Request for Proposals
American Chemistry Council
Long-Range Research Initiative (LRI)

1) **RFP Title:** “Fate and Influence of Natural Ecotoxins in Terrestrial Ecosystems with Reference to Published Literature on Synthetic (man-made) Ecotoxins.”

2) **RFP Number:** EEE-00-05

3) **TIP:** Environmental

4) **INTRODUCTION**

In terrestrial ecosystems, vascular plants are the dominant life form and primary producers of organic compounds on which all other life forms depend. Included among the organic compounds synthesized by plants are hundreds of ecotoxins (Dictionary of Plant Toxins, ISBN 0471951072). The existence of natural ecotoxins in pristine ecosystems (i.e. catechin in oak forests) indicates that the presence of ecotoxins per se is not detrimental to ecosystem functions. Natural ecotoxins, presumably, play a role in the dynamic, changing nature of ecosystems over both space and time; whereby the quantity and distribution of individual organisms at different levels in the food web rise and fall but are not eliminated. Dynamic, reversible shifts of populations within an ecosystem are normal and unavoidable, because of fluctuating environmental stressors, i.e. drought, flood, extreme temperatures, and, presumably, natural ecotoxins. In the case of natural ecotoxins, it is speculated that natural ecotoxins are often, perhaps always, subject to destruction over time, through the action of surviving, populations of organisms (bacteria, fungi, etc.) that metabolize ecotoxins. Although there is an awareness that natural ecotoxins exist, no comprehensive studies have been conducted to determine the effect of such compounds on ecosystem food webs, or their fate (movement, accumulation, life span, etc.) within ecosystems. Recognizing the similarity in structure and the physical/chemical properties between some naturally occurring ecotoxins and introduced synthetic ecotoxins it would be valuable to know the extent of similarity and divergence in the fates and environmental influences of the two sources of ecotoxins.

Opportunities to leverage this work with other projects are encouraged. Awareness of similar global projects to provide technical and scientific basis for assessment/extrapolation factors will be part of evaluation process. A CEFIC LRI project on environmental risk assessment of marine and estuarine environments might provide opportunity for international cooperation. Developing ERA guidance for products and contaminated sites are also prime opportunities to work with State, Provincial, and Federal agencies.

5) **DESCRIPTION OF RESEARCH TOPIC**

A. **Background**

This research address factors that contribute to the dynamic cycles observed in plant and animal populations in nature. All forms of chemical stressors, including naturally derived and man-made synthetics may influence the survival, growth and reproduction of species comprising the ecosystem. Understanding the circumstances when synthetic chemicals must be evaluated differently from natural chemical stressors will reduce the uncertainty in environmental assessments of the fate and effects of chemicals released to the environment, thereby reducing the need for/reliance on conservative assumptions and excessive safety factors used in ecological assessments. Further, these will lead to greater flexibility in regulatory compliance by demonstrating the direct and significant role dynamic ecological attributes play in reducing environmental availability (biological availability), chemical persistence and toxic effects to ecological receptors.

Research the Council is pursuing has implications for corporate issues debated on a global scale (PBTs, Classification, Fate and Effects, Appropriate Methods). Issues are being framed and addressed by regulators and NGOs using more complex and holistic ecological approaches directed at the interrelationships within ecological systems. Bridging toxicology and ecology is becoming more difficult using historical data and traditional approaches applied in ecotoxicology as wider array of stakeholders enter discussions of ecological issues. Environmental science, toxicology and environmental exposure can also inform decisions on managing risks to humans. Opportunities to leverage this work with other projects are encouraged.

Results from this study will highlight the importance of acknowledging differences between temporary fluctuations and permanent ecosystem changes, species versus community responses, ecosystem destruction
of ecotoxins, and ecotoxin-organismic equilibria, all aspects of ecosystem dynamics that should be considered in formulating accurate ecological risk assessment practices. An improved understanding of the presence and role of natural ecotoxins in pristine ecosystems will be useful in establishing concentration ranges at which synthetic ecotoxins will not jeopardize the long-term function and structure of the ecosystem. Thus through a better understanding of natural ecotoxins, biologically/ecological based environmental criteria and cleanup standards may be established.

B. Research Objectives and Deliverables

Responders should consider deliverables such as research initiation and progress discussions with the sponsors. Interactions might begin with discussions on finalization of a research protocol that has results scaled to natural ecosystem dynamics, and progress to continuing interactions and updates on progress and accomplishments. These efforts could include activities such as site visits, periodic technical reports or briefings, and dialogs focusing on understanding links between processes for natural chemicals and environmental issues facing producers of synthetic chemicals. The preparation of a manuscript and submission of the manuscript to a peer-reviewed journal is required. Other electronic deliverables such as software or web pages that might be suited to make the research findings and recommendations accessible to other professionals in applied ecology and environmental science should be considered. The ultimate goal for deliverables of this project is transfer of research knowledge into applied ecological practices and improved capabilities for ecological decision-making. Depending on the details of the proposal, specific deliverables to the sponsor may vary and should be identified in the final proposal. These might include meetings with the American Chemistry Council monitoring team for this project at the beginning and periodically throughout the proposed project duration. Deliverables could be yearly progress reports and periodic seminars with the sponsors to discuss key findings and progress, as well as recommendations for methodological improvements or needed research. Plans for professional presentations and publications to cover these topics also are strongly encouraged. The preparation of a manuscript and submission of the manuscript to a peer-reviewed journal is required. Other electronic deliverables such as software or a web page might be well suited to make the research findings and recommendations accessible to the interested public.

Based on review of the literature, three natural, organic ecotoxin(s) representing different chemical classes (i.e. flavanoids, terpenes, etc.) should be selected as models for study. Considerations used in the selection process should include: similarity in structure and chemical properties to well studied synthetic ecotoxins, (i.e. polyaromatic hydrocarbons) prominence of model ecotoxins in the environment (number of producing species, distribution of producers, estimated total amounts released, etc.), reported mechanism of toxicity, and potential toxicological effect across taxa and kingdoms. Experimentation should be planned to determine: production rate of ecotoxins, environmental partitioning within biological and physical components, impact on the foodweb, and life span of the ecotoxins. The fate and influence of the natural ecotoxins that are studied should be related to synthetic ecotoxins as described in the published literature. Investigators are free to use different experimental approaches (toxicity tests, microcosms, field plots), but the data gained must be related and scaled to natural ecosystems. A combination of experimental approaches used in parallel or series over the course of a multi-year investigation is encouraged, giving rise to comprehensive, interdisciplinary information. The research proposal should include plans for obtaining multi-disciplinary input and broadly disseminating research results (Publications, workshops, technical panels).

Proposals should outline plans for specific deliverables and milestone accomplishments on a planned timeline. Submittals should address development and completion of the research program with a diversity of deliverables to facilitate broad applicability of the results and wide dissemination of the knowledge acquired.

C. Scope

Investigators are encouraged to develop multidisciplinary, inter/intra institutional teams, including where possible, collaborators from outside North America. Submitters should not feel constrained by the RFP topic where relevant but novel ideas / approaches can be developed.

Highly leveraged proposals where the proposed work can be conducted in conjunction with existing or future programs will be viewed favorably. Individuals from academia, governmental, non-governmental and private-sector institutions are encouraged to apply. Applicants are also encouraged to review the list of projects already funded by the European chemical industry (http://www.cefic.org/lri/).
Depending on the details of the proposal, specific deliverables to the sponsor may vary and should be identified in the final proposal. These will include meetings with the American Chemistry Council monitoring team for this project at the beginning and periodically throughout the proposed multi-year timing. A summary and recommendations for improvements or needed research would help communicate the project results to the interested public. The preparation of a manuscript and submission of the manuscript to a peer-reviewed journal is required. Other electronic deliverables such as software or a web page might be well suited to make the research findings and recommendations accessible to the interested public.

Because of the need for fieldwork as part of this RfP, responders are required to provide a list of potential study sites in North America and/or Europe. Sites placed on this list should either have a high probability of access by the investigator or have already been the focus of previous work where obtaining access has not been problematic.

7) ELIGIBILITY

Proposals may be submitted by any domestic or foreign for-profit or non-profit organization, public or private, such as universities, colleges, hospitals, laboratories, or units of State and local governments.

8) FUNDS AVAILABLE

$450,000 over 3-5 years (other time frames/schedules may be proposed)

9) REVIEW OF PREPROPOSALS AND FULL PROPOSALS

A. Review Process

All proposals received in response to this RFP will be reviewed for completeness and responsiveness. Incomplete or non-responsive proposals will be returned to applicants without further review.

Proposals that are complete and responsive will be peer reviewed for scientific merit by scientists from outside of industry. Proposals that receive a rating of “Excellent” or “Very Good” for scientific merit will be forwarded to the Council’s Environmental Technical Implementation Panel (Env TIP) for further review and award recommendations. The Env TIP is composed of scientists from industry, government, academia, and private sector consultants. The Council’s Strategic Science Team will approve award recommendations.

B. Review Criteria

The following criteria will be used to evaluate full proposals. In addition, please review Table 1 for more detailed descriptions.

- Scientific merit
- Scientific feasibility
- Technical feasibility
- Consistency with TIP research plan
- Reputation of institution/investigator
- Compatibility with known skills of investigator
- Quality of proposed milestones/timeline
- Cost effectiveness
- Use of external collaborator/leveraging
- Management of QA, animal care/human subject ethical considerations

C. Preliminary Proposals

Submission of preliminary proposals is strongly encouraged. Preliminary proposals must be received by the Council no later than close of business on December 15, 2000 and must be no longer than 5-10 pages in length.

1. Not more than 5 -10 pages in length;
2. Include specific objectives, deliverables and total budget estimate;
3. List all potential personnel including collaborators and co-investigators;
4. List the phone number, address and email of the principal investigator / contact;
5. Include the RfP designation EEE-00-05 on all pages;

Preliminary proposals must be prepared using the Preliminary Project Proposal Form (attached). Biographical information (no longer than two pages) about the Principal Investigator and all other key personnel, including subcontractors and consultants, should also be submitted. Investigators who choose NOT to submit a preliminary proposal must send a letter indicating their intent to submit a full proposal by December 15, 2000 to the address below.

Two copies of the preliminary proposal should be sent to the following address.

Ms. Cheryl Morton  
c/o American Chemistry Council  
1300 Wilson Blvd.  
Arlington, VA 22209

The Env TIP will evaluate preliminary proposals for scientific merit, relevance to the TIP’s research plan, and cost-effectiveness. Investigators will receive a letter by January 31, 2001 either encouraging or discouraging submission of a full proposal.

10) AWARD CRITERIA

The criteria that will be used in making awards include receipt of a sufficient number of proposals of adequate scientific merit, as determined by peer review; relevance of proposals to the priorities outlined; availability of funds; and program balance.

11) SUBMISSION OF FULL PROPOSALS

Full proposals must be received by American Chemistry Council no later than April 30, 2001 and must be no longer than 20 pages in length. All proposals must be prepared using the Full Project Proposal Form (attached). Curricula Vitae for the Principal Investigator and all other key personnel, including subcontractors and consultants, should also be submitted.

Three copies of the full proposal should be sent to the following address.

Ms. Cheryl Morton  
c/o American Chemistry Council  
1300 Wilson Blvd.  
Arlington, VA 22209

Summary of Timeline for Proposal Submission, Review & Award

<table>
<thead>
<tr>
<th>Event</th>
<th>Timing</th>
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<tr>
<td>Preliminary proposal or letter of intent due to American Chemistry Council</td>
<td>December 15, 2000</td>
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<tr>
<td>Preliminary proposal reviews sent to investigators</td>
<td>January 31, 2001</td>
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<tr>
<td>Full proposals due to American Chemistry Council</td>
<td>April 30, 2001</td>
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<tr>
<td>Award Notification</td>
<td>July 31, 2001</td>
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12) PROPOSAL PROCEDURES

Each applicant will receive a copy of the evaluation of his/her proposal. Successful applicants will receive an award letter from the American Chemistry Council approximately 4 weeks after the final review is completed (first quarter of 2001).

13) INQUIRIES
The Council’s web site [http://www.americanchemistry.com](http://www.americanchemistry.com) contains general information about Health and Environmental Effects Research Initiative. Questions regarding this RFP should be directed to Dr. Robert Keefer at [919 786-5066] or keeferob@earthlink.net.

Table 1. Additional criteria for evaluating and ranking full proposals.

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<thead>
<tr>
<th><strong>Technical Merit</strong></th>
<th>Is the proposal prepared with supportive information, self explanatory, and clearly understandable? Is the proposed effort technically defensible? Is the approach practical? Can the project objectives be achieved in the stated time period with the allotted personnel and budget?</th>
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<td><strong>Responsiveness to RfP</strong></td>
<td>Have the RfP objectives been adequately addressed? If the proposed objectives differ from the RfP, do the stated objectives address current or future needs of the chemical industry?</td>
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<td><strong>Qualifications of Researchers</strong></td>
<td>Do the key project personnel have experience in the proposed area of research? Have key personnel committed an appropriate amount of time to the project? Is the group’s experience and Quality Assurance/Quality Control Program acceptable?</td>
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<tr>
<td><strong>Budget</strong></td>
<td>Is the budget within the funding level proposed for this RfP? Has the applicant provided sufficient in-kind contributions to the project? Is the level of effort allocated to each task reasonable?</td>
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<tr>
<td><strong>Leveraging / Partnering</strong></td>
<td>Has the group identified opportunities to leverage this work with similar ongoing or planned work in the public or private sector? Have partnership opportunities been established and built upon in the project?</td>
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