



CONTROLLING EMISSIONS
PROTECTING THE ENVIRONMENT
CONTINUOUS IMPROVEMENT

NORTH AMERICA PROGRESS REPORT 2007



**The Voluntary Emissions Control
Action Program for Brominated
Flame Retardants**





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**VECAP NORTH AMERICA PROGRESS REPORT
THROUGH JUNE 2007**

Introduction to VECAP

VECAP, the Voluntary Emissions Control Action Program, is a proactive industry initiative to prevent or potentially eliminate emissions of brominated flame retardants (BFRs) to the environment in a sustainable and measurable manner, both from manufacturing facilities and from all end-user sites throughout the supply chain.

As global producers of chemicals, among them brominated flame retardants, we are committed to ongoing efforts to achieve excellence in product stewardship. This voluntary initiative, which has produced significant reductions in emissions of the BFR known as Deca-BDE from end users in Europe since the program began in 2004, was launched in North America in 2006. Since then, a significant majority of Deca-BDE users in the United States and Canada have committed to implementing the VECAP program.

As VECAP completes its first full year of implementation in North America, the member companies of the Bromine Science and Environmental Forum (BSEF) are committed to closely monitoring its effectiveness and making information on the program's progress, results and future plans available to U.S. and Canadian regulatory agencies and to the general public.



About VECAP

CANADIAN PLASTICS INDUSTRY ASSOCIATION

“The Canadian plastics industry supports VECAP, the bromine industry's voluntary initiative that enables suppliers and manufacturing facilities to reduce the potential for emissions of brominated flame retardants to the environment. Further CPIA supports the adoption of the principles of VECAP as the basis for a strong and effective framework for Canada's environmental performance agreement on Deca-BDE.”

Serge Lavoie

President and CEO,
Canadian Plastics Industry Association

VECAP is designed to manage, monitor and minimize the potential for industrial emissions of the high production volume (HPV) brominated flame retardants known as Deca-BDE, TBBPA and HBCD into the environment by establishing partnerships with companies who use these products in their manufacturing or production processes. These efforts are expected to enhance the sustainability of these products, allowing them to continue providing benefits in fire safety, human health and environmental protection.

The Bromine Science and Environmental Forum was established so that bromine manufacturers could work together to support activities promoting:

- Public health and safety
- Transparency with public authorities
- Scientific research
- Responsible care for the environment
- Fire safety in an environmentally sustainable manner

The BSEF member companies are also committed to the chemical industry's broader Responsible Care program, which is focused on employee and public safety and reducing emissions of chemicals generally, and BSEF views VECAP as a logical extension of that broader program.

How Does VECAP Work?

VECAP is based on the development and application of “Best Practices” in all uses of brominated flame retardants; those practices are brought to the supply and customer chain through the VECAP program. VECAP itself is based on recognized environmental management programs, such as ISO 14001 and the European Union’s Eco-Audit and Management Scheme (EMAS), but simplified to focus on the target chemicals and to allow small and medium enterprises to participate in the program.

THE SCOPE OF VECAP

In every production process, there is a difference between the amount of raw materials that enter the process and the amount that subsequently leave as or within finished goods — this is called the “mass balance,” i.e., the difference between what comes in and what comes out. A major component of the VECAP program is to help manufacturers and other users address the potential for direct emissions of BFRs to air and water and to reduce to the greatest degree possible the “mass balance.” VECAP encourages and offers specific guidance to users on how to look critically at their product flows and processes in order to identify potential efficiency improvements and, in doing so, reduce their potential for direct and indirect emissions to air and water.

Put more simply, the VECAP approach provides a clear structure for:

- Qualitatively assessing known air and water emissions using a flow chart of the production process;
- Quantitatively assessing, as precisely as possible, existing emissions to air and water, expressed as grams per ton of flame retardant, which can then be used to establish and more closely close the “mass balance” for the process.

1 → COMMITMENT TO THE VECAP CODE OF GOOD PRACTICE

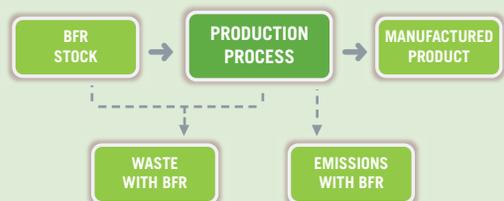
The VECAP system starts with the user’s commitment to the programme, adopting the Industry’s Code of Good Practice and implementing these principles into the procedures and work instructions of daily operations.

2 → SELF AUDIT

With the self-audit, the company identifies the production flow sheet of its operations.

3 → MASS BALANCE APPROACH

The company completes and closes the BFR mass balance (signaling the gap in the amount of BFR entering and leaving the production process).



THE VECAP PROCESS

Continuous Improvement



4 → BASELINE EMISSIONS SURVEY

The company uses the obtained results as a baseline to demonstrate actual performance and to detect future emission reduction priorities.

5 → EMISSIONS IMPROVEMENT PLAN

An emission improvement plan is determined in accordance with the company's own objectives and policies.

6 → IMPLEMENTATION AND CONTINUOUS IMPROVEMENT

Once the improvement plan is implemented, operational results are evaluated and potential for further emission reductions investigated, ensuring effective continuous improvement.

June 2006 to June 2007 Accomplishments

BFR MANUFACTURING

BSEF member companies are applying VECAP methodology and principles to their own manufacturing facilities and processes by identifying potential sources of emissions and implementing appropriate procedural and/or process improvements to reduce or eliminate emissions or the potential for emissions.

These efforts are fully supported by the BSEF member company CEOs, who have personally and publicly committed to working to reduce emissions to the greatest degree possible.

BFR USER COMMITMENTS TO APPLY VECAP PRINCIPLES

The focus of VECAP in its first year in North America has been on introducing the program to users and other stakeholders, and to seek commitments to adopt and implement the program from Deca-BDE users in the United States and Canada.

“Commitment” to VECAP is defined as a Deca-BDE user formally agreeing to implement the principles in the Code of Practice by signing a Letter of Commitment and/or by participating in the VECAP process. The participating company then completes a baseline assessment of Deca-BDE emissions from its production facility, which forms the basis for measuring future emission reductions and continuous improvements.

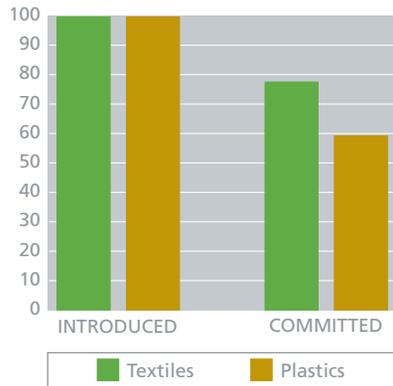
STAKEHOLDER MEETINGS

In November 2006, the bromine industry invited representatives from environmental non-governmental organizations, original equipment manufacturers and government officials to a series of VECAP stakeholder workshops. During these workshops, industry representatives introduced plans for the implementation of VECAP in the United States and Canada and invited feedback regarding the program. Since then, industry representatives have continued to introduce the VECAP program and the importance of product stewardship to dozens of organizations and companies and hundreds of individuals through one-on-one meetings and conference presentations.

RESULTS

- Ninety-nine (99) percent by volume of BSEF member company Deca-BDE customers in the United States and Canada have been introduced to the VECAP program.
- Seventy (70) percent by volume of BSEF member company Deca-BDE customers have committed to implementing the VECAP program.
- A mass balance emissions survey has been calculated for 53 percent of the BSEF member company Deca-BDE customer volume in the United States and Canada.

VOLUME INTRODUCED AND COMMITTED



PROVIDING SUPPORT TO VECAP USERS

The VECAP Competence Center provides support to VECAP users in their on-going implementation of the program. The information and data generated by the VECAP Competence Center also serves as a basis for broad communications about the program to regulatory authorities, elected officials and the general public.

VECAP Toolkit

The VECAP Competence Center has developed toolkits for the textile and plastic industries to assist Deca-BDE downstream users to perform the necessary self-audits and prepare their own mass balance, both of which are central to the VECAP implementation process. These toolkits

are available in several languages and include the following elements:

- **Code of Good Practice:** Provides working procedures and good housekeeping measures aimed at controlling and reducing emissions. It has been specifically developed for the various industrial sectors using Deca-BDE.
- **Self-Control Guidance Document:** Supports users in defining their compliance with Code of Good Practice procedures.
- **Process Flow Chart:** Assists the individual user in identifying where potential material losses can occur within their processes.
- **Mass Balance Sheet:** Provides information indicating which data should be measured, recorded and managed.

BEST PRACTICES DOCUMENT

A “best practices” document has been developed in order to provide answers to technical questions related to the VECAP program. It helps users of BFRs reduce and control environmental emissions by providing valuable insights on:

- Available emission abatement technologies;
- Best practices on waste handling and disposal;
- Waste water sampling and analysis; and
- How to compile a mass balance.

Electronics Industries Alliance

“VECAP is an excellent example of industry’s dedication to protecting the environment by controlling emissions. As the premier representative of U.S. electronic and high-tech associations and companies, the Electronic Industries Alliance (EIA) recognizes that this unique product stewardship program brings added value to our member OEMs. Our members will continue to look to VECAP for leadership in supply chain chemical management as the successes of VECAP in North America expand and its best practices evolve.”

BEST PRACTICES IN ACTION: MANAGING PACKAGING WASTE

A prime example of VECAP and its “best practices” approach in action can be found in a simple, but important, aspect of managing BFRs: Properly emptying and managing the packages in which BFRs are shipped.

The residue left in BFR shipping packages represents a significant opportunity to capture material that would otherwise be disposed of or potentially escape into the environment. In North America, discarded BFR packaging is most likely to be disposed of in municipal landfills. But, through the VECAP program, the bromine industry has identified packaging disposal as a potential source of emissions to the environment, and has developed specific recommendations for VECAP participants on how to thoroughly empty BFR packages and engage in environmentally preferred end-of-life options for product packaging.

The end result is reduced potential for emissions, less product loss for BFR users (which means slightly lowered raw materials costs), and better disposal methods for materials that cannot be reused or recycled.

Additional best practices documents will be developed and provided to VECAP participants as other potential emissions sources are identified and management solutions are developed.



Massachusetts Chemistry & Technology Alliance, Inc.

“MCTA is pleased to support the efforts of the bromine industry in their development and implementation of the Voluntary Emissions Control Action Program (VECAP) for Deca-BDE and other brominated flame retardants. This is a proactive step by industry to reduce and control emissions while addressing the concerns of very small levels of these substances detected in the environment. We believe this program can serve as an innovative model for emissions control in the United States, Canada and the European Union.”

Additional Goals of the VECAP Program

EXPANSION TO OTHER BFRS

Based on the positive response to date from users in the supply chain, as well as regulatory officials and agencies, the VECAP program is being expanded to include:

- Two other high production volume brominated flame retardants — HBCD and TBBPA.
- BFR users in Mexico.

By the end of 2007, VECAP will be introduced to HBCD and TBBPA users throughout North America, with a goal of introducing the program to 75 percent by volume of North America direct customers and distributors of HBCD and TBBPA.

BASELINE EMISSIONS SURVEY

Once a BFR user has committed to the VECAP program and developed its initial mass balance, overall industry results will be aggregated to assess emissions by region and industry, and used to create a baseline. The baseline will provide a benchmark of present environmental performance, and serve as a reference point against which future emission reduction progress can be measured.

As of July 2007, fifty-two percent by volume of BSEF member company Deca-BDE customers have completed a Deca-BDE baseline emissions survey.

By end-2008, VECAP seeks to have 90 percent by volume of BSEF member company Deca-BDE, HBCD and TBBPA customers covered by a baseline emissions survey.

PRODUCT STEWARD SUPPORT

During 2007 the North American VECAP program has been supported by the European program's independent, third-party Product Steward. As the global VECAP program continues to expand, the need for a North American VECAP Product Steward to guide growth, drive continuous improvement and support BFR users throughout the supply has grown and the program is now evaluating options for retaining a dedicated North American Product Steward.

INDEPENDENT CERTIFICATION AND AUDITING

In order to increase the credibility and transparency of the VECAP program, and to provide VECAP participants with formal, independent validation and recognition for their compliance efforts, VECAP is working with the international auditing organization Bureau Veritas to develop a certification program, similar to and compatible with the ISO 14001 and 9000 programs. This approach will provide external auditors with a common and internationally-recognized basis for independently assessing VECAP compliance.

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For further information and access to documents cited in this report, please visit www.vecap.info.



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VECAP is a voluntary initiative of the Bromine Science and
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