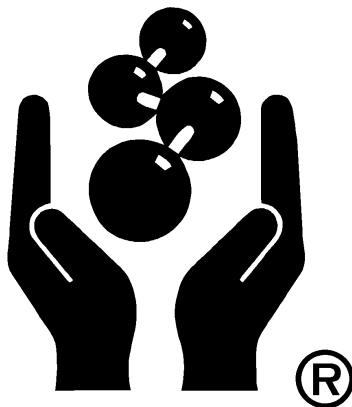


CHEMISTRY INDUSTRY ASSOCIATION OF CANADA



Responsible Care® Re-verification 2005 – 2009 Protocol

of

Cytec Canada Inc.

April 6th, 18, 19th and 20th 2011

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EXECUTIVE SUMMARY

This report documents the observations and conclusions of the independent verification team conducting a Responsible Care Verification of Cytec Canada Inc. The verification began with a visit to their Welland headquarters on April 6th 2011, with the visit to their Welland operations site, on April 18 and 19, and 20, 2011. The verification team also conducted interviews with other company personnel via telephone. This was the fifth Responsible Care verification completed for Cytec with the previous verification being completed in 2007 with sign-off July 16, 2008.

While considering all aspects of the Responsible Care Commitments during this verification the team placed an emphasis on conducting an in-depth examination of company aspects related to the 2009 Responsible Care Protocol:

- Overall Responsible Care Management System
- Response to Incidents and Concerns
- Performance Measures
- Process Safety Management
- Product Stewardship
- Site Security and Emergency Response
- Environmental Management
- Visibility and Employee Awareness of Responsible Care
- Occupational Health and Safety
- Transportation Security
- Risk Communication
- Social Responsibility
- TransCAER outreach
- Carrier Selection
- Engagement of Elected Officials
- Community Outreach and Dialogue

The team concluded there are no Findings Requiring Action in this re-verification, and has documented the following Opportunities for Improvement for the company to consider as a means of augmenting its Responsible Care Management System. Also included here are several Best Practices the team felt should be shared with other CIAC company members.

Findings: None

Opportunities for Improvement:

Op 1 There is an opportunity for improvement to utilize the gap analysis to develop policies and level three procedures for identified gap areas. (See Sect 2b)

Op 2 There is an opportunity for improvement, to the SHEMS, to develop level three documents to address any additional CIAC Responsible Care® specific requirements. (See Sect 2b)

Op 3 There is an opportunity for improvement to finalise a 2009 Responsible Care® protocol commitment by completing the CIAC PSM survey, and for stating the intent of the company to maintain their present level of PSM or move to a level appropriate with the site risk level. (See Sect 3a)

Op 4 There is an opportunity for improvement, to the management system, to document the requirement to review the site emergency plan annually. (See Sect 3b)

Op 5 There is an opportunity for improvement, to the management system, to document the recommended requirement to review the site worst case scenario at least every five years. (See Sect 3b)

Op 6 There is an opportunity for improvement, to the management system, to include a grass fire scenario in the site emergency plan training requirements. (See Sect 3b)

Op 7 There is an opportunity for improvement to the management system, to develop level three documents to describe the actions required to assess the toll contractor based in Australia and the frequency of reassessment. (See Sect 3c)

Op 8 There is an opportunity for improvement to develop a management system that ensures third party laboratories conducting business on behalf Cytec Canada Inc. are guided by the codes and Ethic of Responsible Care®. (See Sect 3c)

Op 9 There is an opportunity for improvement to brand Responsible Care® internally and in the Canadian Company's relationships with customers, suppliers, contract laboratories and public stakeholders. (See Sect 3e)

Op 10 There is an opportunity for improvement to review the effectiveness of the E-Log (employee communication system) to determine if the system provides timely follow-up information relevant to the employees who posted the safety work orders into this system. (See Sect 3f)

Op 11 There is an opportunity for improvement to the management system to document a requirement, to review annually, the potential effects, on employees, of both an Oxy Vinyl's Worst Credible Case Scenario and Worst Imaginable Case scenario event. (See Sect 3f)

Op 12 There is an opportunity for improvement to investigate any potential hazards to site employees from neighbouring industry TerraTec and, if present, include this information in employee training requirements). (See Sect 3f)

Op 13 There is an opportunity for improvement, to the risk communication management system, to provide information on the site Worst Credible Case Scenario and shelter in-place instructions to businesses and community gathering venues just outside the WCCS impingement circle. eg: the golf course, paving company and the new YMCA. (See Sect 3g)

Op 14 There is an opportunity for improvement, to the Community Dialogue management system, to develop level three documents that support the CIAC codes of practice AC125

through AC132. Elements of this management system should be updated annually and should include, but not be limited to the following suggested elements. (See Sect 3h)

- *The site manager and/or a delegate should conduct a door to door ‘meet and greet’ with the 30 or so neighbours located within the 1 km. impingement circle, on an appropriate recurring basis to discuss the risk presented by plant operations and to deal with neighbour concerns.*
- *The company should review the CIAC management tool ‘System for Community Outreach Planning and Evaluation’ (SCOPE) for possible use in their community dialogue process.*
- *The company should consider development of a small brochure outlining the company, its products and processes and what to do in the event of an emergency at the site for distribution. There are a number of examples available from their peers at Leadership Group Meetings.*
- *The site’s Welland Wire newsletter should incorporate a ‘Responsible Care’ column as a regular feature. This would provide an opportunity to afford better education to employees on the linkages between Responsible Care principles and code elements and their day to day job functions.*
- *The Welland Wire should be made available on the Niagara CAER website.*
- *The company’s Sustainability Report should be made available on the Niagara CAER website.*

Op 15 There is an opportunity for improvement to reenergize the CAP process and the team suggests the following plan of action. (See Sect 3h)

- *Although Oxy Vinyl has been attending lately, they should be formally recognized as a full partner/member of the CAP and encouraged to share their risk information with the community. By using their risk profile and circle of impingement, the pool of neighbours as prospective CAP members can be increased.*
- *Meetings are generally held during the day. It may be beneficial to have more evening meetings to provide an opportunity to improve poor attendance.*
- *There is a local privately run nature preserve. The company should consider including it in its local charity efforts and recruiting its owner as a CAP member. The CAP should take a more active role in making recommendations for Cytec’s local charity program.*
- *The company should consider trying to recruit a CAP member from the local high school, perhaps as a part of the school’s student community activity credit program.*
- *Recruit representatives from local NGO environmental groups.*

Op 16 There is an opportunity for improvement, to the management system, to formalize the content and frequency, with a level three document, of the Canada-wide third party emergency response training. (See Sect 3m)

Op 17 There is an opportunity for improvement, to the management system, to formalize a meeting content review and attendance monitoring for the TransCAER meeting attended on behalf of the Canadian company. (See Sect 3m)

Best Practice

BP 1 The team judges as a best practice the design work conducted by the site engineering staff to improve the safety performance and reliability of safety relief valve that were available in the market place but did not meet Cytec Canada's stringent PSM requirements. (See Sect 3a)

BP2 The team views as an industry Best Practice engaging local planners and developers, to include in a local sub divider's purchase agreements, information citing the presence in the community of the Cytec Canada Inc. facility and their potential effects on the community. (See Sect 3g)

BP 3 The team judges as a best practice the remediation efforts at the Niagara Falls site where decommissioned manufacturing units were removed and the land allowed to revert to its natural state. (See Sect 3i)

BP 4 The volunteering of on-site vacant land for local police force canine training is considered by the team a best practice. (See Sect 3i)

As a result of the examination conducted, the verification team is of the opinion that the Responsible Care Ethic and Principles for Sustainability are guiding Cytec Canada Inc. decisions and actions, and that a self-healing management system is in place to drive continual improvement. The team believes that the company is capable of responding to the Opportunities for Improvement identified during the verification, summarized below and discussed in detail in the report. The verification is complete and no further involvement is required by the verification team.

Signed: 

Date: August 18, 2011

Roland Blondin

Section 1: Introduction

1.1 About CIAC's Responsible Care Verification

As a member of the Chemistry Industry Association of Canada (CIAC), the most senior executive responsible for Cytec's operations in Canada attests annually to CIAC and its peers that the company's operations conform to the expectations contained in the Responsible Care Commitments and are guided by the *Responsible Care Ethic and Principles for Sustainability*.

The Responsible Care® Ethic and Principles for Sustainability

We are committed to do the right thing, and be seen to do the right thing.

We dedicate ourselves, our technology and our business practices to sustainability - the betterment of society, the environment and the economy. The principles of Responsible Care® are key to our business success, and compel us to:

- work for the improvement of people's lives and the environment, while striving to do no harm;
- be accountable and responsive to the public, especially our local communities, who have the right to understand the risks and benefits of what we do;
- take preventative action to protect health and the environment;
- innovate for safer products and processes that conserve resources and provide enhanced value;
- engage with our business partners to ensure the stewardship and security of our products, services and raw materials throughout their life-cycles;
- understand and meet expectations for social responsibility;
- work with all stakeholders for public policy and standards that enhance sustainability, act to advance legal requirements and meet or exceed their letter and spirit;
- promote awareness of Responsible Care, and inspire others to commit to these principles.

As an element of this commitment to Responsible Care, Cytec must, every three years, participate in an external verification intended to:

1. Provide the Executive Contact with an external perspective when assessing if the company is indeed meeting the intent of the Responsible Care Commitments, along with advice on areas that may require attention;
2. Identify opportunities for assisting the company when benchmarking its own practices and performance against those of its peers, thus supporting continual improvement;

3. Contribute to the credibility of Responsible Care amongst company personnel and stakeholders, as well as the stakeholders of the broader industry;
4. Identify successful company practices that can be promoted to peers in the CIAC membership; and
5. Support the identification of areas of common weakness so that collective tools and guidance can be developed to improve performance in those areas across the CIAC membership.

Verification is conducted according to a common protocol, developed by the association's members and others, including several critics of the chemical industry. The verification is conducted by a team consisting of:

- Knowledgeable industry experts with experience in Responsible Care;
- A representative of the public at large (usually with a public interest background and with experience in Responsible Care gained from serving on the CIAC's National Advisory Panel) and
- One or more representatives of the local communities where the company's facilities are located.

Once completed, the Verification Report is made publicly available through the CIAC website (www.canadianchemistry.ca). Cytec is also expected to share the report with interested persons in its communities and other stakeholders as part of its ongoing dialogue processes.

Additional information on Responsible Care and / or the verification process can be found at the CIAC website www.canadianchemistry.ca, or by contacting the Responsible Care staff at CIAC at glaurin@canadianchemistry.ca or (613)292-8663 extension 233.

1.2 Cytec Canada Inc.'s Description and Organization

Cytec Industries Inc. is a vertically integrated specialty chemical and materials company consisting of two core business groups: Specialty Chemicals and Engineered Materials with the former further subdivided into two divisions one being In Process Separation Chemicals, and the other being Surface Specialties. Cytec Canada Inc. is a wholly owned subsidiary of Cytec Industries with its Canadian headquarters at 9061 Garner Road Niagara Falls, Ontario which also includes its plant. The company's site covers 1000 acres and currently has 105 employees. Over the years Cytec has reduced its operating facilities until at the present time only the production of phosphine and derivative products remain. Hence at its Welland Plant in Niagara Falls, Cytec Canada Inc. operates the largest phosphine (PH₃) and phosphine derivatives plant, (one of only two in the world), and produces a diverse range of phosphine-based products. These products are used in mining and solvent extraction applications, and as intermediates for catalysts, phosphonium salts, and as a UV photo initiator.

Its phosphine derivatives are produced under ISO 9001-2008 certification. Cytec Canada is a member of CIAC, hence all Cytec's Canadian operations operate under Responsible Care. The site also receives large quantities of Cytec products from other Cytec facilities for resale and thus it operates as a distribution center for Canadian customers. The company uses yellow

phosphorus as its basic raw material converting it first to red phosphorus via an acid process, then finally to phosphine gas under a steam process. While the phosphorus is stored under atmospheric pressure, phosphine is stored at elevated pressure then used in the manufacture of other derivatives. Throughout the facility the process and storage tanks and relevant piping are all made of special materials based on the process requirements. A Research and Development facility is included at the site. The facility is certified under RC14001-ISO-14001, and as a member of CIAC and operates under the Canadian Codes, while still using services of Parent company expertise as service providers to the Welland operation.

1.3 About This Verification

This reverification combines aspects of the 2009 Reverification Protocol and the new 2011 Protocol as the new 2011 Version had not been fully approved and implemented at the time this reverification was scheduled. Retained from the 2009 protocol are the required areas of focus in the reverification interviews which are reported upon as before. However, the focus on the company's organization, its overall management system and how its Responsible Care Management system is integrated therein received closer scrutiny during the initial meeting with the company. We sought to understand how the company integrated the issues defined in the CIAC's Plan-Do-Check-Act approach to its Responsible Care Management System. This approach is graphically documented on Page 3 of the Dec 2010 version of the new protocol and is also included further in this report.

Thus this reverification and the resulting report focuses on six key issues. First, along with a brief description of CIAC's Responsible Care commitment is an understanding of the company's organization, how it fits into the overall parent's corporate structure and where service providers to the Canadian company are located in the parent company organization. Secondly, we sought to understand how it structures the company's Responsible Care Management system. (See Section 1.2.) Thirdly, the team reports on how the company addressed the topics found in the 2009 protocol. (See Sections 3a to m.) Fourth, there is a section summarizing actions undertaken in response to the Findings and Opportunities related to the company's previous reverification. (See section 2.c) Fifth, this is followed by a review of the progress made in implementing 2011 plans and actions on key structures related to specific topics under the Sustainability part of the 2011 protocol. (See Appendix 2.) Sixth, finally the team reviewed how the company understands and identifies the gaps between its own Responsible Care Management system and the elements in the 2011 protocol. (See Section 3p.)

The verification of Cytec Canada Inc. began with a visit to the Welland facility and Canadian head office on April 5, 2011 to familiarize the team with the company organization and structure and its Responsible Care Management System. This was followed by a two day visit to cover the rest of the normal reverification topics. Also the team conducted interviews with other company personnel via telephone. During the course of the verification, the team had the opportunity to interact with a wide range of company personnel. Attachment 2 contains a list of those individuals interviewed and their affiliations.

This was the fifth Responsible Care verification completed for Cytec with the most previous verification being completed in June 2007 with final sign-off date of July 16, 2008.

The verification team was comprised of the following individuals.

- Roland Blondin (Team Leader)
- Cam Dillabough (Industry verifier)
- Jim Wakefield (Public-At-Large Verifier)
- Mabel Biggar (Community Representative)

2. GENERAL FINDINGS OF THE TEAM

2a) Statement on the Responsible Care® Ethic

Throughout the interview process the team checked for evidence that the Responsible Care® ethic was visible and at work in the company, guiding the company's judgement, decisions and actions.

Team Observations

After two days of interviews on-site and interviews with members of the Community Advisory Panel, the team is unanimous in stating that the Responsible Care® Ethic is well understood by company personnel and does in fact underpin the day to day operation and business decisions of Cytec Canada Inc.

2b) Overall Responsible Care® Management System

It is a requirement of Responsible Care® that companies have documented, sound management systems capable of ensuring that all operations of the company across all business units, functions and sites meet the ethic, codes of practice and other expectations of Responsible Care® on an ongoing basis. A sound management system drives continuous improvement, and has the following attributes:

- Plan
 - review code requirements
 - benchmark best practices
 - get input from stakeholders
 - decide on best approach
 - set targets for performance
 - assign responsibility
- Do
 - document
 - train people
 - assign resources
 - carry out activities

Check- audit

- measure performance of system
- measure performance from system
- obtain stakeholders' feedback
- assess employees' performance

Act

- follow-up on audit findings
- communicate performance, get feedback
- reward or correct employees
- repeat *Plan* steps

There must be such management systems both for the overall management of the company and for each code element. This section 2 b covers the team's findings with respect to this overall management system, and section 3 below covers the specific code elements that were reviewed in the re-verification.

Team Observations

Cytec Industries has withdrawn from ACC in the USA, but continues to be a member of CIAC in Canada and is a strong supporter of the CIAC and the Responsible Care® principles. Hence it is no longer able to call its company-wide management system Responsible Care in the USA. Consequently, Cytec has chosen to call its Safety, Health, Environment Management and Responsible Care System, SHEMS in its documents.

The Responsible Care® Management System (SHEMS) is the management system that encompasses all Cytec management systems in place to manufacture and market its chemical products. Cytec Canada is certified to RC 14001 and ISO 14001 by QMI – SAI Global under Cytec Industries corporate certification.

Procedures are set up in a tier system with the Responsible Care policy as tier one and SHEMS procedures as tier two. These procedures document responsibility, document control, auditing and follow up which are the basis of a Plan, Do, Check and Act management system. These procedures are numbered as are the ISO requirements for easy cross reference. Tier 3 procedures are the safety and environmental standard practice instructions. Tier 4 is documents.

SHEMS related corporate goals and objectives, including a corporate sustainability focus, are cascaded through the organization resulting in the development of manufacturing site and personal key performance indicators that support these goals and objectives. There is a corporate level "checking" process to monitor progress in these areas including a real time intranet "dash board".

The team reviewed the GAP analysis Cytec had undertaken between its current management system and the CIAC Responsible Care® Commitments in the new protocol which will be the focus of its 2014 reverification. At the time of this reverification, the Niagara site had partially completed a gap analysis to identify areas where the company's SHEMS system did not entirely address the new Responsible Care® Commitments. . The team noted the additional challenge for this site to dovetail the commitments with the Corporate SHEMS requirements.

Cytec has now restructured its Responsible Care code review team. The Overall Coordinator is now responsible for setting timeframe goals and for guiding the company through the process. Each code manager now feeds his progress to the Overall Responsible Care Coordinator who confirms a consistent approach and the timeliness of the code reviews.

The team encourages this analysis to be completed with emphasis being put on ensuring that the company's SHE Management System being used in Canadian operation incorporates the CIAC Responsible Care requirements in those CIAC code areas that are covered by personnel outside of the Canadian operation.

Opportunities for Improvement

Op 1 There is an opportunity for improvement to utilize the gap analysis to develop policies and level three procedures for identified gap areas.

Op 2 There is an opportunity for improvement, to the SHEMS, to develop level three documents to address any additional CIAC Responsible Care® specific requirements.

2c) Follow-up on Findings in Last Verification Report

The team reviewed how the company addressed the findings requiring action and opportunities for improvement cited by the previous verification team in their report to the company. Certain follow-up items are covered in the specific topics below.

Team Observations

All findings and opportunities from the 2008 report had been addressed. The status of each finding and opportunity was reviewed during the interview process and some improvement opportunities in this report address areas where there was not a full understanding of specific code requirements and expectations contained in improvement opportunities from the 2008 report.

2d) Response to Incidents and Concerns since the last Verification

Since the way in which unplanned situations are handled shows the influence of the Responsible Care® ethic and responsiveness of the management system, the team looked at the issues, incidents and concerns that have arisen since the last verification and how the company has handled them. Some of these may be covered under individual topics below, as noted.

Team Observations

There is a comprehensive management system in place, Cytex Incident Reporting System, (CIRS) to record incidents at the plant site including security related incidents and concerns or information requests from the community. The Corporate level management system, entitled “Plant Corrective Action Tracking”, (PCAT) for tracking, assigning responsibility and corrective action implementation fully meets the expectations of the Responsible Care® Codes of practice in relation to incident tracking and response.

2e) **Performance Measures**

The ‘check’ step of a management system is the part that shows the effectiveness of the system, and a key question is: “What does the company check as its indicator of performance?” For a few items – emissions & wastes, occupational safety & health, incidents related to transportation or process operations – C.I.A.C. specifies measures for reporting under Responsible Care®. Most other areas are left to the discretion of each member or partner. The team was asked to review and comment on the measures used by the company to track and improve performance. Some of these are covered under specific sections below, but general comments are given here.

Team Observations

Performance goals are developed at the corporate level in areas as varied as sustainability, safety, health and environment, quality and customer satisfaction. These performance goals are cascaded throughout the organization and then modified at each level, business group and individual manager where goals and objectives are developed to support the corporate goals. A comprehensive performance tracking system is in place that includes a “real time” corporate dash board that can be reviewed by all employees. A percentage of individual manager’s annual bonus is directly linked to the safety performance of operational areas under their control.

3. **TEAM FINDINGS FOR SPECIFIC CODE MANAGEMENT SYSTEMS**

In examining how the company is fulfilling the specific expectations of Responsible Care®, the team focused first on four topic areas identified as priority items by the CIAC board of directors for the period 2005-2008. These pertain to process safety management and the related site emergency response, product stewardship and environmental management.

3a) **Process Safety Management (PSM)**

The team looked at how the hazards and risks from potential episodic (‘sudden’) incidents are identified and controlled at the company’s sites, including awareness and understanding of the methods used for assessment and the techniques for hazard control, and how these are applied and kept current. This includes how the company’s sites rank based on the *Site Self-Assessment Tool* of the Chemical Institute of Canada – whether they meet criteria for the “Essential” level of PSM, and how the company has assessed the value of aspects beyond the essential level.

Team Observations

The most serious risk at this facility is the presence and use of phosphorus and phosphine (PH₃). The company has decided to use the Welland plant as the model for assessing risk of this

product. Consequently, it has completed two risks assessments here in recent years, one in 1999 and a second in 2004. Both essentially reached the same conclusion. Of the four raw materials phosphine, phosphorous, isobutylene and hydrogen peroxide, thought to be related the most serious consequences of an emergency, it was determined that a phosphine incident could lead to the site's Worst Imaginable Case Scenario, and also to its Worst Credible Case Scenario. As both phosphorus and phosphine are anthropogenic (auto-ignitable), exposure to air causes them to break into fire immediately, hence the issue related to both Worst Case Scenarios is the product of combustion, P₂O₅, or phosphorus pentoxide which is a health hazard to both animals (humans) and plant life. The Worst Imaginable Case Scenario consists of a flange leak at the flange connecting piping to a phosphine storage tank. These tanks are controlled at low temperature and high pressure, hence the leak would cause a jet fire and deluge water must be used to cool the surrounding area until the contents of the tank were depleted by a combination of transferring product to other tanks and by dropping the pressure until the flame stopped. The Worst Credible Scenario is a release most likely from a processing vessel into the piping vent system where the natural gas fuelled pilot flames would cause the vent stack flare to ignite and combust the released phosphine containing material from the process, thus reducing the material to P₂O₅ as in the WICS.

The site's safety and security conforms to the RMP requirements used for high risk sites in the USA. The company had earlier informed CIAC that it had reached the "Essential" level in its process safety self assessment. Since then the site was brought to the requirements of RMP sites, the site did not complete its formal PSSA study to determine what further work beyond "Essential" it needed to complete, as it assumed that the MIACC PSSA was far less demanding and thus was no longer required to report what it considered necessary beyond the "Essential" level. Due to the risk level associated with the products produced at this site, the company's process safety management discipline practiced adheres to the United States Occupational Health and Safety Act (OSHA) standard CFR 1910.119 as required by the U.S. parent company Cytec Industries. This worldwide accepted standard is comprised of fourteen elements that include regularly scheduled process hazard reviews, management of changes procedures, employee training criteria, mechanical integrity and management system audits. This PSM fully complies with the CIAC Responsible Care® code requirements. The company now realizes that as long as it remains a CIAC member reporting its site needs beyond "Essential" is a requirement.

The company uses the FMEA protocol to assess site risk.

Opportunity for Improvement

Op 3 There is an opportunity for improvement to finalise a 2009 Responsible Care® protocol commitment by completing the CIAC PSM survey, and for stating the intent of the company to maintain their present level of PSM or move to a level appropriate with the site risk level.

Best Practice

BP 1 The team judges as a best practice the design work conducted by the site engineering staff to improve the safety relief valve performance and reliability of process valves that were available in the market place but did not meet Cytec Canada's stringent PSM requirements.

3b) Site Security & Emergency Response

The team looked at how the company had identified and assessed the security vulnerability of its sites, and how it had selected and implemented countermeasures to address security concerns. The team also examined how the company assesses the full range of risks its site operations may present to their communities, together with the process for liaison with local emergency officials at each site, and for developing, coordinating and testing site emergency plans with those of the community.

Team Observations

There is a comprehensive site security management system in place with a corporate oversight and audit process. Likewise as per OSHA PSM requirements a comprehensive Emergency Planning and Response management system is in place. As per CIAC requirements the site emergency plan was tested in 2010 and is integrated with the community plan. In 2004 the site worst case scenario was reviewed by a third party consultant and judged to be still relevant. The following are team suggestions on improving this process.

Opportunity for Improvement

Op 4 There is an opportunity for improvement, to the management system, to document the requirement to review the site emergency plan annually.

Op 5 There is an opportunity for improvement, to the management system, to document the recommended requirement to review the site worst case scenario at least every five years.

Op 6 There is an opportunity for improvement, to the management system, to include a grass fire scenario in the site emergency plan training requirements.

3c) Product Stewardship

For this aspect of Responsible Care®, the team examined the company's processes for:

- i) assessing the exposures of people to its products over their life cycles, assessing the potential health implications of these exposures, communicating information to those potentially affected and taking action to prevent health impacts;
- ii) ensuring that their products are not used by terrorists, the illegal drug industry or others who might use them for illegal purposes; and
- iii) ensuring that suppliers of chemicals are meeting the intent of Responsible Care®.

Team Observations

Cytec Industries, the U.S. parent company has a product stewardship management system entitled “Product Risk Characterization Management Process”. To fully comprehend the comprehensiveness of the management system the reader should visit the company web site at: www.cytec.com/about/world-location.htm and access the Safety, Health and Environment page to review this management system’s components. During the team re-verification interviews it was evident that this corporate management and philosophy is well entrenched in the Cytec Canada Inc. Product Stewardship management system.

Opportunity for Improvement

Op 7 There is an opportunity for improvement to the management system, to develop level three documents to describe the actions required to assess the toll contractor based in Australia and the frequency of reassessment.

Op 8 There is an opportunity for improvement to develop a management system that ensures third party laboratories conducting business on behalf Cytec Canada Inc. are guided by the codes and Ethic of Responsible Care®.

3d) Environmental Management

In addition to examining in general the company’s performance in reducing its environmental “footprint, the team looked specifically at the company's performance history and 5-year projections regarding greenhouse gas emissions. This included actions both taken and planned and whether through direct reduction of emissions or indirect reduction through such measures as improved efficiency in use of energy or materials, changes in technology, etc.

For fact-finding purposes only, to assist CIAC in developing recommendations for addressing growing concerns over water consumption, the team also reviewed any actions taken by the company to identify and reduce its usage of water.

Team Observations

As a corporate requirement the Canadian site is ISO 14001 (environmental management standard) certified. The site also complies with the CIAC required emission reporting and the CIAC expectation of developing reduction plans for site emissions and reductions in the use of water and energy. For a flavour of the corporate focus on the environment, sustainability and green chemistry please visit the corporate web site at: www.cytec.com/about/world-location.htm and access the sustainability page. At the time on the reverification visit the parent company had appointed a Corporate level Team Leader to focus company waste reduction activities including those in Canada.

3e) Visibility & Employee Awareness of Responsible Care®

Here the team looked at how the company seeks to make Responsible Care® a visible part of its facilities and its internal and external communications, and how it ensures that all employees understand the essence of Responsible Care® and its relevance to their job activities and decisions.

Team Observations

There were two improvement opportunities in the 2008 report relating to this section. The company did increase the use of the Responsible Care® logo and also did revise the employee safety meeting title to include a reference to Responsible Care®.

Although the term Responsible Care is used in employee EHS discussions, there is still not a good employee understanding of how the Ethic and Codes apply to their own individual work practices at the site. Better signage throughout the plant and a regular Responsible Care column in the internal newspaper outlining specific workplace examples of everyday Responsible Care applications would go a long way towards better employee understanding of Responsible Care and how it relates to everyday activities on the part of all employees. Site management may also wish to utilize the various electronic social networking tools to further enhance the excellent site management communication process.

Opportunity for Improvement

Op 9 There is an opportunity for improvement to brand Responsible Care® internally and in the Canadian Company's relationships with customers, suppliers, contract laboratories and public stakeholders.

3f) Workplace Health & Safety

The team looked at the company's processes for continuous improvement in protecting the safety and health of employees, contractors and visitors.

Team Observations

Based on the OHSA PSM requirements there is a comprehensive workplace health and safety management system in place commensurate with the risk level of this facility. Elements such as pre-employment medicals, structured worker training, current operating procedures, industrial hygiene monitoring and employee participation are in place and were subject to a rigorous Plan, Do, Check and Act Management System of continuous improvement.

Opportunity for Improvement

Op 10 There is an opportunity for improvement to review the effectiveness of the E-Log (employee communication system) to determine if the system provides timely follow-up information relevant to the employees who posted the safety work orders into this system.

Op 11 There is an opportunity for improvement to the management system to document a requirement, to review annually, the potential effects, on employees, of both an Oxy Vinyl's Worst Credible Case Scenario and Worst Imaginable Case scenario event.

Op 12 There is an opportunity for improvement to investigate any potential hazards to site employees from neighbouring industry TerraTec and, if present, include this information in employee training requirements).

3g) **Site Risk Communications**

The team looked at the company's management system for ongoing communication and dialogue on the risks of its site operations with potentially affected communities.

Team Observations

The site risk profile and Worst Case Scenarios (WCS) have been reviewed with residents within the WCS impingent area and with the CAP. There is also a process in place to review changes in the risk profile with residents. Because of the nature of a potential WCS the team would recommend that instructions for action to take in the event of a site incident be provided to businesses and community gathering venues just outside the impingement circle.

Opportunity for Improvement

Op 13 There is an opportunity for improvement, to the risk communication management system, to provide information on the site Worst Credible Case Scenario and shelter in-place instructions to businesses and community gathering venues just outside the WCCS impingement circle. eg: the golf course, paving company and the new YMCA.

Best Practices

BP2 The team views as an industry Best Practice engaging local planners and developers, to include in a local sub divider's purchase agreements, information citing the presence in the community of the Cytex Canada Inc. facility and their potential effects on the community.

3h) **Dialogue Process with Communities**

The team looked at how the company's broader process for dialogue with its communities has been working since the previous verification, including the identification of stakeholders, community issues and concerns, how concerns were addressed and the choice of dialogue methods. They looked at the effectiveness of the management system in ensuring the company is planning, implementing, evaluating and continuously improving its relationship with the community.

Team Observations

There is a level two document contained in the ISO based SHEMS system requiring stakeholder communication. However, good work by the Canadian site in this area has not been documented. In that vein the team will suggest the opportunity on this subject as seen below.

Furthermore, the company has in place a Community Advisory Panel (CAP) populated by company representatives and local residents. In conjunction with the large reduction in the company "foot print" in recent years the involvement and interest in CAP activities by local residents has also been reduced.

Opportunity for Improvement

Op 14 There is an opportunity for improvement, to the Community Dialogue management system, to develop level three documents that support the CIAC codes of practice AC125 through AC132. Elements of this management system should be updated annually and should include, but not be limited to the following suggested elements.

- The site manager and/or a delegate should conduct a door to door ‘meet and greet’ with the 30 or so neighbours located within the 1 km. impingement circle, on an appropriate recurring basis to discuss the risk presented by plant operations and to deal with neighbour concerns.*
- The company should review the CIAC management tool ‘System for Community Outreach Planning and Evaluation’ (SCOPE) for possible use in their community dialogue process.*
- The company should consider development of a small brochure outlining the company, its products and processes and what to do in the event of an emergency at the site for distribution. There are a number of examples available from their peers at Leadership Group Meetings.*
- The site’s Welland Wire newsletter should incorporate a ‘Responsible Care’ column as a regular feature. This would provide an opportunity to afford better education to employees on the linkages between Responsible Care principles and code elements and their day to day job functions.*
- The Welland Wire should be made available on the Niagara CAER website.*
- The company’s Sustainability Report should be made available on the Niagara CAER website.*

Op 15 There is an opportunity for improvement to reenergize the CAP process and the team suggests the following plan of action.

- Although Oxy Vinyl has been attending lately, they should be formally recognized as a full partner/member of the CAP and encouraged to share their risk information with the community. By using their risk profile and circle of impingement, the pool of neighbours as prospective CAP members can be increased.*
- Meetings are generally held during the day. It may be beneficial to have more evening meetings to provide an opportunity to improve poor attendance.*
- There is a local privately run nature preserve. The company should consider including it in its local charity efforts and recruiting its owner as a CAP member. The CAP should take a more active role in making recommendations for Cytec’s local charity program.*
- The company should consider trying to recruit a CAP member from the local high school, perhaps as a part of the school’s student community activity credit program.*
- Recruit representatives from local NGO environmental groups.*

3i) Social Responsibility

In this area the team was not looking for evidence that the company's performance met certain expectations, but rather for information on ways the company has provided benefits to, and worked to understand and further the social aspirations of, its local communities and broader society beyond the boundaries of EH&S performance. Aspects considered include working with schools, progressive employee programs, support for charitable work, policies for investments and operations abroad, workplace diversity, corporate ethics policies, policies for suppliers in social responsibility, etc.

Team Observation

At the U.S. corporate level Cytec Industries has in place a management system for addressing the social responsibility aspects of their sustainability focus. The supporting philosophy is that the company prefers to “give back to the communities in which they operate” and leaves the decisions to the local manager to decide what makes sense for their communities. The Cytec Canada Inc. located in Niagara Falls has supported community initiatives from donating land for a local community centre to supporting local schools career day, local sports teams and community volunteer environmental initiatives. For more information please reference the corporate web site at:

www.cytec.com/about/world-location.htm and access the 2009 Sustainability Report.

Best Practices

BP 3 The team judges as a best practice the remediation efforts at the Niagara Falls site where decommissioned manufacturing units were removed and the land allowed to revert to its natural state.

BP 4 The volunteering of on-site vacant land for local police force canine training is considered by the team a best practice.

3j) Engagement with Elected Officials

Since part of Responsible Care® is a commitment to assist in the processes of sound public policy development consistent with the criteria for sustainable development, the team reviewed the company’s process for establishing ongoing relationships with elected officials (i.e., MPs, MPPs, city councillors, etc.) in constituencies where the company has a presence, to acquaint those officials with the nature of the company’s operations, economic impact, Responsible Care® commitment, activities and public policy concerns, and to understand the elected officials’ interests and concerns. Also reviewed were the company’s engagement in CIAC activities aimed at assisting in the development of sound public policy (e.g., Parliamentary Day, policy discussions, lobbying, etc.).

Team Observations

The Executive Contact for the company participates in the CIAC parliamentary days and has a working relationship with the elected officials at the county level and the city of Niagara Falls. In the past, because of the company’s much larger “footprint,” interaction with local and provincial

elected officials was part of daily business. Today, the challenge for the company with its greatly reduced “footprint” will be to maintain that relationship commensurate with its present size.

3k) Transportation Security

The team looked at how the company assesses the risk of deliberate misuse of products or raw materials in transit and provides protection against such risks.

Team Observations

All Responsible Care® expectations in this area are being met through comprehensive product stewardship and carrier selection and auditing management systems.

3l) Carrier Selection

The team looked at the company’s process for establishing criteria for the selection of road, rail, marine, pipeline and air carriers, and for ongoing assessment of those carriers against those criteria.

Team Observations

The basis for addressing this aspect of Responsible Care® is the corporate supplier approval management system. This management system is a comprehensive process that utilizes specific criteria, based on risk levels, to select various carrier modes, audit performance against specific criteria to continuously improve system safety and customer satisfaction.

3m) TransCAER Outreach

TransCAER is the CIAC program for Transportation Community Awareness and Emergency Response. It involves the company’s approach to preventing transportation incidents, its transportation emergency response plan, and also outreach to communities through which chemicals are transported. Company responsibilities are decided by regional TransCAER committees formed from the members and partners in each region. The team looked at how the company has participated in TransCAER outreach in each region where it has facilities, and how effectively the Responsible Care® ethic drives the building of relationships with targeted stakeholder groups.

Team Observations

The Canadian site maintains a trained Emergency Response Incident Management core group at the Niagara Falls location to respond with technical support and hands-on response if required. They also retain a third party emergency response company for incidents that would require additional resources. In 2010 the company conducted an internet based training session, across Canada, for their third party emergency response contractor. The North American Logistics Manager, based in Connecticut, attends the Ontario Road Committee meetings on the company’s behalf.

Opportunity for Improvement

Op 16 There is an opportunity for improvement, to the management system, to formalize the content and frequency, with a level three document, of the Canada-wide third party emergency response training.

Op 17 There is an opportunity for improvement, to the management system, to formalize a meeting content review and attendance monitoring for the TransCAER meeting attended on behalf of the Canadian company.

3n) Areas of Focus Requested by the Company

In addition, the company has the opportunity to ask the team to investigate other aspects of Responsible Care®.

There were no specific focus areas requested by the Company for this reverification.

4. CONCLUSION

The report focused on six key issues:

- 1) The company's organization, how it fits into the parent's corporate structure; and where its Canadian company's outside (corporate) service providers fit into the parent company structure.
- 2) The company's Responsible Care Management system. (See Section 1.2.)
- 3) What actions were undertaken in response to the Findings and Opportunities related to the company's previous reverification. (See section 2.c),
- 4) The progress made in implementing 2011 plans and actions on key structures related to specific topics under the Sustainability part of the 2011 protocol. (See Appendix 2.)
- 5) How the company understood and identified the gaps between its own SHEMS and the CIAC's Responsible Care elements in the new protocol. (See Section 2b.)
- 6) How the company addressed the required topics found in the 2009 protocol. (See Sections 3a to m.)

Based on the assumption that the Responsible Care is a set of guideposts and not a rule book, the team must determine whether through discussions, documents and overall company culture, Cytex Canada SUFFICIENTLY:

- 1) operates as a goal and ethics driven organization, with tangible evidence in place to confirm this through its actions and commitments,
- 2) that it has a management system in place to guide setting company goals that show proof of continuous improvement through self correction and

3) that the company does sufficiently meet the expectations of the CIAC's Responsible Care commitments.

In reporting its findings, the team also needs to identify the symptoms of weaknesses it found in a way that leads the company to correct the gaps or deficiencies in the Company's ethics, its management system, or code interpretation so it can correct the gaps through understanding current benchmarks and expectations and approaches for operating facilities in Canada.

- 1) The company's description of the Welland facility, its products and the associated hazards was clear and concise. The hazardous nature of its processes was clearly the basis for many precautions and procedures associated with the plant operations and emergency fail-safe approaches to its operation.
- 2) Cytec's overall management system is based on a variety of approaches including ISO 9001, ISO 14001 and the ACC's Responsible Care approach. Currently, the Parent company is no longer a member of ACC. While the Responsible Care® Management System (SHEMS) is the corporate-wide management system that encompasses all Cytec management systems in place to manufacture and market its chemical products, in Canada, Cytec Canada is a member of CIAC and therefore operates under the CIAC's Responsible Care Management. Our comments pertaining to Cytec Canada's Responsible Care Management System will focus on the CIAC's Responsible Care approach. Our comments are found as Opportunities and Best Practices throughout Section 3a-m as they occur and are listed in the Executive Summary.
- 3) The team reviewed how the company addressed the findings requiring action and opportunities for improvement cited by the previous verification team in their report to the company. The company has a systematic approach in reviewing all findings and opportunities, However the company's resolution of the 3 findings from the previous reverification were found wanting and have been addressed further in this report. All opportunities were addressed, some accepted while others were not.
- 4) 5) Cytec Canada's progress made in implementing 2011 plans and actions on key structures related to specific topics under the Sustainability part of the 2011 protocol were substantial and based on the overall Cytec Industries Inc's excellent approach to Sustainability. (See Appendix 2.)
- 5) The company's understanding and identification the gaps between its own Responsible Care Management system and the elements of both the old CCPA's Responsible Care Management System and CIAC's new Management System in the new protocol was incomplete. This had already been recognized by the company. Consequently, the team responsible for identifying these gaps has been reorganized with the Responsible Care Overall Coordinator leading the approach and thus providing a uniform approach to gap identification and action to resolve any such gaps. (See Section 2b.) Cytec Canada needs to focus on the elements of the new protocol rather than review both the old and the new code elements.

It is the consensus of the re-verification team however, that Cytex Canada Inc. is sufficiently meeting the codes, benchmarks and collective expectations of Responsible Care®, that the company has an effective self-healing management system in place and the Responsible Care® Ethic is tangible and guides the company's judgement, decisions and actions both internally and externally.

5 COMPANY COMMENTS

None

APPENDIX 1: COMPANY ORGANIZATION AND DESCRIPTION

Cytec Industries Inc. is a vertically integrated specialty chemical and materials company consisting of two core business groups: Specialty Chemicals and Engineered Materials with the former further subdivided into two divisions one being In Process Separation Chemicals, and the other being Surface Specialties. Cytec Canada Inc. Is a wholly owned subsidiary of Cytec Industries with its Canadian headquarters at 9061 Garner Road Niagara Falls, Ontario which also includes its plant. The company's site covers 1000 acres and currently has 105 employees. Over the years Cytec has reduced its operating facilities until at the present time only the production of phosphine and derivative products remain. Hence at its Welland Plant in Niagara Falls, Cytec Canada Inc. operates the largest phosphine(PH₃) and phosphine derivatives plant, (one of only two in the world), and produces a diverse range of phosphine-based products. These products are used in mining and solvent extraction applications, and as intermediates for catalysts, phosphonium salts, and as a UV photo initiator.

Its phosphine derivatives are produced under ISO 9001-2000 certification. Cytec Canada is a member of CIAC, hence all Cytec's Canadian operations operate under Responsible Care. The site also receives large quantities of Cytec products from other Cytec facilities for resale and thus it operates as a distribution center for Canadian customers. The company uses yellow phosphorus as its basic raw material converting it first to red phosphorus via an acid process, then finally to phosphine gas under a steam process. While the phosphorus is stored under atmospheric pressure, phosphine is stored at elevated pressure then used in the manufacture of other derivatives. Throughout the facility the process and storage tanks and relevant piping are all made of special materials based on the process requirements. A Research and Development facility is included at the site. The facility is certified under RC14001-ISO-14001, and as a member of CIAC and operates under the Canadian Codes, while still using services of Parent company expertise as service providers to the Welland operation.

The Niagara Falls plant is part of the Specialty Chemicals Group with further specialisation in the In Process Separation Chemicals Division. This facility also houses a distribution centre which handles a large number of resale items manufactured at Cytec facilities worldwide and destined for distribution in Canada.

For further information go to: www.cytec.com/about/world-location.htm

APPENDIX 2: New Company Actions Based On 2010 Principles for Sustainability

The team reviewed what new approaches the company had initiated since the last reverification that contributed towards the Principle of Sustainability within the company. The following is a summary of the company's activities in this area in the requested fields.

- a) Work for the improvement of people's lives
 - Employee wellness program
 - Community engagement (Project Share)
- b) Work for the improvement of the environment
 - Use of bicycles in the summer
 - H₂S scrubber installed
 - Close under-utilized building
- c) Take preventative action to protect health and the environment
- d) Innovate for safer products
 - Replace methyl bromide based fumigants
 - Move from solvent based to water based coatings
- e) Innovate for safer processes
 - Development of a more efficient safety relief valve
- f) Innovate to conserve resources
 - Introduction of variable speed drive motor technology (energy)
 - Reuse warm water from process to replace cold water (water, energy)
 - Condensate return (water)
 - Use of energy efficient lighting
- g) Innovate for products and processes that provide enhanced value
 - More efficient compressor installed
- h) Engage with business partners to ensure stewardship and security of products and/or services
 - Recycle and reuse solvent extraction product (economic sacrifice)
 - Member , Phosphorous Emergency Response Training (PERT)
 - Visit to Toller in Australia
- i) Engage with business partners to ensure stewardship and security of raw materials
 - Phosphorous cars sealed with no bottom outlet
- j) Understand and meet expectations for social responsibility

- Company Sustainability Report
 - Employee education assistance, scholarships
- k) Promote awareness of Responsible Care.”

APPENDIX 3: TEAM AND CONTACTS

1. The Verification Team consisted of the following:

Name	Affiliation	Representing
Roland Blondin	C.I.A.C. verifier	Industry (team leader)*
Cam Dillabough	C.I.A.C. verifier	Industry*
Jim Wakefield	C.I.A.C. verifier	Public*
Mabel Biggar	Community Representative	The Niagara Falls/ Port Robinson area

Team members assigned by CIAC. are shown by an asterisk (*).

2. Persons contacted at the company

Name	Position
Rene Lemay	Site manager
Ken Milo	Health, safety & Environment Manager
Jim Blain	Safety & Industrial Hygiene Co-ordinator
Kelly Mischuk	Environmental Technician
Michael Moser	Research Group Leader
Jeff Dyck	Research Chemist
Elisa Allen	Engineering Supervisor
Charlie Schreier	North American Logistics Manager
Anna Macugajlo	Product Specialist, Phosphine Specialties & Mining

	Chemicals
Bryon Hansen	Site Logistics Manager
Tom Hynes	Joint Health And Safety Committee (JHSC) member
Gates Vachon	JHSC member
Rob Edwards	JHSC member
Lui Mignone	JHSC member
Bryan Sebben	JHSC member

APPENDIX 4 Graphical Representation of CIAC Responsible Care Management System

