE 2 (Anticipated, but unknown at this time)**<br>• Any durable capital equipment necessary will be purchased by grantee, not from state funds | $ - | Pending |
| **Funding History:** | NA | |
| **Remaining $ From Current ENRTF Appropriation:** | NA | |

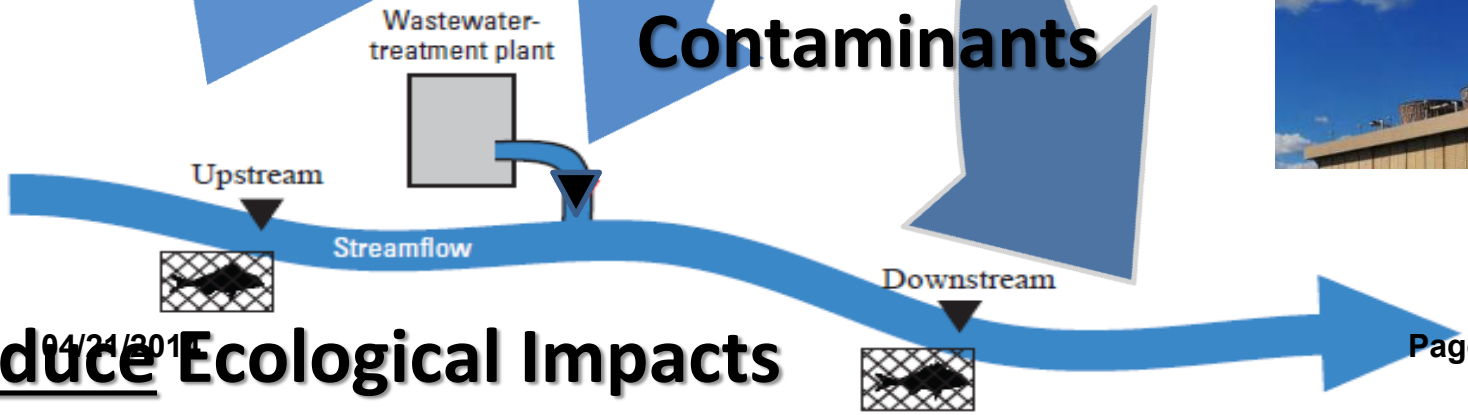
# Replace Chemical Hazards in Products






# Reduce Levels in the Human Body


# Reduce Emerging Contaminants




# Reduce Ecological Impacts

**Minnesota Pollution Control Agency (MPCA)**
*Planner Principal State (1997-present)*
*Pollution Control Specialist, Senior (1995-1997)*

PERTINENT EXPERIENCE

1. CURRENT - Green chemistry and product design initiatives; chemicals policy
   SCOPE: Green chemistry and toxics reduction, relating to wastewater, stormwater and nonpoint source discharge, energy use, criteria and greenhouse gas air emissions, use of bio-based or sustainable feedstocks, and human health
   - Create and develop grants supporting company and college faculty priorities for green chemistry activity
   - Develop projects (and RFPs) which investigate the ability of the State to find and reduce Minnesota Priority Chemicals where they occur in commerce
   - Coordinate with other MPCA staff involved in related research and policy activities
   - Lead unit staff/P2 team into project activities which inform the potential for future MPCA green chemistry program elements
   - Lead green chemistry and chemicals policy development and legislative initiatives, using partnerships with other Minnesota state agencies, companies, NGOs, other states, and through observation of EPA initiatives and federal TSCA reform
   - Coordinate development of MPCA Commissioner's product chemistry framework
   - Develop and supervise student worker positions for green chemistry support
   - Manage MPCA green chemistry and coal tar sealcoat web pages and GovDelivery e-mail communications
   - Serving on Steering Committee of the Minnesota Green Chemistry Forum
   - Active member of Interstate Chemicals Clearinghouse workgroups, including tracking of state and national policy, program development, and priority chemical selection processes
   - Numerous presentations to state/national audiences on pollution prevention, green chemistry

2. CURRENT - Minnesota and Great Lakes coal tar-based sealcoat/PAH reduction project
   SCOPE: Pollution prevention, toxics reduction and some elements of green chemistry, relating to stormwater, contaminated sediment, and volatile/particulate air emissions
   - Secured and managing EPA Great Lakes Restoration Initiative grant totaling $243,000
   - Negotiated consensus among technical experts to generate guidance on safer alternatives
   - Developed and led outreach and publicity to various owner and provider audiences, especially contractors and suppliers to demonstrate the viability of safer alternatives
   - Create, develop, gather data for, and report metrics of reduced coal tar/PAH loadings
   - Developed and negotiated Quality Assurance Project Plan with U.S. EPA

PERTINENT MPCA PUBLICATIONS

Toxics and Pollution Prevention Evaluation Report (to the Minnesota Legislature): Mark Snyder; Amanda Cotton; John Gilkeson; Garth Hickle; Alister Innes; Catherine O'Dell. Minnesota Pollution Control Agency, December 2013. See MPCA's Toxics and Pollution Prevention Evaluation web page: http://www.pca.state.mn.us/aj0r76b

Options to Reduce and Phase-out Priority Chemicals in Children's Products and Promote Green Chemistry (Report to the Minnesota Legislature): Patricia Engelking; Alister Innes; Catherine O'Dell; Nancy Rice. Minnesota Pollution Control Agency, December 2010. http://www.pca.state.mn.us/index.php/view-document.html?gid=15319

- 2011 Notable Document Award, National Conference of State Legislatures