

# RESPONSIBLE PRODUCTION

A Framework for Chemical Hazard Management for Small and Medium Sized Enterprises

Incorporating best practice from Safer Production, APELL and Corporate Social Responsibility

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## UNEP

The United Nations Environment Programme (UNEP) acknowledges that the comprehensive management of chemical hazards is a crucial aspect of any sustainable development strategy. As countries move towards more responsible industrial systems and face the challenges of a global green economy, many have enacted measures requiring industries to manage chemicals in a manner that poses less risk to human health and the environment. National authorities, industrial associations, and technical institutions have in many cases developed guidelines promoting the sound management of chemicals. However, many of these guidelines are primarily applicable to larger-scale industries and Small and Medium Sized Enterprises (SMEs) often find it difficult to deal with too many different approaches and requirements, all contributing to the same results. SMEs also receive little assistance and do not have access to relevant sources of information on chemical hazards and risks.

Because SMEs form the backbone of the industrial sectors in many developing countries and fast-growing economies where hazardous chemicals are manufactured, transported, repackaged and used, UNEP considers that it is critical that SMEs develop the capacity to safely manage their chemical hazards. To set up effective safety management approaches, SMEs must be involved in initiatives that promote chemical safety management throughout the value chain. These initiatives need to engage a wide range of stakeholders including workers, transporters, distributors, customers, authorities, nearby communities and other businesses including larger companies.

UNEP's Responsible Production framework is a systematic, continuous improvement approach to chemical safety along the value-chain. The approach provides technical materials and tools to help SMEs understand hazards, control chemical exposures, reduce the risk of accidents, promote product stewardship and engage stakeholders. The tools are meant to offer practical methods for improved risk planning, management, and communication, with the goal of preventing human or environmental exposure to hazardous substances. Pilot studies conducted in Thailand and Peru demonstrated the advantages of the Responsible Production approach and resulted in a responsive and user-friendly guidance.

By using this handbook UNEP hopes that SMEs will improve their ability to proactively manage chemical hazards at their facilities, resulting in more responsible production throughout the supply-chain and an increased capacity for sustainable development.



**Arab Hoballah**

Chief, Sustainable Consumption and Production Branch  
Division of Technology, Industry and Economics  
United Nations Environment Programme

### **AccountAbility**

It is becoming increasingly difficult for Small and Medium Sized Enterprises to be competitive. Not only must they contend with rapidly changing technical requirements, ever increasing pressure on prices and an often complex and confusing regulatory and policy context. They are increasingly faced with demands to address unfamiliar social, environmental and ethical issues. These new demands are not coming only from the people and organisations they already know and work with. They are coming from a much wider range of stakeholders who are knowledgeable about social, ethical and environmental issues and vocal about their concerns. These demands are forcing Small and Medium Sized Enterprises to understand what sustainability means in relation to their business and to look beyond their own fences and consider their actions in relation to the full value chain that they are part of.

Responsible Production gives Small and Medium Sized Enterprises an accessible, systematic and adaptable approach to understanding and addressing these new demands. It will enable them to operate more sustainably and to be more competitive. Real progress towards sustainable development will only come when Small and Medium Sized Enterprises play a significant role in driving change and innovation. Responsible Production has been designed to catalyse this innovation.



**Alan Knight**

AccountAbility

### **International Council on Mining and Metals (ICMM)**

Robust and integrated chemicals management policies are a vital component of a commitment to a more sustainable future. Managing chemicals, including minerals, metals and alloys, throughout their life cycles in a responsible way is clearly one important aspect of the mining industry's commitment to sustainable development.

The United Nations Strategic Approach to International Chemicals Management (SAICM) acknowledges the essential contribution made by minerals, metals and alloys to modern societies and economies while at the same time recognizing the potential threat to man and the environment if chemicals are not managed responsibly. ICMM hopes that SAICM will soon lead to efficient, effective and coherent chemicals management systems around the world.

The UNEP Responsible Production framework supports these international efforts by providing guidance for Small and Medium Sized Enterprises working with potential chemical hazards. Responsible production – the management of social, economic, environmental, health and safety issues associated with any industry – is a keystone for responsible business. There is a wealth of information and many lessons can be shared between different parts of each sector, and between different sectors, to facilitate safe and clean operations. The UNEP Responsible Production process and resulting framework ably demonstrate the benefits of doing so. Together with the related toolkit, this document will equip small and medium-sized companies with the information needed to effect real change on the ground.

#### **Christine Copley**

International Council on Mining and Metals

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### International Council of Chemical Associations (ICCA)

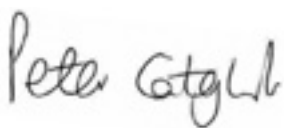
Chemicals management is at the heart of ICCA's premier environmental, health, and safety performance initiative, Responsible Care®. It provided an ideal platform for our partnership with UNEP in development of the Responsible Production approach.

The partnership is also fully in line with the commitments we made under the Responsible Care Global Charter and the Global Product Strategy (GPS), developed by ICCA to help our industry better address the many chemical management challenges it faces. The Global Charter and the GPS were launched in 2006 at the first International Conference on Chemicals Management to articulate and demonstrate our commitment to the UN's Strategic Approach to Chemicals Management (SAICM).

We regard the Responsible Production approach as an effective tool for SMEs to help achieve SAICM objectives, and complementary to the chemical industry's improved focus on capacity building activities. ICCA's Responsible Care Leadership Group and the Chemical Policy & Health Leadership Group, through the GPS, have strengthened their product stewardship activities through the value chain, and improved cooperation with suppliers, customers and downstream users. Many of these activities are particularly targeted at SMEs.

Working with UNEP and other key stakeholders involved in development of the Responsible Production guidance and toolkit has provided further opportunity to share industry best practices and learn from our partners as part of the process to ensure improved management of the risks and impacts associated with chemicals.

Providing SMEs with a practical and easily-integrated approach to chemicals management that incorporates elements such as worker safety, community engagement and reducing environmental impacts, also enables them to demonstrate a real commitment to Corporate Social Responsibility. ICCA commends development of the Responsible Production guidance and toolkit as an important step forward for all stakeholders involved in the continuing drive for sustainability.



**Peter Cartwright**

Chairman, ICCA Responsible Care Leadership Group

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### Ministry of Environment of Peru

Environmental management tools are the operational means of a technical or policy aimed at supporting public and private management for effective conservation and sustainable use of natural resources, considering the principles outlined in the National Environmental Policy, The General Law Environment and related regulations.

In this regard, the program Awareness and Preparedness for Emergencies at Local Level (APELL) is constituted as an instrument of preventive environmental management, which aims to provide a timely and adequate response against the occurrence of an event due to technology, with potential risk to the environment and health in the premises of the company or during the transport of hazardous materials used or produced by the joint action between business, community and the appropriate authority. The program APELL also promotes greater transparency between the actions of businesses and risks associated with the management of their chemical form and plan their actions, creating greater awareness on the part of the company and the community related.

Therefore the implementation of such programs articulated and transparent manner among the three key players, business community and authority, generates a reduction in the risks and possible effects to the environment and health technology events and contributes to the actions control, mitigation and environmental remediation to be considered due to improper handling of response actions during the care of such events.

Ministry of Environment of Peru


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### Abiquim

The concept of responsibility in dealing with chemicals has evolved over the years, from a reactive response to national workers health and safety and chemical plants environmental legislations, to a much broader concept of product stewardship covering health, safety and environmental aspects, embracing all those involved across the life-cycle of a manufactured chemical substance in a balanced mix of legal regulations and voluntary instruments based on ethical values, such as the chemical industry's Responsible Care® Program.

This change has been followed by another very important one, that responsible chemicals management is not a cost, but rather a condition to do business globally and an integral part of the path towards sustainability. At this point, product stewardship needs to be instrumented in order to be implemented by all companies dealing with chemicals, regardless of their size and location.

UNEP's Responsible Production Framework is based on effective and proven experiences, and provides a simple platform to support organizations, small and medium sized companies in particular, who are seeking for information on how to develop or be engaged in product stewardship activities. We are convinced that this initiative is an excellent tool to help the international community reaching the SAICM target that, by 2020, chemicals be produced and used in ways that lead to the minimization of all significant effects on human health and the environment.



**Marcelo Kós Silveira Campos,**  
Director, Industry and Regulatory Affairs

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### Department of Industrial Works (Thailand)

Thailand was selected as a pilot country to demonstrate UNEP's project "Engaging Business and Supply-Chain on Safer Production and Emergency Preparedness Project through Applied Corporate Social Responsibility at the Site Level". The aim of this project is to assist Small and Medium Sized Enterprises in developing countries and

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countries with economies in transition to improve their risk management and emergency response plan in order to ensure the safety and protection of people, communities, properties and environment.

Under this valuable project, the Guidance of Responsible Production and Toolkit was developed based on experiences and knowledge from leading experts of both governmental and non-governmental agencies as well as private sectors. Then, it was recently taken to implementing in selected pilot factories in the Bangpoo Area, Samutprakarn Province in Thailand. From this test result, it demonstrated practical solutions and guidance for the participating factories in becoming more efficient in safety management approaches and enhancing the communications with not only their neighboring factories but also their adjacent communities. This clearly shows a good example on responsible manner of the factories handling hazardous chemicals.

On behalf of the Royal Thai Government, Department of Industrial Works, Ministry of Industry, would like to express our appreciation to UNEP and the Norwegian Government for giving Thailand an opportunity as a demonstration site for further worldwide dissemination. We can say that on one hand this project has successfully achieved its objective. In the other hand, this cannot be achieved without sound corporation among our stakeholders such as Thailand Environment Institute (TEI), Faculty of Public Health – Mahidol University, Industrial Estate Authority of Thailand (IEAT), Federation of Thai Industry (FTI), Samutprakarn Province, German Technical Cooperation (GTZ) in Thailand and all steering committee members.

Ultimately, Department of Industrial Works would ensure further corporation and support on the chemical management related program and its future activities to the sustainable development in the field of chemical management in Thailand.



**Dr. Witoon Simachokedee**

Director General of Department of Industrial Works, Ministry of Industry, Thailand

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### **Thailand Environment Institute**

Industrial development has played an important role in promoting economic growth in many countries, including Thailand. However, economic development without properly balanced considerations between environmental protection and social development may lead to unsustainable development. Several tools and techniques have been introduced to address such issues: Environmental Management Systems (EMS), Risk Management, and Life Cycle Management (LCM), Occupational Health and Safety. However, most of them mainly focus on environmental and pollutions issues with less emphasis on social aspects. The new initiative has been introduced in addressing social issues such as Corporate Social Responsibility (CSR), which is firmly believed that it will lead to sustainable development.

UNEP's project on Responsible Production has proved to be a valuable project to Thailand. The concept of the Responsible Production has integrated CSR approaches into the Safe Production and APELL. It has been demonstrated to improve risk communication between local communities and factories among the industrial estates and beyond.

The product of this project "Responsible Production Guidance and Toolkit", which has been developed and successfully tested in Thailand, will certainly be useful tools for other countries to achieve a safer community and also a safer world.



**Professor Dr. Sanit Aksornkoae**

President, Thailand Environment Institute



# 1. Introduction to Responsible Production

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## A. WHAT IS IT?

**Responsible Production** was developed to improve chemical hazard management in small and medium sized enterprises. It is designed to increase overall safety and to reduce chemical emergencies and their environmental, social and economic impact by helping companies address the hazards and risks related to the manufacturing, processing and handling of chemical substances in their operations.

It is a systematic, continuous improvement approach to chemical safety along the value-chain that will help managers and safety officers address chemical hazards at site as well as promoting chemical safety with business partners and suppliers, clients, and local communities.

It provides guidance on understanding hazards, controlling and preventing exposure to hazardous substances, reducing accident risks and engaging stakeholders. It also promotes chemical product stewardship through risk planning, management and communication.

**Responsible Production** was developed because there is a critical need today for a simple, integrated approach to chemical hazard management that draws on the best and most appropriate guidance from the many different sources.

The many guides and tools available in this approach for chemical hazard management can be gathered into three groups:

- Safer Production - operational and management systems and process guidance and tools;
- APELL (Awareness and Preparedness for Emergencies at Local Level) - local emergency preparedness and response guidance and tools as proposed by UNEP
- CSR - corporate social responsibility guidance and tools.

All of these approaches add value in different ways by addressing different aspects important to effective chemical hazard management. But for smaller enterprises it is difficult to have to deal with too many different approaches that contribute to the same results.

**Responsible Production** has brought the best of all of these approaches into a single, easy to understand and apply framework. It is a single pathway to the benefits of all three approaches: Safer Production, APELL and CSR. It builds on the work of international development agencies and institutions, industry associations, and inter-agency initiatives, in the promotion of chemical hazard management and emergency preparedness in Small and Medium Sized Enterprises, as well as leading CSR initiatives.

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This booklet, along with the **Responsible Production Guidance and Toolkit** and the **Responsible Production Training Package**, focuses on application at the local level. It provides the basis for identifying, understanding and responding to not only the chemical hazards themselves but also to the needs and concerns of local business partners, suppliers and communities that may have an effect on or be affected by them.

This booklet has been developed to provide an understanding of:

- the concept of Responsible Production;
- the purpose and value of combining the best practice approaches of CSR, APELL and Safer Production;
- the way in which these approaches have been integrated; and
- the tools and training approaches appropriate for site level application.

The Responsible Production approach was developed by UNEP and AccountAbility in cooperation with the International Council of Chemical Associations (ICCA) and the International Council on Mining and Metals (ICMM). Other project partners included the European Chemical Industry Council (CEFIC), the European Process Safety Centre (EPSC), the Brazilian Chemical Industry Association (ABIQUIM), the Latin-American Science & Technology Development Programme (CYTED), the Netherlands Foundation for Applied Scientific Research (TNO), the Swedish Association of Mines, Mineral and Metal Producers (SVEMIN), and the European Association of Mining Industries (EUROMINES). The United Nations Industrial Development Organization (UNIDO) also contributed with technical inputs to the approach.

The development of the Responsible Production approach was supported by pilot cases or sites in Peru (in the mining sector) and Thailand (in the chemical sector). These provided important feedback that has resulted in a responsive and user-friendly approach. The pilot exercises were undertaken with the official support of the Department of Industrial Works of the Ministry of Industry of Thailand, Samutprakarn Provincial Government, the Ministry of Environment of Peru, and the Regional Government of Cajamarca.

National project partners included also the Thailand Environment Institute (TEI), the Chemical Industry Club of the Federation of Thai Industries, the Industrial Estate Authority of Thailand (IEAT), Faculty of Public Health of the Mahidol University of Thailand, the German Technical Corporation (GTZ), the National Society of Industry (SNI) in Peru, and the Peruvian National Society of Mining, Oil and Energy (SNMPE). In addition, a number of multinational companies, including Clariant Chemicals (Thailand), Antamina, Newmont

Mining (Yanacocha), Golds Fields La Cima, and Barrick also partnered with UNEP in this project sharing their corporate best practice with the SMEs involved in the pilots. Rio Tinto also provided support to project activities in Peru.

The booklet, toolkit and training materials can be used to build capacity, guide implementation and improve performance of local, site level businesses, their partners, and supply networks. The materials should be adapted to country and sector specific needs, to achieve optimum results.

Implementing **Responsible Production** should involve national and local level authorities from the relevant sectors to raise their awareness, build their capacity and ensure their support. Responsible Production can also support the implementation of the Strategic Approach to International Chemicals Management – SAICM.

## B. WHY DO WE NEED IT?

In many countries, including many developing countries, Small and Medium Sized Enterprises form the heart of the industrial sectors where hazardous chemicals are manufactured, transported, repackaged and/or used. The agro-chemical, chemical, leather and tanning, metal finishing, mining, paint and coatings, pharmaceutical, and plastics are among some of the sectors of concern. The risks they face and manage associated with hazardous manufacturing and handling operations are having an increasing impact on business success, as well as on the environment and society.

As a result, the way in which these businesses operate is changing. The most successful businesses no longer see risk management as a cost of doing business. They see it as a way to gain competitive advantage and to build sustainability into core business operations.

Companies need to respond to a range of important drivers.

- They need to gain and keep customers and clients who are increasingly looking for evidence of effective risk management.
- They need a license to operate from the communities they work in and from the people whose lives they affect.
- They need to strip out of their price base the increasing cost of accidents, incidents and clean up.
- They need to develop new products and processes that are inherently safer.
- They need to understand, select and manage their own business partners and suppliers so that they are not taking on any unsuspected or unacceptable risk.

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- They need to guard their image and reputations in a business world where often 50% or more of entity value is based on intangibles. In addition to price, image and reputation are also what differentiate one company from its competitors and attract more and better quality business. Reputations have a significant effect on how much we can sell and at what price.
- The cost of one accident may be the difference between ruin and success for Small and Medium Sized Enterprises

By bringing CSR together with APELL and Safer Production, Responsible Production extends chemical hazard management across the value chain – from suppliers to end users and disposal.

## NOTES FROM THE FIELD

### Gold Fields La Cima, Peru – Responding Responsibly to an Environmental Accident

Gold Fields La Cima S.A. is part of Gold Fields Limited, a centenary mining company with operations in South Africa, Australia, Ghana and Peru. In its Cerro Corona project in the Cajamarca region of Northern Peru, Gold Fields La Cima S.A. operates an open-pit mine, from where it extracts copper and gold through a concentrate plant with a capacity of approximately 17,000 tons/day.

On July 4th 2006, a truck belonging to a SME contractor of Gold Fields La Cima S.A. spilt 450 gallons of diesel fuel over a creek following an accident in which the tanker turned over and fell into the creek causing a tank to split and start the leak. Those at the scene immediately erected rock barriers to slow the flow in the creek, placed absorbent material over the water along 200 m of the creek, and put in place 3 absorbent barriers. The remaining fuel was then pumped out of the tanker into two cisterns of lower capacity.

As this accident was caused by an SME contractor Gold Fields La Cima S.A had no legal responsibilities over the incident, but understanding the important role of its value chain partners and the potential consequences on it and the community in which it operates it decided to assume the responsibility for the control of the emergency. The company immediately alerted the communities in the area about the incident, and coordinated with them to support the cleaning and restoration activities in the affected area. Once the road





tanker was rescued, the contaminated land and absorbent materials were collected, before a mechanical recovery of the fuel took place downstream. The local community were informed of and involved in every stage of these developments.

Mitigation action started after the emergency response, and lasted for a month. This action was aimed at improving the water quality and helping the ecosystem to recover, taking into account the needs of the population (including their live stock), the users of the water resources, and the local authorities. Such mitigation activities involved significant engagement to determine the best course of action and resulted in measures such as the construction of fuel retention pits, the provision of materials to address the difficulties in providing livestock with water and the mechanical cleaning of the creek. Environmental monitoring began and the results show that the repopulation of trout after the diesel spill has been successful.

#### WHY IT WORKED

The impacts of this accident were limited because of good preparation, good engagement between Goldfields and the local community and an understanding from Goldfields that although it didn't have a legal responsibility, its supplier was an important part of its value chain and so needed to be considered as part of its approach.

#### WHY IT WAS GOOD FOR THE BUSINESS

The accident was a potential risk for Goldfields. If handled badly it could have caused an angry reaction from local communities and environmental groups. This could have interrupted production and damaged the possibility of keeping or obtaining further mining rights in the region. By preparing properly, engaging and reacting quickly and responsibly Goldfields helped build its role as a responsible producer.

### C. WHO NEEDS IT?

**Responsible Production** is mainly for those people in Small and Medium Sized Enterprises who are responsible for chemical management and safety, typically managers and safety officers. It is for SMEs that do not have sophisticated management systems in place and that need to understand the business and other benefits of:

- improved chemical hazard management,
- working with their stakeholders,
- sharing information about decisions and performance.

## Introduction to Responsible Production

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Though the role of managers and safety officers is emphasised, **Responsible Production** will also benefit local authorities and government officials who have an interest in ensuring and enforcing responsible chemical hazard management. The **Responsible Production** framework provides a set of indicators that can be used to assess performance and develop benchmarks and can be used to support planning, inspection and continuous improvement activities.

Local authorities and government officers should be seen by business as a source of information, expertise and constructive input. Plans and outputs can be reviewed by local authorities and government officers to better understand and develop appropriate responses to significant issues. Businesses should look to local authorities and government officers to support their improvement. Local authorities and government officers can also play a role in collaborating with other businesses in the area and at the regional and national level.

**Responsible Production** is also for large companies that do business with Small and Medium Sized Enterprises. They will need some assurance that smaller organisations are managing chemical hazards safely and responsibly, without having to impose their own sophisticated management systems requirements. Responsible Production provides a basis for larger businesses to develop confidence in the operations of the smaller companies with which they have relationships.

## 2. Responsible Production: Rethinking Chemical Hazard Management

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### A. FROM REACTION TO PREVENTION

Reaction is the process of dealing with whatever happens. Companies find themselves reacting when they do not know enough about whatever it is they have to manage. It could be the chemicals they use, the trucks they hire or the drivers that drive them.

Prevention is about anticipating what might happen so that you can do things in such a way that an incident becomes less likely to happen. This requires an understanding of, and engagement with, all possible factors that may affect the management of a hazard.

Most businesses learn as they go. This often means reacting. Reacting frequently means that something unexpected has happened. Unexpected things usually end up having a negative impact (on people, on the environment, on business) and are usually costly.

Prevention on the other hand often requires investment. However it puts you in a better and more competitive position. It is an investment towards understanding what might happen and a way to establish practices that will help you avoid the unexpected.

Codes, standards, guidelines and frameworks are often easy ways towards understanding prevention. People who have experienced the unexpected have written these down, based on experience. They mark ways to avoid the unexpected, are focused on easy implementation, and are the product of evolved practice.

Any business that uses or handles chemicals poses a risk to workers, to the public and to the environment. If unexpected things happen because of a lack of foresight, the result may be an accident that has significant impact. Companies have an obligation to safeguard workers, the environment and the wider community by doing as much as they can to prevent and avoid accidents. Companies must therefore have in place the means to identify the possibility of accidents and to understand, prevent, and (where necessary) respond to them appropriately. This is the basis for Responsible Production.

### B. FROM THE COST OF COMPLIANCE TO BENEFITS TO THE CORE BUSINESS

When does a cost become a benefit? It happens when the cost of not doing something is greater than the cost of doing something. The cost of having two drivers instead of one in every truck transporting hazardous chemicals, or assuring that the transport takes place in a convoy and/or with a dedicated escort when needed, will seem more like a benefit than a cost if a truck with only one driver has an accident when he falls asleep at the wheel. The cost of a water treatment plant will seem like a benefit when untreated water from your plant seeps into the water table, causes illness in the local community and results in the government shutting down your plant.

The same is true when it comes to fire prevention and emergency training, as



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very often fires - and particularly explosions – at facilities storing or processing hazardous chemicals can have devastating effects for a business.

A reactive model only seems cost effective before an incident. The costs only really begin to appear after an incident when you are forced to react. Any investment in prevention has to be weighed, not only in relation to operating cost, but also against the incident scenarios associated with the chemicals you handle and use.

Accidents can put companies out of business. The right investments in improved chemical hazard management will benefit the company. Some investments may need sizeable capital expenditure, but many will require a much more modest financial outlay. Keeping equipment and facilities clean, tidy and well maintained is an example of such minimal or zero costs activities which can enhance both safety and competitiveness. Responsible Production is designed to help you make the right investments.

## C. FROM LARGE COMPANIES TO SMES

Small and Medium Sized Enterprises (SMEs) are a very important part of the global economy. They are the source of most growth in employment. They are flexible, adaptable and quick to respond to changes in the marketplace and new opportunities. They are typically started and run by people with energy and vision and are often drivers of innovation.

Yet most codes, guidelines, standards and frameworks are developed with large companies in mind. This is not unexpected. Large, leading practice companies are often the first to acknowledge and recognize the need to consolidate and improve practice rather than just innovate. They are the ones with the appetite for the tools needed to support this consolidation and improvement. They also have more resources to invest in the development of these tools. And they have more resources to invest in their implementation too.

But if SMEs are to grow and become sustainable enterprises they too must learn to consolidate and improve practices; to become more productive; to manage and mitigate risk more effectively; to understand their value chain and business environment more fully. This is a hurdle that often prevents small companies from becoming big companies. And small companies that try to become big companies and fail often disappear.

Unsafe chemicals manufacturing and handling operations can have greater impact on the viability of a small company than a large company. SMEs may deal with smaller amounts of chemicals, but if they do not have the expertise to properly deal with them they are unlikely to succeed. That is why codes, standards, guidelines and frameworks that bring the experience of big companies in a useable way to small companies are so valuable. They provide the lever that will assist them over the hurdle.



Responsible Production is designed specifically for SMEs but in a way that connects them through an understanding of the value chains they are part of in relation to larger businesses and the wider community. It provides SMEs that are handling hazardous chemicals with a recognized method to help communicate their hazard management approach to big companies and others which will help strengthen these relationships.

#### D. FROM AN OPERATIONAL FOCUS TO A VALUE-CHAIN FOCUS

To move from reaction to prevention and from a compliance mindset to a value creation mindset in a way that can effectively involve SMEs requires us to address the whole value chain and not just what we manage inside our own fences. We must reconsider the boundaries of our impact and extend our engagement.

Risk information must be developed and made available to suppliers, business partners, end customers and, where necessary, to affected communities. Efforts to foster the safe use of chemicals can not stop at the company door, but must be part of a wider approach to chemical product stewardship<sup>1</sup> along the value chain and in the community.

The value chain typically includes:

- Inbound logistics and material inputs
- Operations
- Outbound logistics
- Marketing and sales
- After sales service and disposal

Each activity is the point at which value is added.

How much value you add depends on the quality of your

- employees
- supplier, partner and other stakeholder relationships
- operational and management systems
- design, technology and materials

There are risks and impacts associated with each of these that can undermine or destroy the value you hope to add through each activity in the value chain. What sustainability has brought to business is not just a new set of risks to consider, but a new view of the impact of these risks. The impacts of a spill are no longer just the costs related to lost time, lost materials and production, clean up and perhaps a fine, even though these costs are often significant. The impacts now include those to the environment, the costs of remediation and the effects on biodiversity and habitat; those to the community and the costs associated with effects on human health and livelihoods; additional employee impacts

<sup>1</sup> Chemical product stewardship is the practice of making health, safety and environmental protection an integral part of the life cycle of chemical products (ICCA Product Stewardship Guidelines, 2007)

# Responsible Production: Rethinking Chemical Hazard Management

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related to human and labour rights. With the chemical hazard risk register growing and the associated impacts becoming more costly, if you do not know what you're doing, an accident may well put you out of business, and if you do not understand and manage these risks you are more likely to have an accident.

In the past, chemical hazard management has tended to focus on operation inside the company gates; how the company operated and on responding to incidents (spills, fires, explosions). There has been an emphasis on operational effectiveness and compliance management. Chemical hazard management has been seen as a cost of doing business and avoiding fines or worse.

Looking at chemical hazard management across the value chain requires a more strategic method. Best practice organisations look at hazard and risk management as a way to address the business drivers in the market place.

- How can it help you get and keep your license to operate?
- How can it strip out cost by reducing the number of accidents, and improving productivity and cost effectiveness?
- How can it contribute to improved product and process design?
- How can it help you gain and keep customers and clients?
- How can it help you choose the right suppliers and partners?
- How can it help you develop and enhance a reputation that will attract more business?
- How can it help to improve your relations with authorities and the community?

Strategy depends on knowing about risks and opportunities. Production processes present both; risk in relation to process failures; opportunities for example in relation to process changes that result in risk elimination through material changes, product cost reductions, quality enhancements and improved relationships.

## NOTES FROM THE FIELD

**Yanacocha, Peru – Community Capacity Building**

Yanacocha operates an open pit gold mine in northern Peru, which is the largest gold mine operation in Latin America.

Yanacocha is very aware of the importance of community engagement as part of responsible mining. Its current community engagement plan involves work with 12 communities and several SME contractors on the transportation route from Ciudad de Dios to Cajamarca.



The programme aims to engage with and educate the communities on how to react in several emergency situations. Central to this was being able to identify hazard symbols, prepare local emergency plans and know how to respond in an effective and coordinated manner. At the heart of this programme was engagement and dialogue in various forms including interactive teaching, workshops and capacity building.

Topics covered have ranged from identifying hazardous materials to 'how to assess an accident scene'. Communities learn how to prepare for an accident and organize themselves after an accident. Techniques such as first aid and fire control are taught and even the basics of search and rescue are introduced.

This project is all about engagement. The communities and the mine have to trust each other and engage if they are to be safe and productive. By developing a commitment to the communities and explaining the hazards and how to protect themselves, the mine has built greater trust for itself and company's activities are being increasingly accepted by the communities.

It is important to note that this initiative is working successfully because it is based upon a partnership involving many actors, not just the mining company and the community. The National Civil Defence (INDECI), Yanacocha suppliers, many of whom are local SMEs, and others have been providing additional expertise and support, ensuring where necessary efforts are connected to existing local plans.



Results have been positive because the communities are placed at the centre of engagement and empowered to take responsibility for their own safety in a positive way. One example of this is where community members have become part of the national voluntary firemen corps of Peru, which was highly appreciated by the communities.

# Responsible Production: Rethinking Chemical Hazard Management

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## CORPORATE SOCIAL RESPONSIBILITY: BUILDING TRUST AND DIALOGUE FOR IMPROVED COMMUNITY RELATIONS

Improved community relations require trust and continuous dialogue. These activities are part of that process. It is crucial that the local communities are engaged with the mine to ensure that efficient and responsible mining operations can continue.

## E. FROM SINGLE FOCUS TO AN INTEGRATED APPROACH

Safer Production, APELL and CSR have all been developed to better understand and respond to the risks and opportunities associated with various types of hazards. Each has its strengths and brings different elements to Responsible Production. Safer production has significant strengths in the area of operational management. APELL brings a focus on community involvement, preparedness and capacity building, partnership and coordinated response. CSR brings an understanding of extended boundaries and a broader range of social and environmental issues and impacts, as well as an emphasis on stakeholder engagement and credible public disclosure.

The value of the Responsible Production Framework is its integration of this range of elements into a single, integrated approach. The benefits of a single, integrated approach are clear and include:

- A clearer focus and improved understanding of organisation change issues
- Clearer links to core business issues
- Cost and resource efficiencies
- Increased applicability to SMEs with limited staff capacity
- Easier and improved risk communications

By combining the three existing approaches into one model Responsible Production ensures each of the three elements is given equivalent focus and each is seen in the context of the others. This helps make your response more appropriate and complete. By bringing together various initiatives into one whole, existing communications will improve as those responsible for each area come together. This can enable better hazard identification, emergency preparedness and response, and communication across the organisation. There are also significant potential efficiency benefits if done successfully. Resources can be allocated more effectively and savings can be made by using one single integrated approach. This is particularly useful for smaller businesses where staff constraints are often an obstacle if there are multiple approaches. By providing an integrated approach to APELL, Safer Production and CSR, Responsible Production enables organisations improve performance in a simpler and more effective way.

### **Safer Production**

Since the Bhopal tragedy in 1984, several models for safer production and, in particular, process safety management (PSM), have been developed, focusing on producers and users of industrial chemicals. Although there are a number of safer production standards, they cover common features and differ mainly in terminology and emphasis.

Among other frameworks, PSM models published by the Center for Chemical Process Safety (CCPS) of the American Institute of Chemical Engineers (AIChE), the American Petroleum Institute, or the American OSHA, have been applied throughout the chemical industry. In Europe these frameworks are anchored within the Seveso II Directive and the national implementation of this legislation.

In parallel, the Chemical Manufacturers Association (presently the American Chemistry Council, ACC) Code of Management Practice for Process Safety has been widely used. Oriented towards the chemical industry, it describes the elements of a process safety management program as part of the ACC Responsible Care Program. The Responsible Care framework was initiated in Canada in 1985 and has since become an international code of best practice for the chemical industry.

Similar approaches also form part of broader environmental and health and safety management systems standards, such as ILO-OSH 2001, OHSAS18001 or the ACC's own Responsible Care Management System (RCMS). These integrate elements of Process Safety Management models as relevant to industry type and process.

More recently, a global review of the Responsible Care framework by the International Council of Chemical Associations (ICCA) has resulted in the new Responsible Care Global Charter (RGGC), and Global Product Strategy (GPS) initiative.

The 2006 Responsible Care Global Charter extends the original elements of the Responsible Care framework initiated in Canada in 1985, focusing on new and important challenges facing the chemical industry including the effective management of chemicals along the value chain, and greater industry transparency. As for the Global Product Strategy initiative, it is focused on product stewardship and in the extension of Responsible Care along the value chain.

### **APELL**

APELL allows for effective communication about risks and planning for emergency response. It was first developed by UNEP with the chemicals industry in the 1980s. The APELL approach centres on building local partnerships between business, local government agencies and local communities, through a systematic 10-step multi-stakeholder process for the development of an integrated emergency plan.

The APELL process has been introduced in more than 30 countries, and in approximately 80 communities since 1988.

# Responsible Production: Rethinking Chemical Hazard Management

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A number of sector specific applications of APELL have been developed, including "APELL for Port Areas" in 1996, and "TransAPELL, Guidance for Dangerous Goods Transport: Emergency Planning in a Local Community", which was published in 2000. "APELL for Mining" and its follow up report "Good Practice in Emergency Preparedness and Response", developed with ICMM in 2005, focus on emergency preparedness in the mining sector. The benefits of going through the 10 steps of the APELL process are:

- It reduces the likelihood of accidents and reduces their impacts
- It builds capacity at local authority level at a time when government round the world is becoming more decentralised
- It helps industry secure its "social licence to operate"
- It helps to build relationships between a company and the community and helps to generate the confidence, trust and support which companies need whether or not they experience an accident

With the implementation of the APELL process, local communities become aware of potential risks and impacts, and prepared to respond correctly in the event of an accident. Emergency services become coordinated and prepared to respond to accidents and are able to coordinate their efforts with the relevant authorities.

## CSR

Over the past 25 years there has been a fundamental change in the private sector's relationship both with government and with society. Globalisation, deregulation and privatisation have redrawn the lines between states and markets and have changed the basis on which private enterprise is expected to contribute to the public good.

Corporate Social Responsibility (CSR), Corporate Citizenship or Responsible Business Practice, as it is variously called, has been one key response to this. It has been adopted by leading businesses as well as many governments and some civil society organisations as an approach to harness the power of business to the benefit of sustainable development.

Corporate Social responsibility has been defined by the World Business Council for Sustainable Development as:

*"the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large."*

And by AccountAbility as,

*“the basis on which business renegotiates and realigns the boundaries of its accountability.”*

CSR addresses issues related to the full range of a company’s impacts, from business ethics and governance, to community investment, and from environmental impacts due to production and product use to human rights and workplace standards. Across these areas, the particular issues that are considered ‘material’, meaning the most relevant and important, vary by business size, strategy, industry sector and location, and may change and develop over time. Thus CSR is not best viewed as a list of issues or standards, but as the principles, policies, practices and programmes through which a company engages with its stakeholders, integrates social and environmental issues, and impacts into its decision making, operational management and spheres of influence (e.g. supply chain).

The emergence of CSR has also been supported by the development of local and international networks and institutions to accelerate learning and the development of standards as well as open and proprietary tools and management system elements for managing their corporate responsibility.

These tools, frameworks and standards have tended to focus on the needs of large corporations with the scale and reputation to invest in CSR programmes. But in recent years the CSR debate has turned towards the challenge of making the CSR agenda more relevant for SMEs. CSR brings a new set of principles, issues and practices to the management of a business.

CSR focuses on ensuring that important sustainability issues – in this case chemical hazards – are understood strategically as well as technically and responded to appropriately by the business. This means being ‘inclusive’; ensuring that the right stakeholders are involved in developing this understanding; that decisions about how to respond (‘responsiveness’) are built on this stakeholder-based understanding; and that there is transparency around how and what decisions are made and how the business has performed.

It is clear that while there is a strong emphasis on operational controls and management programs in Safer Production and APELL, CSR has a strategic approach that they do not share.

### **Responsible Production**

Responsible Production draws the best elements from Safer Production, APELL and CSR. The table below maps the contributions of Safer Production, APELL and CSR to Responsible Production. The Responsible Production Framework described in the next section of this booklet is built on this mapping.

# Responsible Production: Rethinking Chemical Hazard Management

	Safer Production	APELL	Corporate Social Responsibility
Leadership and vision			<ul style="list-style-type: none"> <li>• Business case</li> </ul>
	<ul style="list-style-type: none"> <li>• Safety Policy/Commitment</li> </ul>		<ul style="list-style-type: none"> <li>• Top level commitment</li> </ul>
			<ul style="list-style-type: none"> <li>• Vision, mission and operating policies and principles</li> </ul>
		<ul style="list-style-type: none"> <li>• Identify the emergency response participants and establish their roles, resources, and concerns.</li> </ul>	<ul style="list-style-type: none"> <li>• Engagement</li> </ul>
			<ul style="list-style-type: none"> <li>• Culture change</li> </ul>
Planning	<ul style="list-style-type: none"> <li>• Process Hazard/Risk Assessment and Research</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate the hazards and risks that may result in emergency situations in the community.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify compliance requirements</li> </ul>
			<ul style="list-style-type: none"> <li>• Identify key concerns, risks and opportunities and feeding into decision making</li> </ul>
		(see tactical planning below)	<ul style="list-style-type: none"> <li>• Identify actions and outcomes</li> </ul>
			<ul style="list-style-type: none"> <li>• Strategic planning</li> </ul>
	<ul style="list-style-type: none"> <li>• Emergency Preparedness and Response</li> <li>• Customers, suppliers and distributors</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of response tasks not covered by existing plans</li> <li>• Matching tasks to the resources of the identified participants</li> <li>• Making changes to improve existing plans, integrate them into an overall community plan, and gain agreement</li> <li>• Review emergency response plans for coordinating response</li> </ul>	<ul style="list-style-type: none"> <li>• Tactical planning</li> </ul>
Delivery	<ul style="list-style-type: none"> <li>• Management of Change</li> </ul>	<ul style="list-style-type: none"> <li>• Educate the community about the integrated plan.</li> <li>• Educate participating groups about the integrated plan and ensure that all emergency responders are trained.</li> </ul>	<ul style="list-style-type: none"> <li>• Change management</li> </ul>
	<ul style="list-style-type: none"> <li>• Process Risk Management</li> <li>• Training</li> <li>• Enhancement of Process Safety Knowledge</li> <li>• Management system requirements (e.g. structure and responsibility, records and records management, and management system review)</li> </ul>		<ul style="list-style-type: none"> <li>• Management programs</li> </ul>



	Safer Production	APELL	Corporate Social Responsibility
	<ul style="list-style-type: none"> <li>• Process Safety Knowledge/ Documentation</li> <li>• Operational procedures/Safe Work practices</li> <li>• Maintenance/Process and Equipment Integrity</li> <li>• Employees proficiency and fitness for duty</li> <li>• Contractors</li> <li>• Performance of carriers, suppliers, and distributors</li> </ul>		<ul style="list-style-type: none"> <li>• Internal controls</li> </ul>
	<ul style="list-style-type: none"> <li>• Community awareness and emergency response</li> <li>• Assistance in development of laws, regulations, codes</li> </ul>	<ul style="list-style-type: none"> <li>• Commit the integrated community plan to writing and obtain approval from local governments</li> </ul>	<ul style="list-style-type: none"> <li>• External influence</li> </ul>
Monitor, review and report	<ul style="list-style-type: none"> <li>• Pre-Startup Review</li> <li>• Incident/Accident Investigation</li> </ul>	<ul style="list-style-type: none"> <li>• Establish procedures for periodic testing, review, and updating of the plan</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring, measuring, auditing and feedback</li> </ul>
	<ul style="list-style-type: none"> <li>• Audits</li> </ul>		
			<ul style="list-style-type: none"> <li>• Tactical and strategic review</li> </ul>
	<ul style="list-style-type: none"> <li>• Reporting</li> </ul>		<ul style="list-style-type: none"> <li>• Reporting progress</li> </ul>
			<ul style="list-style-type: none"> <li>• Assurance of reporting</li> </ul>

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### 3. Implementing Responsible Production

#### A. THE RESPONSIBLE PRODUCTION FRAMEWORK, INDICATORS AND TOOLS

The Responsible Production Framework provides a step by step process for improving chemical hazard management. The Responsible Production Framework is comprised of five main steps.



These steps provide a systems approach to managing the risks and impacts associated with chemical hazards. The system is not meant to be a stand alone system. It is meant to be integrated with your existing management practices and systems.

The tools provided in the Responsible Production Toolkit give you guidance on how to implement each action. There is also a set of indicators that allow you to evaluate your implementation of these actions and therefore how well you are doing on each step of the Responsible Production Framework.



For each step of the framework there is a main indicator. Each main indicator is supported by a number of detailed indicators, expressed as questions. The main and detailed indicators are used to enable the evaluation of each step of the framework. Main indicators directly correspond to the steps of the responsible production framework and capture at a high level how well you are doing on each step. Detailed indicators are specific questions that help evaluate how you are addressing each step and provide advice about how to improve. The answers to the detailed indicators feed into the score for the main indicator. The table below summarises the links between the steps of the framework and the main indicators.

# Implementing Responsible Production

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Responsible Production Framework	Main Indicators
STEP 1: Identify responsible production issues	Issue knowledge
STEP 2: Get the right people involved	Engagement effectiveness
STEP 3: Develop your plan	Planning effectiveness
STEP 4: Put the plan into practice, train and communicate	Implementation
STEP 5: Evaluate how well you did	Evaluation and Communication

The detailed indicators are used to evaluate implementation at three levels.

- awareness and commitment
- understanding and application
- improvement and innovation

All five steps of the Responsible Production framework can be evaluated in relation to each level. Organisations can move from one level to the next as their expertise and capacity for improvement increases. This does not mean that an organisation must score perfectly on one level before moving to the next. However, failing to score well at one level will hinder performance at the next level.

The tables below show the main indicators and the detailed indicators for each step, as well as an indication of the related tools and training materials (found in the Responsible Production Toolkit and in the Training Package) that will help you improve your implementation of the Responsible Production Framework.

Finally, the dashboard worksheets (found in the annex) show how your performance is evaluated against the indicators.

## NOTES FROM THE FIELD

**Bara Chemicals, Thailand – From identification to planning and implementation**

Bara Chemical Co. Ltd was established in 1973 as a joint venture between Thai and Japanese companies. It manufactures products primarily for the textile and automotive industry. The company is a medium sized company that employs about 130 people.

Bara Chemicals has taken several steps along the responsible production pathway and has a strong understanding of its onsite chemical hazard management issues. By fully identifying and understanding its key hazards Bara has been able to prepare plans to make its production more responsible and efficient. Bara has a comprehensive process for listing chemicals and their quantities and properties, including having MSDS for all raw materials and products. It also keeps an up-to-date register of legal requirements, including some of the relevant international codes.



This information forms the basis of risk assessment. Bara uses the HAZOP for some chemicals and prioritises these risks accordingly. This enables it to map the hazard hotspots in their operational processes, to ensure it understands where the most important risks are located which include:

1. fire and explosion risks in the melamine process
2. risk of a run away reaction in the acrylic emulsion process leading to loss of containment
3. risk of powder/dust explosions during the production of plastic additives (mixing powders)

Bara develops its clear identification and understanding of the hazards into detailed plans and preventative measures, particularly for high priority hazards. Two particularly strong examples of good practice planning to reduce risk are:

1. the use of N<sub>2</sub> to purge O<sub>2</sub> in the loading of the raw materials in order to reduce the risks of explosion due to electrostatic discharge
2. a management of change procedure that includes provisions for training and risk assessment

# Implementing Responsible Production

## WHY IT WORKED

Bara's processes work because they are based on strong identification and understanding processes. In addition these are supported by efficient general housekeeping. Without good housekeeping additional hazards can be created and existing one become more difficult to manage. This highlights Bara's positive and diligent attitude towards safety.

## WHY IT WAS GOOD FOR THE BUSINESS

Effective hazard identification and planning process help Bara minimize the likelihood of accidents and ensure production is ongoing and cost-effective. By understanding and managing risks early Bara prevents the large costs associated with an accident.

## RESPONSIBLE PRODUCTION INDICATOR, TOOLS AND TRAINING TABLES

Awareness and Commitment Level			
Main indicator	Detailed Indicators	Relevant Tools and Guidance	Training Modules
Issue knowledge	1) Do you know what chemicals you handle and their average quantities at site?	Tool 1.2 Chemical inventory and Hazard Classification	<i>Chemical Inventorying Chemical Hazards</i>
	2) Do you know what standards, codes, legal requirements and regulations apply to these chemicals?	Tool 1.5 Legal Register	<i>Legal and Regulatory Requirements</i>
Engagement effectiveness	1) Do you know who your stakeholders are?	Tool 2.1 Map Stakeholders	<i>Stakeholders identification and engagement</i>
	2) Do you know what concerns them in relation to the chemicals you use?	Tool 2.2 Profile Stakeholders	
Planning effectiveness	1) Have you identified ways to control the hazards and/or reduce the risks associated with chemical hazards on site and developed action plans to implement them? (e.g. in off-loading and transfer of raw materials, storage and handling of chemicals, process, packaging and expedition of your finished products)	Tool 3.1 Identify Actions for Risk Reduction Tool 3.4 Chemical Control Action Plans Tool 3.7 Prevent and reduce risk at Site – General Tool 3.8 Prevent and reduce risk at site – Specific: Off-Loading and Transfer of Chemicals Tool 3.9 Prevent and reduce risk at site – Specific: Process Areas Tool 3.10 Prevent and reduce risk at site – Specific: Storage of Chemicals Tool 3.11 Prevent and reduce risk offsite – Specific: Transport of Chemicals	<i>Risk analysis and identification of risk reduction actions  Chemical Control Action Plans</i>

Awareness and Commitment Level			
Main indicator	Detailed Indicators	Relevant Tools and Guidance	Training Modules
Planning effectiveness	2) Do you have objectives and targets for controlling these hazards/reducing these risks?	Tool 3.3 Set Goals, objectives, targets and indicators	<i>Chemical Control Action Plans</i>
	3) Do you have an emergency plan?	Tool 3.6 Emergency Plan	<i>Emergency Planning</i>
	4) Do you have any training plans for staff?	Tool 3.5 Training Plan	<i>Training</i>
	5) Do you have any training plans for: a) business partners and suppliers? b) communities/general public? c) customers?	Tool 3.5 Training Plan	
	6) Do you know the costs associated with managing your chemical hazards and the costs savings associated with reducing risk?	Tool 3.2 Prevention and Risk Reduction Cost Analysis Tool 3.12 Business Case	
Implementation	1) Have you trained your employees to reduce chemical hazard risk?	Tool 4.2 Training Materials	
	2) Have you trained your business partners and suppliers to reduce chemical hazard risk?	Tool 4.2 Training Materials	
	3) Have you trained your customers to understand and reduce chemical hazard risk?	Tool 4.2 Training Materials	
	4) Do you manage chemical hazard risk according to the procedures you have in place?	Tool 4.1 Best Practice Procedures	<i>Best Practice Procedures</i>
	5) Do you provide chemical hazard risk information on your products?	Tool 4.4 Product Risk Information	
Evaluation and communication	1) Do you evaluate your performance and management systems?	Tool 5.1 Performance Assessment Tool 5.2 Management Assessment	<i>Assessment</i>
	2) Do you have independent audits or certifications of your performance and systems?	Tool 5.1 Performance Assessment Tool 5.2 Management Assessment	
	3) Do you communicate externally and obtain independent assurance on these communications?	Tool 5.3 External Communications Tool 5.4 Independent Assurance	
	4) Do you have a system for handling inquiries and complaints concerning safety issues from the public?	Tool 5.3 External Communications	

# Implementing Responsible Production

Understanding and Application Level			
Main indicator	Detailed Indicators	Relevant Tools and Guidance	Training Modules
Issue knowledge	1) Do you understand the properties of the chemicals you use and their associated hazards?	Tool 1.3 Identify health, social, environmental and economic risks.	<i>Process and Chemicals Flow</i>
	2) Do you understand the flow of the chemicals used in your business?	Tool 1.1 Process Flow Chart	
	3) Have you undertaken a risk assessment, and prioritised, banded or classified your chemical hazards?	Tool 1.2 Chemical inventory and Hazard Classification Tool 1.3 Identify health, social, environmental and economic risks Tool 1.6 Hazard classification	<i>Hazard Identification and Classification</i>
	4) Have you identified and do you understand your Hazard Hotspots (in processes, related to the supply and transport of your chemical raw materials to the disposition or disposal of by-products and waste, and related to the transport and use of your finished products)?	Tool 1.4 Hazard hot spots map	
	5) Do you understand how to comply with the standards codes, legal requirements and regulations that apply to your chemicals?	Tool 1.5 Legal register	
Engagement effectiveness	1) How well do you understand your stakeholders and the issues that concern them?	Tool 2.2 Profile Stakeholders Tool 2.5 Prioritise issues	<i>Stakeholders identification and engagement</i>
	2) How well do you understand how to engage with them?	Tool 2.3 Select the engagement method Tool 2.4 Plan the engagement	
Planning effectiveness	1) Do you understand the best ways in which to control the hazards and/or reduce the risks associated with chemical hazards offsite and developed appropriate action plans? (e.g. in the transport of raw materials, and in the transport, distribution, and use of your finished products)	Tool 3.1 Identify Actions for Risk Reduction Tool 3.4 Chemical Control Action Plans Tool 3.11 Prevent and reduce risk at site – Specific: Transport of Chemicals	<i>Risk analysis and identification of risk reduction actions Chemical Control Action Plans</i>
	2) Do your plans incorporate this understanding?	Tool 3.4 Chemical Control Action Plans	
	3) Do you understand how your plans will achieve your objectives and targets for controlling these hazards/reducing these off site risks?	Tool 3.3 Set Goals, objectives, targets and indicators	<i>Chemical Control Action Plans</i>
	4) Do your training and awareness plans build on your understanding of your chemical hazard risks?	Tool 3.5 Training Plan	<i>Training</i>



Understanding and Application Level			
Main indicator	Detailed Indicators	Relevant Tools and Guidance	Training Modules
Planning effectiveness	5) Do you understand the impact of chemical hazards in relation to your overall business strategy?	Tool 3.12 Business Case	
	6) Have you developed risk prevention activities for the risks posed by chemicals hazards related to your onsite and offsite activities, and to the products and services of your market, along the value chain?	Tool 3.1 Identify actions for risk reduction	
	7) Does your understanding of the costs associated with managing your chemical hazards, and the cost savings associated with reducing risk, influence your strategies and plans?	Tool 3.2 Risk Reduction Cost Analysis Tool 3.12 Business case	<i>Chemical Control Action Plans</i>
Implementation	1) Do your staff, customers, business partners, suppliers, and communities understand your approach to chemical hazard management and your performance?	Tool 3.5 Training Plan	<i>Training</i>
	2) Have you extended chemical hazard management into your procurement processes?	Tool 4.5 Procurement Checklists	
	3) Do you communicate the results of audits/inspections concerning safety issues to your employees, business partners and suppliers, customers and communities?	Tool 4.3 Risk Communication	<i>Communication</i>
Evaluation and communication	1) Are the results of evaluations, audits and assurance used to improve your understanding, plans and actions?	Tool 5.2 Management Assessment	<i>Assessment</i>
	2) Do you have a system for handling inquiries and complaints concerning safety issues from the public?	Tool 5.3 External Communications	

# Implementing Responsible Production

Improvement and Innovation Level			
Main indicator	Detailed Indicators	Relevant Tools and Guidance	Training Modules
Issue knowledge	1) Do you have systems in place to monitor and improve your chemical hazard identification and understanding?	Tool 1.4 Hazard Hotspots Map	<i>Hazard Mapping</i>
	2) Do you track and assess new standards, codes, legal requirements and regulations that apply to your chemicals and chemical processes?	Tool 1.5 Legal register	
Engagement effectiveness	1) Do you have systems in place to monitor and improve your understanding of your stakeholders and how to engage them?	Tool 2.6 Review the engagement process	<i>Stakeholders identification and engagement</i>
	2) Do you respond to stakeholders in ways that enable them to help you improve?	Tool 2.6 Review the engagement process	
Planning effectiveness	1) Do you have systems in place to monitor and improve your understanding of your risk prevention activities?	Tool 1.3 Identify Risks Tool 3.1 Identify Actions for Risk Reduction Tool 3.4 Chemical Control Action Plans	<i>Risk analysis and identification of risk reduction actions</i>
	2) Do you have systems in place to monitor and improve your understanding of the need for and value of training?	Tool 3.3 Setting goals, objectives, targets and performance indicators Tool 3.7 Prevent and reduce risk at Site – General Tool 3.8 Prevent and reduce risk at site – Specific: Off-Loading and Transfer of Chemicals Tool 3.9 Prevent and reduce risk at site – Specific: Process Areas Tool 3.10 Prevent and reduce risk at site – Specific: Storage of Chemicals	<i>Chemical Control Action Plans</i>
Implementation	1) Have you benchmarked and aligned your procedures with best practice?	Tool 4.1 Best Practice Procedures Case	
	2) Do you have systems in place to monitor and improve how you communicate about chemical hazard management?	Tool 4.3 Risk Communication	<i>Communication</i>
Evaluation and communication	1) Are your evaluations, audits and assurance part of a continual improvement cycle?	Tool 5.1 Performance Assessment Tool 5.2 Management Assessment Tool 5.4 Independent Assurance	

## Preliminary Steps for Responsible Production

### *Top Management Commitment*

Responsible Production is a strategic framework for making a company safer and more successful both onsite and across the value chain. Plant managers and safety officers have a crucial role to play but, without the commitment of the senior management, many of the most important actions will not be implemented. The senior management also has a crucial role to play in terms of creating a responsible production culture and in empowering staff to play an active role in improving the company.

### *Good Housekeeping*

Responsible production is about the systematic and continuous improvement of chemical safety along the value-chain. However, this framework will be unable to deliver the intended results if good housekeeping is ignored at site level.

Responsible production and good housekeeping at site level are complementary. The elimination of immediate site-based problems as well as inefficiencies and potential hazards caused by poor conditions in and about a site are essential to complete the job properly and safely.

Good housekeeping involves every phase of industrial operations and should apply throughout the entire site, indoors and outdoors. It is more than just cleanliness. It requires orderly conditions, the avoidance of congestion, and attention to details such as the orderly layout of the whole workplace, correct marking and labelling of all hazardous substances, adequate storage arrangements, and suitable provision for cleaning and maintenance.

A well looked after work environment sets the tone of your establishment. It encourages tidy work habits and helps reduce fatigue. It promotes good relations between management and workers. All of these factors can be reflected in the quality of production and overall efficiency.

However, there is an even more important reason why good housekeeping matters; it makes your site a safer place in which to work and helps you reduce the likelihood of accident or injury.

### *Resources*

Responsible production is about much more than throwing resources at the issue of safety. It is a change in approach and many elements cost nothing or are at a very low cost. Having said this, there is a need for adequate resources to ensure the improvements are successful. This means having the right human

# Implementing Responsible Production

resources (i.e. having a suitably qualified safety officer who can act as a champion to drive the process internally), as well as adequate financial resources to enable the achievement of key commitments. Resources also include resources for training to ensure that relevant managers are more aware of existing and potential hazards.

## NOTES FROM THE FIELD

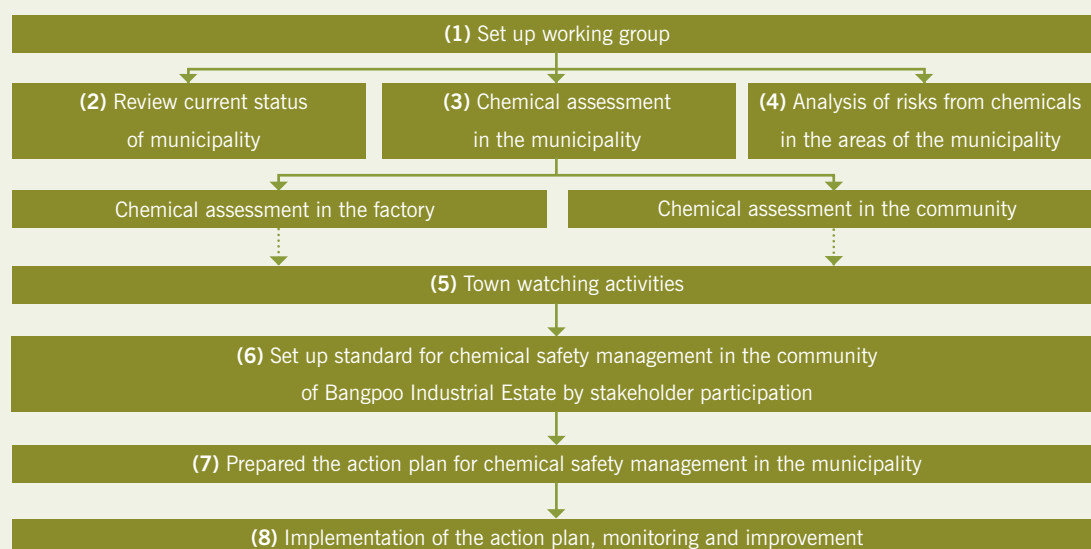
### Thailand Pilot – Introducing APELL



New efforts to improve safety in the chemical industry are seen as beneficial and so the Responsible Production programme was welcomed by all participating pilot stakeholders: Bangpu Municipality, Bangpu Industrial Estate, Industrial Estate Authority of Thailand (IEAT), Office of Disaster Prevention and Mitigation of Samutprakarn province, and the 5 chemical SMEs involved in the pilot.

The key feature that attracted the participants to Responsible Production is the holistic approach that integrates chemical safety management with offsite actions and engagement. Addressing and enhancing competencies in emergency preparedness, risk reduction, and effective communication with all stakeholders was seen as highly valuable. The diagram shows the way in which those involved in the pilot programme adapted the Responsible Production framework to develop their community safety plan.

### Community Safety Plan





- » Survey of characteristic chemical transportation routes such as roads, railways and pipelines
- » Survey of hot spots in community areas such as schools, temples, rivers and canals

**Surveys supported data from Demonstration municipalities, demonstration factories and Bangpu Industrial Estate**

Recognising the importance of stakeholder engagement in relation to emergency preparedness and community safety, the pilot participants started by encouraging activities at the sub-district level to help formulate a chemical disaster and emergency preparedness plan. The pilot companies all elected key staff to attend the planning workshops and assigned members of their own staff to joint 'town-watch' activities, which were aimed at identifying chemical hot spots along transport routes in the neighbouring community. 'Town-watch' activities, as described in the diagram below, added to the level of understanding produced by company and municipality data. This approach produced fruitful results and enabled the stakeholders at the sub-district level to better identify and understand chemical hazards and risks associated to transportation, and to produce a community hazard map.

The disaster plan is now under development and being integrated with the provincial plan. These activities were developed through an APELL style planning scheme which involved significant dialogue between different affected stakeholders in the community.



As a result of the latest sub-district planning workshop, three areas of further action were agreed upon:

- (1) the establishment of an information network for chemical emergency preparedness and response planning
- (2) the development of an effective chemical disaster and emergency preparedness plan in two sub-districts around the Bangpu Industrial Estate, with the plan test to be conducted following this

(3) The Industrial Estate Authority of Thailand will follow

and adapt the lessons learned from these activities to develop a knowledge-based approach for improving risk communication in other industrial estates under its jurisdiction

# Implementing Responsible Production

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## B. THE RESPONSIBLE PRODUCTION INDICATORS DASHBOARD

The Responsible Production Indicators Dashboard is designed to help you understand the areas in which you are doing well and where you might need to improve. The dashboard has two elements. The first is an implementation dashboard to help you understand what systems and processes you have implemented and how well you have implemented them. The second dashboard provides key performance indicators to help monitor outcomes.

### *The Implementation Dashboard*

The Implementation Dashboard is clearly linked to the five step framework and is designed to help you identify and understand implementation strengths and weaknesses. It is designed to be an internal management tool. The aim of the dashboard is to help you improve your safety. The score indicates where you will need to improve. The Implementation Dashboard primarily addresses implementation although there are clear links between improved implementation and improved performance. However, if you score highly on this tool it does not necessarily mean your performance is without fault or risk.

For each of the five steps of the framework the evaluation against the indicators is based on three levels of a learning cycle. This will assist you in understanding not only what steps of the framework you are performing well or poorly on but also what you need to prioritise to improve each step. The three levels for each step of the framework measure:

- Awareness and Commitment – Are you aware of the issue and doing something about it?
- Understanding and Application – Do you really understand the issue and have you applied this understanding in practice?
- Improvement and Innovation – Do you continually improve what you do and innovate with new solutions (including collaboration with other stakeholders)?

Performance against each main indicator is scored out of five for each level, making a total of fifteen. These indicators are displayed on a simple 'dashboard' so that it is easy to see and understand performance. The dashboard is built so that an organisation should progress through the three levels, focusing on Commitment and Awareness before moving onto the more advanced requirements of the other two levels. It is possible to evaluate your organisation against each indicator. However, it is advised that if your score for Commitment and Awareness is below three, you should concentrate efforts there before moving on to Understanding and Application.

The Responsible Production Implementation Dashboard can be helpful at

various stages. Initially it can be a useful diagnostic tool to evaluate where your business is today. It can help identify existing strengths and highlight areas where improvements are needed. As you then implement the Responsible Production approach, the indicators become a very easy way to monitor progress in each area.

You can display the dashboard using the chart of your choice. Here is an example using a simple bar chart. In this example the following scores have been achieved:

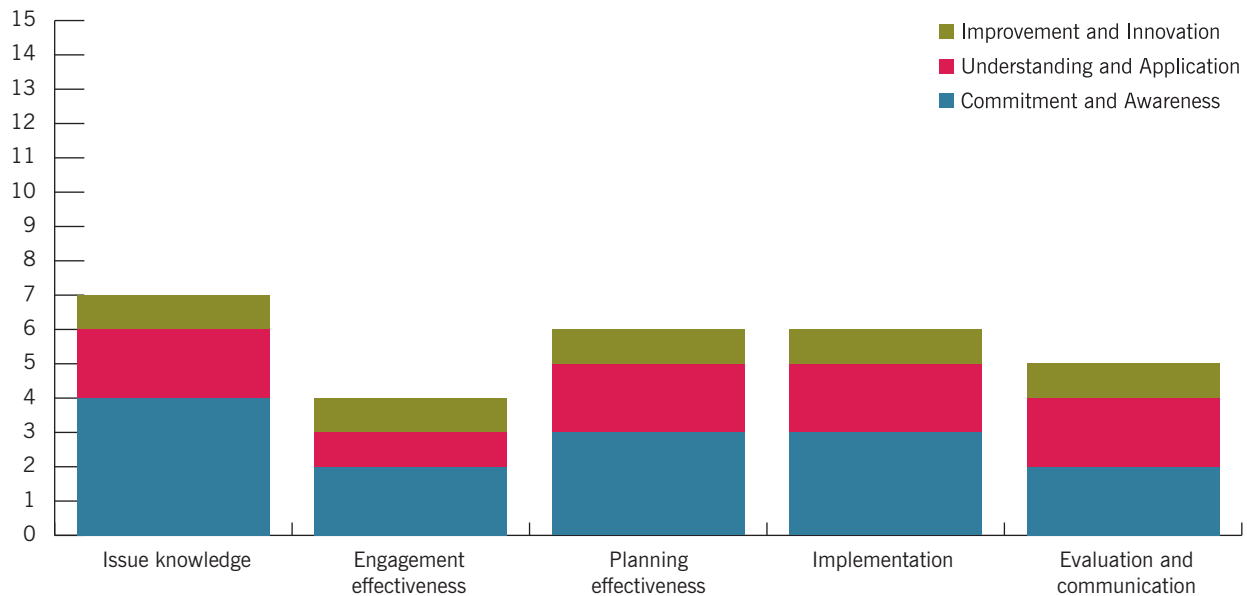
<b>Issue knowledge:</b>	
Awareness and Commitment	4
Understanding and Application	2
Improvement and Innovation	1
<b>Engagement effectiveness:</b>	
Awareness and Commitment	2
Understanding and Application	1
Improvement and Innovation	1
<b>Planning effectiveness:</b>	
Awareness and Commitment	3
Understanding and Application	2
Improvement and Innovation	1
<b>Implementation:</b>	
Awareness and Commitment	3
Understanding and Application	2
Improvement and Innovation	1
<b>Evaluation and Communication:</b>	
Awareness and Commitment	2
Understanding and Application	2
Improvement and Innovation	1

This gives a clear indication of the strengths and weaknesses of the Responsible Production Framework. The organisation illustrated is strongest on Issue Knowledge and weakest on Engagement Effectiveness. With regard to the position of the organisation within the learning cycle throughout the framework, the organisation scores well on Commitment and Awareness for most stages, however the scores on the other two indicators are poor.

# Implementing Responsible Production

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## Sample Responsible Production Implementation Dashboard



The scores are developed by evaluating your performance against the detailed indicators for each main indicator. To do this, you must use the implementation dashboard worksheets (see annex). To use these worksheets:

- select the action that most accurately reflects what you have achieved
- add up your raw scores
- calculate your score at each level
- use your scores at each level to create the dashboard graph

### *Performance Indicator Dashboard*

The performance dashboard provides a series of outcome focused indicators to help monitor safety performance and set targets for improvements. This is clearly linked to the implementation of adequate systems as described in the framework.

You should select the safety performance indicators that are most suited to the needs and characteristics of your operations. Possible safety performance indicators to choose from include the following:

#### **Effects of accidents**

- Lost time (personnel), measured in man days
- Lost time (production), measured in man days or production units

#### **Differentiating types of accidents**

- Number of emissions (sudden and accidental releases)
- Number of accidents related to unforeseen risks (not identified in the Risk Assessment)



- Number of accidents attributed to contractors or visitors as a root or contributing cause.
- Number of accidents reported involving raw materials being supplied to the company (upstream)
- Number of accidents reported involving the company's products (downstream)

**Training**

- Extent to which relevant staff are trained in Risk Assessment
- Extent to which workers are trained on chemical hazards and risk, and on emergency response

**Storage of hazardous substances**

- Extent to which tanks or warehouses containing hazardous substances have secondary containment
- Extent to which tanks containing hazardous substances have overfilling protection systems
- Capacity of storage facility/warehouse to contain contaminated fire water

**Hazard identification and labelling**

- Number of chemical raw materials with/without MSDS
- Number of chemical products with/without MSDS
- Number of unlabelled containers

**Personal Protection**

- Extent to which workers and management wear the appropriate PPE for the hazards involved

**Cooperation with authorities**

- Number of fines/conflicts with local authorities
- Reduction in numbers of questions about safety from the authorities
- Participation in voluntary initiatives promoted by the authorities

**Relations with the public and with other stakeholders**

- Number of (external) complaints from the public regarding safety and environmental performance
- Number of complaints from workers regarding health and safety issues
- Number of complaints from business partners (suppliers, transporters, contractors, competitors, customers) regarding safety and environmental performance

**Cooperation with other companies**

- Extent of participation in industry associations and programmes that address safety and environmental -related issues.
- Extent of participation in local networks that address safety-related issues (ex: mutual aid groups and safety circles)

# Implementing Responsible Production

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## Accident prevention

- Work days since last spill
- Work days since last transport accident
- Work day since last personal accident/incident

## Emergency Planning

- Extent of planned provisions for accidents occurring offsite (surrounding area, nearby facilities, transport)
- Extent and quality of support to public authorities and others involved in offsite preparedness planning
- Extent other companies provide support during a emergency response or exercise.

An example of possible indicators selected in a company is shown below.

	This Quarter	Average Quarter	Target (80 % of average is suggested)
Lost time (personnel) – man days	5	4	3.2
Lost time (production) – man days	30	25	20
External complaints received	2	4	3.2
	Current Performance	Target	
Work days since last spill	24	(5% higher than previous best)	
Work days since last transport accident	46	(5% higher than previous best)	
Work day since last personal accident/incident	7	(5% higher than previous best)	

## NOTES FROM THE FIELD

**Barrick, Peru – Transport of Hazardous Substances**

As part of their approach to Responsible Mining, Barrick identified the transport of hazardous substances as a crucial issue. As a result, since July 2005, when the first drill on the transport of hazardous substances took place at the Lagunas Norte mine, Barrick has been implementing a comprehensive programme for the transport of hazardous substances. The focus is on establishing and maintaining the highest safety standards for stakeholders across the value chain.

After developing a detailed hazard road map, Barrick developed a plan to address emergency situations. Central to this was the engagement of stakeholders, including the communities located close to the mine. In addition to five workshops with authorities and eighteen with transporters ahead of any transport of hazardous substances, Barrick has also held ongoing capacity building workshops with the objective of preparing and informing community members. The workshops have theoretical and practical components. In the former, safety experts share information with the community in schools and institutions through talks and educational material that is made available to the community. In order to add a real world context, role-plays are used to demonstrate the safety actions that are to be applied when of environmental emergencies related to spills and safety in the transport route.

As part of understanding its hazards, Barrick identified the use and management of cyanide in its operations. Therefore two of its mines including Lagunas Norte have become the first in South America to be certified against the International Cyanide Management Code, which contains a set of 200 requirements clustered around 9 principles including transportation, handling and storage, emergency response and dialogue.

**WHY IT WORKED**

Transportation and cyanide are issues that potentially affect those beyond the mine significantly and therefore engagement with these people is crucial. Through the Community Relations team, Lagunas Norte agrees on the details of the programmes with community representatives. Engagement started before the transport of hazardous substances and in this way there is a shared understanding and a shared preparedness.



# Implementing Responsible Production

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## WHY IT WAS GOOD FOR THE BUSINESS

For Barrick, the development of the mining industry is associated with the economic and social growth of local communities. The hazardous material transportation initiative is a part of what is known as Responsible Mining, which implies the use of best available technology, and compliance with the highest work safety, environmental and human resources standards. Through responsible practices Barrick can continue to annually extract the 9.1 million ounces of gold from the site with the support of local stakeholders.

## C. TRAINING

Training materials have been developed to support the Responsible Production approach. The training materials are organized into the following modules:

**Module 1: Introduction** – explains the need for better management of chemical hazards throughout the supply chain and the context in which the Responsible Production approach can be used.

**Module 2: Responsible Production** – introduces the 5-step approach of the Responsible Production and presents the list of tools available in the Responsible Production Toolkit.

**Module 3: Chemical Hazards at Work** – considers the properties of hazardous substances, how they can come into contact with the body and cause injury or disease, how they may cause a fire or explosion in the workplace, and how a spill or leak may cause harm to the environment. It also includes some basic information on the safe handling of hazardous chemicals and potential offsite consequences of hazardous chemicals accidents.

**Module 4: Legal and Regulatory Requirements** – covers legal and regulatory requirements related to chemical hazard control and accident prevention relevant to the chemical industry in general.

**Module 5: Hazard Identification and Classification** – covers the identification of hazardous chemicals and their properties through information provided on recognized international label and classification systems.

**Module 6: Process and Chemicals Flow** – addresses the flow of chemicals and builds capacity for identifying where hazardous chemicals are used and located. It takes into account external operations that companies can influence, including procurement of products and services, and transport and delivery of products to customers.

## NOTES FROM THE FIELD

**Thailand Pilot – Training and coaching of participating companies**

The Thailand pilot of Responsible Production was led by the Thailand Environment Institute (TEI) with significant support from Clariant Chemicals, Faculty of Public Health – Mahidol University, Department of Industrial Works (DIW) of the Ministry of Industry of Thailand, and German Technical Corporation.

In addition the members of the local project steering committee were crucial to enabling the project; these included the Responsible Care Management Committee of Thailand, and the Chemical Industry Club of the Federation of Thai Industries. Particular mentions should be given to Mr. Prakrit Hanidhikul in delivering training as part of Clariant's CSR efforts, Mrs. Helen Arromdee, Professor Chalermchai, and Mr. Pongnarin Petchu for their support and Mr. Mark Hailwood for sharing his expertise in chemical safety management.



# Implementing Responsible Production

The five pilot companies involved were Kem Fac, Q Fac, Bara Chemicals, Bangkok Chemicals and TJC, all located in the Samutprakarn province, inside or outside Bangpu industrial estate. The Industrial Estate Authority of Thailand provided support for pilot activities inside Bangpu Industrial Estate. The pilot developed results for each plant. These fed into action plans for implementation after the end of the pilot. The pilot consisted of training, site visits and ongoing support for management. The diagram here highlights the approach the TEI used to help the participant companies adapt the responsible production framework to help them improve their activities.

The pilot began with initial training for 14 chemical companies and involved local trainers from the TEI, Clariant Chemicals, GTZ, Mahidol University, DIW and UNEP. Training was provided to safety officers and plant managers from these companies as well as to emergency responders and community representatives at Samutprakarn Provincial Government. Participants shared experiences in emergency planning and response which led to a greater understanding and support for the program.

The training was followed by site visits to the five small chemical companies engaged in the pilot. These site visits helped the companies understand where good practices already existed and where improvements could be made. During the site visits, experts highlighted the importance of improving hazard identification, and the need to clearly identify and understand what was dangerous and why. Most companies had both strong and weak areas. Key challenges included the dissemination of good practices throughout the organisations as a whole. This extended to greater sharing of good practice between companies and to the creation of conditions for cooperation.



Site visits were built on by the work of the TEI in partnership to coach the companies on the development of a legal register, flow diagrams, chemical inventories, hazard identification, mapping of hazard hotspots, risk assessment, stakeholder analysis and communication, performance assessment, development of chemical control action plans, and improvement of emergency preparedness. The diagram above shows focus areas of TEI's work to help the participant companies learn from the Responsible Production approach.

During the pilots the TEI identified three key themes for successful uptake of the Responsible Production approach.



*High level commitment:* Responsible production gives an overarching view that requires there to be high level involvement and commitment to the approach within the organisation.

*Creating a Safety Culture:* Education and continual improvement that result in positive change in the safety culture are key signs of success.

*Gap analysis is an essential starting point:* A plant needs to establish a baseline in order to understand where to focus its efforts. Conducting a self-assessment helps prioritize the high risks over the less vital areas for improvement.

**Module 7: Chemical Inventorying** – covers the development of a chemical inventory for the systematic identification of all chemical substances that are stored, handled and used at companies, integrating information on quantities, type of storage, and hazard classification.

**Module 8: Risk Analysis, Hazard Prioritization, and Identification of Risk Reduction actions** – covers preliminary risk analysis and aims to build capacity for identification of risk reduction actions.

**Module 9: Hazard Mapping** – covers the mapping of companies' Hazard Hotspots. It also covers mapping of offsite hazards along the chemicals chain.

**Module 10: Stakeholders Identification and Engagement** – addresses how to identify and map stakeholders along the value chain and to decide on the best way to engage them to promote improved chemical safety and risk management.

**Module 11: Chemical Control Action Plans** – covers the rationale and steps needed to develop systematic chemical control action plan(s) with clear responsibilities and deadlines for implementing actions for risk reduction.

# Implementing Responsible Production

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**Module 12: Training** – considers how to identify and assess awareness raising and training needs within a company, at its business partners and among other relevant stakeholders.

**Module 13: Emergency Planning Part 1** – explains the 10 steps of the APELL process and the way in which it structures the necessary activities for establishing a fully integrated emergency plan through a multi-stakeholder participation process involving industry, local authorities, and the community.

**Module 14: Emergency Planning Part 2** – addresses further details on the development of an Emergency Plan through a multi-stakeholder approach using the APELL Process

**Module 15: Best Practice Procedures** – explains the approach in the Responsible Production Toolkit for developing company specific best practice / standard operating procedures aimed at improved chemical safety.

**Module 16: Basic Overview of other RP tools** (risk communication, preparing product risk information, and procurement) – covers the development of risk communication materials, including the assessment of stakeholders' needs and concerns, the development of risk communication messages, and their delivery to the target audiences. It also explains the approach proposed in the Responsible Production toolkit for the development of product risk information. Finally, it covers sustainable chemical procurement as a process of purchasing goods and services that take into account the social, economic and environmental impact that such purchasing has on people and communities, in the context of chemical safety and environmental protection.

**Module 17: Performance Assessment and External Communication of Company Achievements** – addresses the approach in the Responsible Production Toolkit to performance assessment, as well as methods for communicating company achievements to external stakeholders.

**Module 18: Conclusions** – brings the training to a close, reiterating the main points of the training and suggesting next steps to be implemented.



## NOTES FROM THE FIELD

**Peru Pilot – Responsible Production and APELL Training Program**

Training has been an important element of the Responsible Production and APELL pilots in Peru. Strongly based upon the stakeholder engagement and communication aspects common to APELL, to TransAPELL, and to Responsible Production, the training programs have received significant support from numerous stakeholders including the Ministry of Environment of Peru (MINAM), the Ministry of Energy and Mines (MEM), the Ministry of Transport and Communications (MTC), the National Institute of Civil Defence (INDECI), the District Government of Hualgayoc, and the Regional Government of Cajamarca. The support of industry bodies such as the National Society of Mining, Petroleum and Energy (SNMPE) and the National Society of Industry (SNI) have been instrumental, as has that of the companies Gold Fields La Cima, Yanacocha, Compania Minera Antamina, S.A., Rio Tinto, Barrick, Consolidada de Hualgayoc, SA, and of the NGO RAPID LatinoAmerica.

The pilot began with local meetings with representatives from the key mining companies operating in Peru and in the Cajamarca region. Training developed a dialogue between transporters, mining companies, responders/firemen and government representatives. Topics covered included the new Peruvian regulation on road transport of hazardous material and wastes, emergency preparedness and community relations.



Two of the main mining companies operating in the Cajamarca region – Gold Fields La Cima and Yanacocha – delivered specific technical presentations on their emergency preparedness and corporate social responsibility programmes, much contributing to workshop discussions and debate.

The experience of Antamina and RAPID with their program addressing APELL and community engagement for emergency preparedness created a strong impression.

As a direct result, RAPID will start a similar programme in the Cajamarca region with the support of Gold Fields La Cima. Transportation was highlighted as the single most important issue to address.

The second pilot training session deepened the understanding of the issues discussed in the first session. This included INDECI delivering a presentation on Regional Systems for Emergency Preparedness, local mining companies presenting on emergency response and community engagement and UNEP's local consultant giving technical presentations on Sustainable Mining, APELL, TransAPELL, and APELL for mining. Participants were guided through, a new software-based TransAPELL tool developed by UNEP for hazard road mapping and emergency preparedness in the transport of hazardous substances.

## Implementing Responsible Production

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Of particular importance was the presentation of the Ministry of Transport and Communications on the newly approved Peruvian regulation on road transport of hazardous substances and wastes, which fostered active and constructive discussion among stakeholders, including Small and Medium Sized Enterprises (SMEs) that provide transport and safety services to mining operations.

Consolidada de Hualgayoc, an exploration company, presented innovative approaches to community engagement and environmental restoration during the exploration phase. All presentations were delivered in a way that encouraged strong participation and discussion among workshop participants.

A final closure workshop was held in Cajamarca in the end of 2009. Highlights of this meeting include the discussion of a guidance and regional strategy on TransAPELL for Mining Operations, developed by the Ministry of Environment of Peru through technical consultations with key national and regional stakeholders facilitated by the pilot activities. Other highlights include the presentation of a knowledge platform on TransAPELL and APELL in the Peruvian mining sector, developed by UNEP and the team of consultants involved in the overall training program.

## 4. The Value of Responsible Production

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We have evaluated two selected companies against the Responsible Production Framework, using the Responsible Production indicators. These cases make clear the value of Responsible Production practices to the organisation, its stakeholders and the environment.

The cases featured look at companies who have tried to identify and implement best practice in order to prevent accidents. They represent a good benchmark against which to evaluate your performance.

The companies featured in the following case studies understand that major accidents are not only costly but have significant impact on the image, viability and future prospects of a company. While smaller accidents have less dramatic impact, it is clear that they are an indicator for practice that needs improvement and that they represent a higher risk environment.

As these cases show, the decision to understand and implement good practice results in a better score. The scores primarily address implementation, although there are clear links between improved implementation and improved performance. However, scoring highly using this tool does not necessarily mean your performance is without fault or risk. Better performance is the ultimate goal. It is companies that perform well with whom people want to do business, with whom investors want to invest, and whom communities are happy to host.

As these cases show, Responsible Production practices are not just a way of surviving, but a way of thriving.

# The Value of Responsible Production

## A. THAILAND

### Clariant Chemicals

#### THE COMPANY

Clariant is a global company that produces specialty chemicals. It has operations on five continents through more than 100 affiliated companies and employs more than 20,000 people. It has its headquarters in Muttenz near Basel, Switzerland and, in 2007, generated sales of more than CHF 8.5 billion.

Clariant Thailand is an affiliated company of Clariant Group. Clariant first traded in Thailand as Sandoz, which distributed its chemicals through a sole Thai agent called Berli Jucker. The Bangoo plant was established in 1992, and in 1995 the company name was changed to Clariant Chemicals due to the reorganisation of several major chemical companies including Sandoz and Hoechst. Clariant employ over 450 professional staff in Thailand.

#### BEST PRACTICE EXAMPLES

Clariant has developed robust and comprehensive responsible production practices that help mark it as a leader in Thailand. It views health, safety and environmental considerations not as an add-on but as a core and strategic element of being a safe and profitable chemical company.

Clariant has a strong culture of safety. A rigorous training programme forms the backbone of this, ensuring all staff are aware of and understand all the hazards and how to minimize risk. Best practice influences come from various sources including the parent company in Switzerland and are applied to the local setting to guarantee practical and realistic solutions.

The culture of safety is emphasized by the Continuous Improvement Process which encourages and provides incentives for staff to contribute to innovative improvements that will enhance the safety of the site. This is an example of the very strong internal engagement processes that are central to responsible production. By external engagement through the establishment of partnerships with government ministries and the Bangoo Industrial Estate Authority Clariant demonstrate that engaging beyond the factory gate is important in building a truly responsible approach to production.

Clariant considers the whole value chain in its safety management, from the suppliers to transporters and final users, all of whom have received training to improve their understanding of the hazards. While unable to put precise numbers on the value of such measures, Clariant remains convinced that being a responsible producer actually saves money in both the medium and long term.

#### ISSUE KNOWLEDGE

Clariant understands all of the important information related to the chemicals they use. This includes a clear understanding of what chemicals are being handled and the quantity of each on site. They fully understand



Clariant's key businesses are organized in four divisions: Textile, Leather & Paper, Pigments & Additives, and Functional Chemicals and Masterbatches. Clariant distributes both imported and local products produced at one of the production sites (Bangpoo and Phan Thong). The products are sold domestically and throughout the South East Asia region.

the chemical, physical and toxicological properties of each chemical and their associated hazards to health and the environment.

Clariant has a comprehensive documentation system for identifying all issues. They keep lists of all substances (both raw materials and finished goods). On top of this, updated quantities and yearly amounts of each product are available in the company SAP system. All safety data sheets are accessible on the computer system. The SAP system itemizes where each chemical is stored which enables chemicals to be properly separated by their associated hazards. Furthermore all information on the safety data sheets including the hazard properties of all raw materials are compiled on a company database. This is grouped by a specific Clariant Thailand Method which helps internal risk analysis. Risk analysis is conducted using Zurich Hazard Analysis which helps classify the risk associated with the various hazards based on their severity and frequency.

Clariant shows a strong appreciation of the relevant international codes. Clariant have applied 'corporate and divisional guidelines and guides' which are equivalent to international standard ISO 14001. The Clariant's Continuous Improvement Process (CIP) helps the company fulfil OHSAS 18001 requirements. They also have internal standards that are similar to Responsible Care® codes of management practice which cover community awareness and emergency response, process safety, employee health and safety, pollution prevention, distribution and product stewardship. Clariant's finished products comply with international transportation standards (UN Recommendation for Transportation of Dangerous Goods) for both imported products and local manufacturing products. Clariant also communicate regularly with relevant Thai authorities such as the Ministry of Industry, the Ministry of Labour and Welfare and the Industrial Estate Authority of Thailand.

Chemicals are classified with the names controlled by the SAP information system. Chemicals are labelled using CAS No., EC No. and UN number. The SDS are now according to GHS in both Thai and English.

Chemicals are classified by the place in the value chain (transportation, workplace, warehouse, production) as well as the nature of the hazard. By grouping chemicals in this way the risk analysis process becomes simpler to understand. Such a process requires a detailed understanding of what the chemical flows are. This comes from clear communication with local suppliers as well as those from Germany, Indonesia and China. Chemicals coming on and going off site are often monitored, as well as chemicals and solvents used on site. Even chemicals that are disposed of are monitored. These flows are all controlled by an electronic SAP business system.

In certain areas Clariant is a pioneer company in Thailand. The implementation of the UN Globally Harmonized System for Classification and Labelling of Chemical (GHS) is an example of this. This includes collaborating with German experts on the implementation of GHS and helping the Department of Industrial Works develop an e-curriculum and training programme. In this way Clariant are helping the rest of the Thai chemical industry become more responsible as they understand a big accident elsewhere could impact them negatively.

Clariant has developed a culturally appropriate system to communicate the dangers of each type of chemical. **Tigers** relate to chemicals where there is a risk of fire or explosion. Toxic chemicals are **snakes**. Corrosive chemicals are **dogs**. This risk assessment considers production, storage and transport processes. The system helps Clariant employees understand the relative risks. The risk assessment used incorporates different methods including an internal checklist, the Zurich Hazard Analysis and a What If analysis following instructions defined by the Thai authorities. Risk factors were assigned to all potential accidents (hazard hot spots) depending on the probability of occurrence and severity of impact. All potential accidents (hazard hot spots) are prioritized and marked into red, yellow and green zones which make up the yearly risk portfolio. This portfolio helps allocate and prioritise budget for any additional safety measures. Site level activities are supported by the national level company safety expert.

# The Value of Responsible Production

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## ENGAGEMENT EFFECTIVENESS

Clariant has a strong understanding of its stakeholders. It defines stakeholders as those 'on whom we have an impact and who have an impact on us'. Clariant understands that stakeholders are connected to chemical hazard management at both the site level and beyond. They communicate an understanding of the key concerns to each group: employees (e.g. safety and health), neighbours and communities (e.g. air emissions and waste water), business partners and suppliers, customers, the environment, government and authorities, shareholders and future generations.

Clariant gets the right people involved in a number of ways, including through meetings, open dialogue and site visits. Employee concerns are discussed and reviewed every month in the Site Safety Monthly Meeting. Communication with staff on an ongoing basis is important for continuous improvement. There is also an internal Personal Protective Equipment Committee to discuss improvements to staff clothing.

Clariant's consumers are not only communicated with in a commercial sense but also engaged to ensure they have a suitable understanding of the risks and practices associated with each chemical through training programmes, covering issues such as handling hazardous chemicals, basic fire and explosion training and warehousing training. The local authorities are engaged on local rules and regulations as well as

through Clariant's participation in efforts to help train and educate other chemical companies in the region.

There is strong internal engagement on issues such as learning from accidents and the introduction of new chemicals. However, there is a limited range of issues on which Clariant engages with the external stakeholders who are engaged on a more limited basis. Clariant has a good understanding of some of the issues of other external stakeholders, including environmental issues such as waste water and emissions, and responds to these in a comprehensive manner. However, Clariant does not have an ongoing comprehensive engagement programme. This is one area that can be improved.

## PLANNING EFFECTIVENESS

Clariant has clearly identified ways of controlling hazards and the related risks associated with chemical hazards onsite. Their plans build on the risk assessment and cover off-loading and transfer of raw materials, warehousing, handling of chemicals (in warehouse and production), processing, packaging and delivery of finished products and even retail and use. This highlights the very strong onsite planning process and also that Clariant have begun to think about offsite risks as their responsibility in addition. By including offsite issues in their risk assessment, they are consciously adopting the value chain approach and a more complete picture of the potential hazards is being developed.

Clariant has a very systematic process for developing chemical hazard management plans. Initially the chemical hazards (physical, health and environment), the equipment hazards and the process hazards are identified. The Clariant Corporate requirements and those of the local authorities are then considered. This feeds into the three colour risk matrix that prioritises high, moderate and low risks. Weaknesses and gaps are easily highlighted and additional preventative measures are taken to address problems within a stated timeframe. Clariant develops clear action plans, that state who is responsible and what the deadline for





action is. Plans are then reviewed for consistency and effectiveness.

Clariant understands the importance of objectives, targets and indicators to ensure plans are delivered. It has established objectives for controlling each hazard and reducing associated risks. These objectives are then supported by clear targets (e.g. ensuring Clariant Thailand accident statistics are below Clariant Corporate accident statistics). Performance indicators are then set to measure progress against these targets. The objectives, targets and indicators are reviewed yearly for gaps, and new ones are added as appropriate.

Clariant's emergency plan lists all the steps required in the event of an emergency and is based on various scenarios. The plan clearly identifies key stakeholders and their roles. This includes the Emergency Response Services and the Local Emergency management. Clariant has an integrated community plan as part of the Bangoo Industrial Estate Emergency Mutual Aid Group (BEMAG). Clariant have built some external stakeholders into an offsite emergency plan but do not yet have an integrated community emergency plan.

Clariant has an extensive training programme based on its own comprehensive curriculum. It is intended to match international best practice within the local context. There is a yearly standard training programme for all staff. Training is delivered with pictures and adapted



to the Clariant situation. The materials are developed by Clariant but are distributed to customers, authorities, universities and industry associations in an effort to promote wider adoption of good practice.

Contractors are trained by Clariant but third party suppliers are not at present. Some customers have been given training to increase their understanding of the hazards associated with Clariant products. Such training covers a wide variety of issues depending on the customer and the risks they face.

### IMPLEMENTATION

To increase the awareness of safety, Clariant has implemented a Continuous Improvement Process (CIP) with 6 teams, each of which is responsible for a different section on site. This process encourages and rewards staff to develop improvements. More than 200 CIP projects have been completed. This has resulted in increased awareness of safety, increased productivity, cost savings and a reduction in non-compliance. This has had an impact not only in terms of improved safety but also in terms of costs, resulting in a more profitable factory.

Employees receive on the job training about safety precautions from their supervisors and managers.



Records of training are kept, each with a signature of acknowledgement. Training records are kept by the Site Safety Education Officer (SEO) for reference. Employees also receive training directly from the Site SEO on certain issues.

Training is given to employees on many issues, with additional training at the supervisor level. Training modules include job safety analysis, PPE, hazard classification and labelling and flammable substances.

Clariant uses both internal and external audits and inspections. The communication of all gaps found is

# The Value of Responsible Production

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clear and based on the severity and likelihood of the hazard, which links it back to the overall risk management framework. It explains all gaps as well as the responses required from employees. Communications are targeted and designed to match the needs and interests of each type of employee.

Clariant has a multi level audit procedure. Daily site inspections are conducted. Key procedures are cross checked and unsafe actions or conditions are reported verbally or in writing to the head of the relevant section. The Site Safety Officer also conducts a daily inspection. In addition the Site Safety Committee conducts a monthly inspection. Findings are discussed immediately and responses decided upon. A full self-audit is conducted annually and reviewed by the Clariant country head of environment, health and safety. Furthermore, Clariant group provides expert audits every three years. Clariant has been certified for ISO 9001:2000, ISO 14001:2004 and OHSAS 18001:1999. These all required external audit. In addition an external audit by a project team from German Technical Corporation (GTZ), the Industrial Estate Authority of Thailand (IEAT) and the Department of Industrial Works (DIW) awarded Clariant a 'green' label (best of three levels) for occupational health and safety, environmental care and evacuation. It was awarded a 'yellow' label for fire and fire protection but was the best in the area on this issue.

Finished goods are transported by selected contractors and there are specific checks and criteria placed on these contractors, including the condition of trucks and the competence of drivers who have all undergone emergency action training.

All waste that is classified as hazardous is disposed of by experienced waste disposal companies. The waste water collection system at Clariant ensures all storm or fire water drains into a flood pool and is only released after being treated. No water is allowed to enter the drainage system before Clariant is certain that it is sufficiently clean. These measures ensure the environmental impact of Clariant's operations is minimal and the organisation is confident it will avoid fines and



other costs that could result from an environmental accident.

## EVALUATION AND COMMUNICATION

Clariant defines targets as part of its yearly plan. Setting deadlines allows it to monitor progress at site monthly meetings. Trends in the number and severity of incidents are evaluated and Clariant worldwide data is used as a benchmark for evaluation in Thailand. Clariant had some small incidents between 1994 and March 2005 but there has been no incident since then.

Clariant has processes in place to ensure they learn from any mistakes. All accidents are investigated fully and lessons are learnt when necessary. Accident investigation training was given to the supervisors of all sections in 2007 to ensure that accidents are responded to appropriately and that staff understand how to alter plans if an accident highlights a gap.

The completion of tasks and the corrective action taken to fill gaps are monitored regularly, and currently these tasks have a near 100% completion rate within the stated timeframes. This includes completed jobs as part of the Clariant Continuous Improvement Process (CIP) on factory floor level. Clariant has completed over 200 such projects in the last few years.

Clariant has an efficient and trained emergency response services team (ERS) to manage accidents or respond to incidents including inquiries and complaints from the public (if there are any). Since



operations commenced in 1995 there have been no inquiries or complaints from neighbours or the public. Instead, Clariant has been working with the Industrial Estate Authority of Thailand to improve standards across the sector.

**COST ANALYSIS**

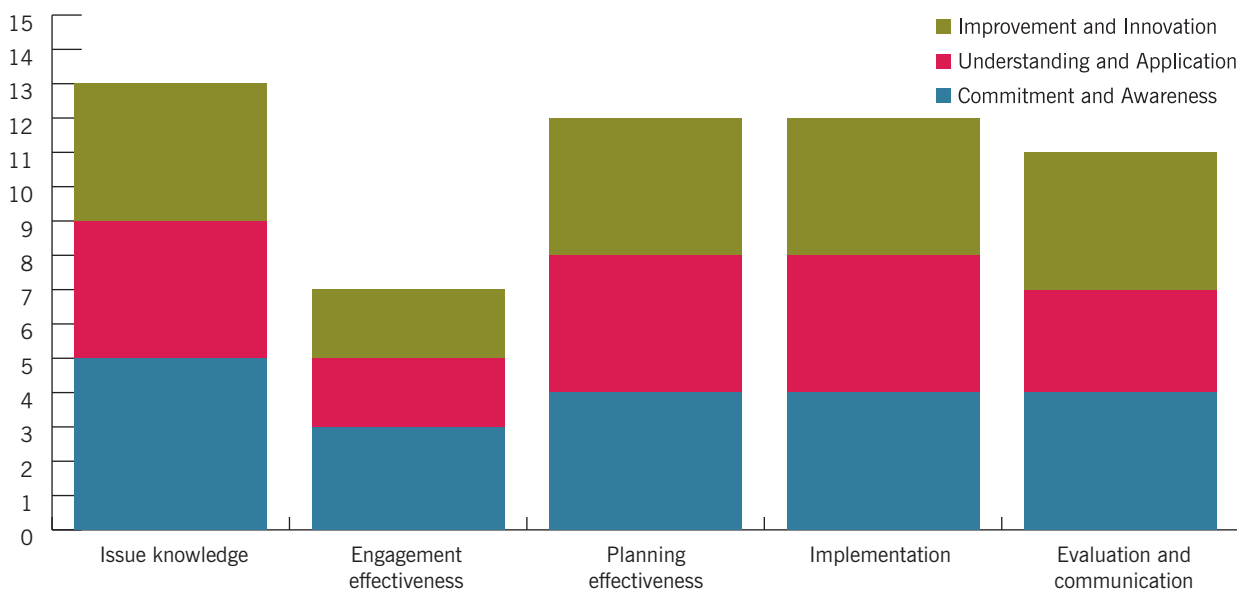
Clariant understands the cost of dealing with accidents even though they have not had a lost workday accident in the last three years.

The yearly costs associated with managing chemicals safety is 5-6 million Bht on average and over the last

three years an additional 1 million Bht has been invested in addition to this.

Clariant does not know the exact cost savings associated with reducing risks. However, it is clear that the safety measures have cut costs (including a reduced need for expensive waste water treatment and reduced medical treatment costs due to healthier workers). There have been significant cost savings from their good safety record due to the lack of any damage to property and equipment or personal injuries. Furthermore, responsible production practices have enabled Clariant to avoid breaks in production, saving the costs associated with production delays.

Clariant Implementation Dashboard



# The Value of Responsible Production

## NOTES FROM THE FIELD

### Thailand Pilot – Case Studies on the Impact of Responsible Production on Pilot SMEs

The full case studies show how the Responsible Production framework can be implemented comprehensively, but this framework aims to provide an easy tool for SMEs. The pilot in Thailand provides evidence of how Responsible Production can help SMEs improve in simple and cost-effective ways. The pilot SMEs involved in the Thailand pilot have been assisted, particularly by the Thailand Environment Institute, to help understand and implement relevant aspects of the Responsible Production framework. The cases below illustrate some of the issues that Responsible production has helped them understand better and some of the resulting improvements.

#### TJC

**Planning and implementation effectiveness:** Site visits highlighted that there was a mismatch between potential hazards, protective equipment signage and personal equipment usage. The hazards were

understood but the planning and implementation of protective equipment usage was not always appropriate or consistent and this seemed to cause confusion among workers about the need for protective equipment. The project helped TJC clarify where protective equipment was required and where it was not. More importantly it explained to workers why protective equipment was necessary and what hazards it helps protect them from.



**Engagement Effectiveness:** As a result of this and other information, the TEI have helped TJC develop better value chain stakeholder engagement. This has involved clearly identifying who in the value chain they need to engage with better in order to improve safety and on what issues they need to communicate. This is being developed into a more strategic approach to safety and engagement.

#### Q-FAC

**Issue Identification:** Chemical classification needed to be improved in order to more effectively manage safety. In storage areas, hazard labelling is being improved by ensuring Material Safety Data Sheets (MSDS) are available for all products including mixtures and they are available in Thai not just English or Chinese. Q-Fac was helped to understand that better labelling can help improve identification of hazards and lead improve planning, especially in storage areas which will ensure incompatible hazards are kept apart. Q-Fac indicated that the lack of labelling was an issue for their suppliers, which reinforced the stakeholder engagement and value chain approach articulated in



Responsible Production. Q-Fac has been encouraged to work with their suppliers more closely to address this problem.

**Issue identification and planning effectiveness:** Q-Fac did not have a clear hazard mapping process and therefore planning and implementation of hazard management was not effective. The Responsible Production approach helped them develop a hazard mapping process and a clear way of identifying high risk hazards. The pilot ensured that this process was not isolated and that it linked through into safety planning.

# The Value of Responsible Production

## B. PERU

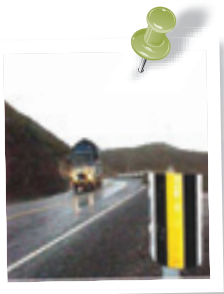
### Antamina

#### THE COMPANY

Antamina is a large mining company based in Peru. The mine is the world's third largest and is located high in the Andes in the remote Ancash region, which lies more than 4,300 metres above sea level. Antamina currently has approximately 1,500 direct employees and 5,500 indirect employees. The majority of these are Peruvians and many come from the Ancash region itself.

The mine was owned by the Government of Peru and operated by Minero Peru until privatisation in 1996. Antamina began commercial production in 2001 and now produces a number of different mineral concentrates, primarily copper and zinc, as well as molybdenum, silver and lead. The four shareholders are major international mining companies, with Xstrata and BHP Billiton Plc owning 33.75% each and Teck-Cominco Ltd and Mitsubishi Corp each owning smaller shares.

The copper and zinc concentrates are transported through a pipeline to the port in Huarney where they are treated and shipped around the world. The molybdenum and lead-bismuth concentrates are filtered and hermetically sealed for transport in trucks from the mine to the port of Callao. The roads near the mine require the trucks to pass through some severe mountain passes making transport a potential hazard



#### BEST PRACTICE EXAMPLES

In recent years Antamina has developed strong responsible mining practices based on quality community engagement. The company sees this as strategically beneficial to the business and a crucial part of its operations, hazard management and emergency

preparedness. Antamina has shifted from treating issues as individual considerations to having a much more integrated view of chemical hazard management across the whole value chain and how it links with other aspects of performance.

*"At Antamina we don't only focus on the initial costs, because we as a company want to be a winner. These activities will improve many aspects of our business and are part of making us a winner."*

Senior Engineer, Antamina

They have developed engagement partnerships with suppliers, local communities and transporters. This engagement has enabled them to have a better understanding of the issues, particularly regarding safe transportation of hazardous materials, which in turn has meant planning and performance has improved. The company believes the likelihood of an accident is now lower and, due to the integrated response mecha-



nisms they have established, the company is well placed to minimise impact if there were to be an incident.

Preventive measures created through engagement and partnerships are at the centre of Antamina's strategy for responsible mining. Local communities are engaged to enable appropriate training and the development of local emergency plans. Suppliers and transporters

participate with Antamina in an open forum to discuss best practice, lessons learnt and the impact of new regulations. Drivers also receive comprehensive training including training in soft skills such as how to deal with local communities in the event of an accident.

Antamina has taken what they have learnt from engagement and developed comprehensive plans throughout the business and supply chain to ensure that using contractors doesn't expose them to additional risk. Its MASSC certification system requires all contractors and sub contractors to reach a certain level of performance before they are considered for contracts. In this way Antamina has begun to shift the focus of responsible mining practices towards the SMEs that they work with, benefiting both types of organizations in the process.

Antamina also evaluates their activities through engagement with partners. This open forum enables honest appraisal and leads to improvements across all suppliers.

Antamina have plans to further integrate these activities in order for them to become truly sustainable, but importantly they have acknowledged and embraced the need for a change in mindset and process such as the one that Responsible Production requires, and are beginning to see the benefits.

### ISSUE KNOWLEDGE

Issue knowledge has enabled Antamina to identify and prioritise hazards. This led to the determination that the major hazard in their value chain is the transportation of hazardous materials, due to the dangerous roads and often poor weather.

Antamina has identified Hazard Hotspots associated with its pipeline as the 4 points at which the underground pipeline is exposed. This hotspot identification enables Antamina to design risk prevention plans which focus additional measures and resources at such hotspots.

### ENGAGEMENT EFFECTIVENESS:

Antamina has recently moved from a three-way relationship (Antamina -Transporters-Suppliers) to a four way partnership that includes the local community.



Stakeholder mapping of communities close to the mine identified a number of key stakeholders to engage with: various community groups, local government, local emergency services and schools.

The local community is engaged to discover what their concerns are related to the mine, to explain the activities of the mine and explain the risks. Through RAPID LatinoAmerica (a NGO employed to be an independent facilitator) the community is educated and given new skills as well as the opportunity to provide feedback on how to better link them into company risk management. Engaging the community in this way was a new step for Antamina. It required careful handling and a phased approach. Phase 1 concentrated on initial engagement, community emergency preparedness planning and the capacity to respond. Antamina funded the project but initially employed RAPID to engage directly with the local communities to help build up trust and commitment. Antamina will engage more directly in the future. Phase 2 will integrate community engagement with Antamina controls and plans, integrated training (alongside transporters and communities) and increased service provision. Phase 3 is the point at which these activities become a sustainable partnership.

# The Value of Responsible Production

## ANTAMINA AND RAPID LATINOAMERICA - AN INNOVATIVE AND RESPONSIBLE PARTNERSHIP

Antamina brought in RAPID LatinoAmerica to help coordinate the community engagement and disaster preparedness program. RAPID LatinoAmerica is a Non-Governmental Organisation (NGO) created in Peru in order to cater the increasing need of preparedness and response for disasters in Latin America. RAPID LatinoAmerica were better placed as an independent NGO to build trust with the communities, engage them in safety training and capacity building, and build awareness of the risks that exist and how to respond to emergencies. Ultimately this will enable the communities to become safer and more integrated with the actions of the nearby mine.



RAPID play several roles including helping communities develop their own risk management plans, creating local community and emergency brigades, providing training on emergency response, first aid and evacuation techniques. Local communities are all educated on the chemicals and symbols they may see and the appropriate responses to each. In this way the project is building a safer value chain for the mine. Through this RAPID also helps connect these rural communities to other stakeholders including local government and emergency services or even APELL programs.



The program continues to develop, with Antamina planning to get gradually more involved as the trust builds. It has been hailed as a highly successful partnership and other mining companies in the country are looking to RAPID and to similar initiatives to develop partnerships elsewhere.

Antamina also engages with transporters and suppliers through a committee which is chaired by a supplier rather than Antamina. This committee is a forum to express concerns, share best practice and explain when mistakes are made. It is also used to discuss the implications of new laws and regulations.

### PLANNING EFFECTIVENESS

Antamina understands the issues across the value chain and views responsible mining as a core business value. This means it understands that to create successful plans it must involve all of its stakeholders. Antamina has acknowledged that planning

cannot be purely technical but also needs to accommodate human aspects of safety and emergency preparedness along the whole value chain.

Antamina has helped the development of off-site emergency plans and built the awareness and preparedness of local communities through engagement and training, of drivers and other employees through training, and of suppliers through forums. Training programmes are developed and reviewed together with participants to ensure their effectiveness.

The Antamina committee of suppliers and transporters is where a 5-year transport plan is developed as a





partnership between Antamina and its stakeholders. This is chaired by a supplier to prevent Antamina dominating. This plan addresses risk management, emergency preparedness and training.

Planning is aimed firstly at preventing accidents, but equally there is recognition of the need to have emergency preparedness measures. These include community training as well as spill pools which can contain non hazardous liquids if the pressure in the pipeline becomes too high. Drivers are also trained in emergency preparedness and also softer skills



such as interpersonal skills to enable them to deal with local communities more appropriately in the case of an accident. There are 5 levels of driver training and their road logs start the day before a journey to ensure adequate preparation.

### IMPLEMENTATION

Antamina manages chemical hazard risks according to the procedures they have developed. Various control points on the route have been created addressing

technical aspects as well as the more human side of transport safety, which involves an informal assessment of the driver. The transport of hazardous materials requires two escorts and the materials are carried in large sacks placed between containers to prevent them spilling out if the truck tips over in an accident.

Antamina also have their own emergency response vehicles that can respond to an incident quickly since the government capability in these rural areas is very limited.

Rapid Latin America have run emergency drills with local communities which simulate various types of incidents to ensure the training and awareness building has been understood. This began with the communities closest to the mine and is expanding each year to more communities.

Antamina has begun to extend chemical hazard management into their procurement process. The MASSC system, which is an internal certification system addressing environmental, social and health and safety criteria, is a requirement for all suppliers and their suppliers to adhere to. It ensures that principles (such as the ones presented in Responsible Production) are embedded in the supply chain. MASSC is based on a paper and field audit. If an organisation fails to comply it cannot be awarded a contract for 6 months, at which point it may apply for certification again.

### EVALUATION AND COMMUNICATION

Communities who engaged with Rapid Latin America have been able to provide feedback and are also



# The Value of Responsible Production

utilised to train the next community in the programme, improving and increasing the credibility of the training.

The MASSC has a regular committee chaired by suppliers not the company to share best practice and learn lessons from incidents. This provides a useful arena for evaluation and enables procedural changes to be made in a transparent way.

## COST ANALYSIS

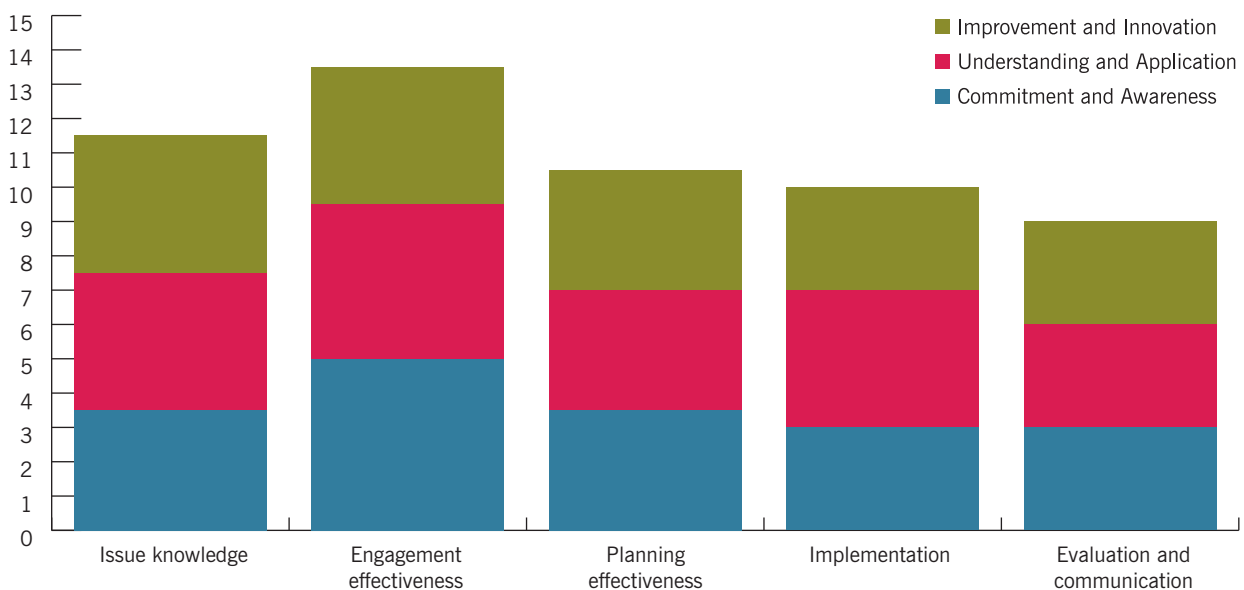
Antamina emphasises that this programme is not entirely about costs savings, it is about building strategic relationships with suppliers and local communities to ensure better understanding, performance and, of course, responsible mining operations. However, these programs can bring long term financial benefits to Antamina, as well as some shorter term operational costs benefits.

A quality programme like this costs money and the tangible benefits can sometimes be difficult to highlight, but many of the basic level improvements are simple to introduce and low cost. It is worth remembering that as the ‘costs of learning’ examples illustrate, the financial implications of not implementing responsible practices can be enormous both immediately and in relation to longer term reputation damage.

There are two areas of major financial gain to Antamina:

- Accident cost avoidance – by reducing the likelihood of major accidents, and/or minimising the potential impact of an accident, significant cost savings can be made over time
- Licence to operate – through engaging with communities, local government and suppliers, the opposition to further expansion or new projects can be minimised.

## Antamina Implementation Dashboard





## NOTES FROM THE FIELD

**Peru Pilot – Developing new initiatives and partnerships through stakeholder engagement across the value-chain**

An important part of both APELL and Responsible Production is bringing together stakeholders. Responsible Production goes one step further and emphasizes stakeholder engagement across the value chain for increased communication and participation. Consultations and training programmes were a crucial part of the pilot programme in Peru and promoted multi-stakeholder dialogue and increased the general awareness and understanding of chemical risks with relation to the transport and use of hazardous chemicals. The impact of these efforts led to the formation of new initiatives related to the Responsible Production approach, many of which build on the existing recognition of APELL in the region.

As APELL and TransAPELL, Responsible Production encourages multi-stakeholder and value chain approaches to issues such as transporting materials and emergency preparedness. This approach has had a significant impact on developing new initiatives. The examples below illustrate some that were formed as a result of the dialogue and outreach of the stakeholder engagement pilot.



A consultation meeting with the Technical Group of Chemical Substances helped re-start the dialogue on local level emergency preparedness related to the transport of hazardous substances in mining operations. This was developed in the context of the new Peruvian regulation on the transport of hazardous substances and wastes. Transportation of hazardous substances is perhaps the most critical issue for many stakeholders and so this move was highly welcomed.

As a result of the APELL training programmes held in Cajamarca, the Ministry of Transport and Communication, the new Ministry of Environment of Peru (MINAM), the National Society of Industry (SNI) and the National Society of Mining Petroleum and Energy (SNMPE) created a technical group that will further promote the implementation of APELL and selected elements of the Responsible Production approach such as hazard mapping and stakeholder engagement, and will provide extensive inputs on a new TransAPELL planning and communication tool.

At the local and regional levels a working group was formed in Cajamarca involving representatives from civil society, SMEs (transport companies and service providers), local and regional authorities, and the larger mining companies (including Newmont/Yanacocha and Gold Fields La Cima). This group aims to form an APELL Coordinating Group and APELL Strategy for the Region.

## The Value of Responsible Production

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Finally, and as a result of the pilot, the Ministry of Environment of Peru has developed a guidance and regional strategy on TransAPELL for Mining Operations, in close partnership with key national and regional stakeholders.

These initiatives are the most tangible and have immediate signs of impact, but meetings with other relevant stakeholders such as the National Society of Industries (SNI) and representatives from mining companies has led to a process that will further assess current needs with a view to up-scaling initiatives on APELL, TransAPELL and Responsible Production in other regions of Peru.

## 5. Annex Implementation Dashboard Worksheets

An organisation generates its implementation dashboard by answering all the questions in these worksheets. By choosing the response to each question that most closely matches its performance, the organisation generates a score for that question. The scores for each question are added up and the calculation generates a score for each level (Awareness and Commitment, Understanding and Application, Improvement and Innovation)

### Calculation

1. For each main indicator (e.g. Issue Knowledge) divide the total points achieved at each level (e.g. Awareness and Commitment) by the number of questions for that level. This provides a score out of five.
2. The scores for each level are then added together to give a total score out of fifteen for that main indicator (e.g. Issue Knowledge).
3. When an organisation has produced a score for each main indicator it can produce an indicator dashboard to observe the areas in which it is performing well and in which improvement is needed.

Issue Knowledge						
	0 points	1 point	2 points	3 points	4 points	5 points
Awareness and Commitment Level	Awareness of the issue				Using the available information	
Do you know what chemicals you handle and their average quantities at site?	No	We have a partial list of raw materials and finished products handled at site	We have a complete list of raw materials and finished products handled at site	We have a complete list of raw materials and finished products including information on their average quantities at site	We regularly update this list and make the information available to all relevant functions in the company	The list is used to manage inventories and chemical flows in the scope of chemical safety management
Do you know what standards codes, legal requirements and regulations apply to these chemicals?	No	We have a register of legal requirements but cannot confirm that it is complete or up to date	We have a register of legal requirements that we keep up to date	We have an up-to-date register of legal requirements that includes updated information on our status of compliance with the listed requirements	We make this information available to all relevant functions in the company and use the updated register to monitor compliance	We update it with all relevant international legal requirements and voluntary codes and use it to anticipate new requirements
Calculation	Total score _____ / 2					=

## Annex: Implementation Dashboard Worksheets

Issue Knowledge						
	0 points	1 point	2 points	3 points	4 points	5 points
Understanding and Application level	Understanding of the issue			Application of this understanding in practice		
Do you understand the properties of the chemicals you use and their associated hazards?	No	Our list of chemicals includes information on the properties and hazards of some of the chemicals we use, in a language that is understood by all workers	We have information on the properties and hazards of all chemicals we use, in a language that is understood by all workers	We make this information available to all workers by making available Material Safety Data Sheets (MSDS) in all the relevant areas and for all relevant operations	We have used a hazard classification and labelling system that allows all workers to understand the properties and hazards of the chemicals handled	We have specific notes for handling, use, storage and disposal of all chemicals, in a language understood by all workers
Do you understand the flow of the chemicals being used in your business?	No	We understand and have mapped the flow and quantities of chemicals within our operational processes	We understand and have mapped the flow and quantities of chemicals both being transported to our site and shipped to our customers upstream	In addition we understand and have mapped where our chemical raw materials come from and how and by whom they are transported to us	We have mapped where our chemical products, by-products and wastes are shipped to or disposed of and how and by whom they are transported	We understand and have mapped how our chemical products are used and disposed of by the end users
Have you undertaken a risk assessment, classified/banded and prioritized your chemical hazards?	No	We undertake basic risk assessment but do not classify/band or prioritise our chemical hazards based on it	We undertake basic risk assessment and classify/band our chemicals as a result, but do not conduct a detailed prioritisation of chemical hazards	We undertake a basic risk assessment which we use to classify/band and prioritise our chemical hazards	The basic risk assessment is regularly updated and the results are made available to all relevant functions in the company, to be taken into account in the definition of priorities for action	We have a comprehensive risk assessment system based on international methods which we update regularly. The results enable us to classify our chemicals and operations according to their risks, and to define priorities for action

Issue Knowledge						
	0 points	1 point	2 points	3 points	4 points	5 points
Understanding and Application level	Understanding of the issue			Application of this understanding in practice		
Have you identified and do you understand your Hazard Hotspots (in processes, and related to the supply and transport of your chemical raw materials, to the disposition or disposal of by-products and waste and to the transport and use of your finished products)?	No	We have identified all of the risk prone groups, areas and assets associated with an accident	We have identified the potential severity of related health, environmental, social and economic impacts of an accident affecting these groups, areas and assets	We have estimated the likelihood of all potential accidents and mapped the main hazard hotspots	We have assigned a risk factor to all potential accidents (Hazard Hotspots) and prioritised these accordingly	We have done this for Hazard Hotspots in the wider value chain (supply, transport, use, disposal) as well for onsite risks
Do you understand how to comply with the standards codes, legal requirements and regulations that apply to your chemicals?	No	We are aware of some of the regulations but do not understand fully how to comply with them	We understand some regulations fully and how to comply with them but are less clear on other relevant codes	We understand all the regulations and codes we think are relevant to us and we know what is needed to comply with them	We ensure we regularly and continually update our understanding of the applicable legal requirements and of the actions needed to comply with them	We proactively search for new national and international codes that can help us improve and go beyond compliance by law
Calculation	Total score _____ / 5					=

## Annex: Implementation Dashboard Worksheets

Issue Knowledge						
	0 points	1 point	2 points	3 points	4 points	5 points
Improvement and Innovation level	Monitoring			Improvement and innovation		
Do you have systems in place to monitor and improve your chemical hazard identification and understanding?	No	Yes, we monitor our processes on an ad hoc basis and make changes after review	Yes, we monitor our processes on a regular basis and make changes as required	We have a comprehensive and regular process that leads to a co-ordinated response to improvements	In addition we have a system to encourage and incentive staff to suggest improvements	We also involve our suppliers, partners, customers etc in our improvement process
Do you track and assess new standards, codes, legal requirements and regulations that apply to your chemicals?	No	We track what legal requirements are new and forthcoming	We track new voluntary standards and codes as well as legal requirements	We have a process in place to track and assess new standards and codes and make decisions on which ones to implement	We periodically assess all of our standards and codes against best practice and look for better alternatives	We participate in the development of new standards and codes
Calculation	Total score _____ / 2					Total
(Awareness and Commitment + Understanding and Application + Improvement and Innovation)						=

Engagement Effectiveness						
	0 points	1 point	2 points	3 points	4 points	5 points
Awareness and Commitment level	Awareness of stakeholders			Using information related to stakeholders		
Do you know who your stakeholders are?	No	We have an internally developed list of stakeholders	We have consulted others to get a better idea of who our stakeholders are	We have categorized the stakeholders on our list according to their type (e.g. suppliers, community members, government etc) and built this into engagement planning	We have also identified stakeholders who can speak on behalf of those who can't speak for themselves (e.g. the environment, future generations, children etc) and built this into engagement planning	We have mapped our stakeholders according to the nature of our relationship (we have impact on them, they have impact on us etc) and built this into engagement planning
Do you know what concerns them in relation to the chemicals you use?	No	We have made an internal judgment about the concerns of our stakeholders based on the input of staff	We have made an internal judgment about the concerns of our stakeholders based on the input of staff supported by published research	We build on our internal understanding of concerns through limited ad hoc external engagement on certain issues	We review our understanding of stakeholder concerns on an annual basis or when we change processes and chemicals	We have an ongoing dialogue with key stakeholders and build this in to our understanding of issues
Calculation	Total score _____ / 2					=

## Annex: Implementation Dashboard Worksheets

Engagement Effectiveness						
	0 points	1 point	2 points	3 points	4 points	5 points
Understanding and Application level	Understanding stakeholder engagement			Application of this understanding in practice		
How well do you understand your stakeholders and the issues that concern them?	We do not know who our stakeholders are	We understand a few of our stakeholders but only engage informally when they have complaints to make	We understand some of our stakeholders but we engage only when there is a specific issue that we want to talk about – usually after an incident has occurred	We have a planned schedule of engagements to help us understand the concerns of all stakeholders and how to build these into management decisions	We do not just engage to find out concerns. We engage with stakeholders to help us understand how to respond to their concerns, and we build this understanding into management decisions	We have an engagement strategy that helps us understand concerns and potential responses that we implement and review annually. This is an important element of our decision making process
How well do you understand how to engage with them?	We do not	We do not think about how to engage, we just speak when we have to	We think about who we are engaging with, but the most important consideration is engaging in ways that are convenient for us	We aim to engage in ways that make stakeholders more comfortable expressing their views, but we still control the process	We aim to engage in ways that make stakeholders feel comfortable expressing their views and are confident we will respond to what they tell us, but we still control the process	We involve stakeholders in designing and planning how we engage
Calculation	Total score _____ / 2					=



Engagement Effectiveness						
	0 points	1 point	2 points	3 points	4 points	5 points
Improvement and Innovation level	Monitoring			Improvement and Innovation		
Do you have systems in place to monitor and improve your understanding of your stakeholders, and how to engage them?	No	We monitor our processes on an ad hoc basis and make changes after review	We monitor our processes on a regular basis and make changes as required	We have a comprehensive and regular monitoring process that is focused on improvements and linked to change management practices	In addition we have a system to encourage and incentive staff to suggest improvements	We involve our suppliers partners, customers etc in our improvement process
Do you respond to stakeholders in ways that enable them to help you improve?	No	We monitor and address stakeholder concerns where we can in a way that allows us to conduct business as usual	We monitor all stakeholder concerns and act to address those that we feel are significant (material) to our business	We work with our stakeholders to understand and develop the best responses to their concerns in order to improve our overall performance	We work with stakeholders to agree on responses and also communicate to them on how we have responded to their concerns	We provide annual communications to stakeholders on our performance in relation to their concerns and use this as a way of engaging on suggested improvements
Calculation	Total score _____ / 2					=
Total (Awareness and Commitment+ Understanding and Application + Improvement and Innovation)						=

## Annex: Implementation Dashboard Worksheets

Planning Effectiveness						
	0 points	1 point	2 points	3 points	4 points	5 points
Awareness and Commitment level	Awareness of issues that require planning			Using the available information to produce plans		
Have you identified ways in which to control the hazards and/or reduce the risks associated with chemical hazards on site and developed action plans to implement them? (e.g. in off-loading and transfer of raw materials, warehousing and handling of chemicals, process, packaging and expedition of your finished products)	Not done	We have developed preventative measures for some hazards	We have developed preventative measures for all hazards	We have developed plans that identify the required actions for each preventative measure	The action plan details who is responsible and the timelines for each action	Plans are updated whenever changes occur
Do you have objectives and targets for controlling these hazards/reducing these risks?	No goals or objectives	We have identified an overall goal in relation to chemical hazard management and made a commitment to achieve it	We have identified the objectives for controlling the hazards/reducing the risks in relation to the overall goal	We have established targets related to these objectives	We have set performance indicators to measure progress against these targets	We compare and align objectives and targets with best practice in sector and region
Do you have an emergency plan?	No plan	We have an onsite plan that includes a list of all steps in the event of an emergency	We have an onsite plan that includes a list of relevant stakeholders in an emergency	We have an onsite plan that contains identified participants matched to emergency response tasks and resources	We have an integrated on and offsite plan and we communicate the details to the general community	We have an integrated on and offsite plan which is communicated widely. We also have procedures for periodic testing, review and updating the plan

Planning Effectiveness						
	0 points	1 point	2 points	3 points	4 points	5 points
Awareness and Commitment level	Awareness of issues that require planning			Using the available information to produce plans		
Do you have any training plans for staff?	No training	We have lists of skills and knowledge needed by staff in each relevant function	We have an evaluation of where knowledge gaps exist	We have developed basic training to address all knowledge gaps including operating instructions, chemical hazards, hazard communication and labelling, safe handling of hazardous chemicals, and emergency preparedness	We have developed a range of training on wider aspects of chemical hazard management, including stakeholder engagement, risk communication, chemical product stewardship, and environmental impacts	We have training procedures in place which are reviewed periodically (when new procedures are introduced, when new chemicals are being used, etc). We involve staff in this review process
Do you have any training plans for a) business partners and suppliers? b) communities/general public? c) customers	No training	We only consider training plans for these when specifically requested	We have identified where knowledge gaps exist but have not yet developed training plans that meet these needs	We have developed basic training to address knowledge gaps, including operating instructions, chemical hazards, hazard communication and labelling, safe handling of hazardous chemicals, and emergency preparedness	We have developed a range of training on wider aspects of chemical hazard management, including stakeholder engagement, risk communication, chemical product stewardship, and environmental impacts	We have training procedures in place which are reviewed periodically (when new procedures are introduced, when new chemicals are being used, etc). We involve partners, communities and customers in this review process

## Annex: Implementation Dashboard Worksheets

Planning Effectiveness						
	0 points	1 point	2 points	3 points	4 points	5 points
Awareness and Commitment level	Awareness of issues that require planning			Using the available information to produce plans		
Do you know the costs associated with managing your chemical hazards and the costs savings associated with reducing risk?	No knowledge of costs	We know the costs associated with specific recent accidents	We know the annual operating costs associated with safety management	We link the annual capital investment costs associated with specific risk reduction options to decision making	We know the average costs of dealing with accidents per annum (e.g. average over 10 years) and link this longer term view into decision making	We have a good estimate of the costs avoided by not having had any type of major accident over a longer time period (e.g. 10 years) and link this longer term and scenario driven view into decision making
Calculation	Total score _____ / 6					=

Planning Effectiveness						
	0 points	1 point	2 points	3 points	4 points	5 points
Understanding and Application level	Understanding how to plan			Application of this understanding in practice		
Do you understand the best ways to control the hazards and/or reduce the risks associated with chemical hazards off site and how to develop appropriate action plans? (e.g. in the transport of raw materials, and in the transport, distribution, retail and use of your finished products)	No	Our understanding is based solely on our experience at the site level	Our understanding is based on site experience and local requirements and guidelines	We attend regular training to ensure our understanding is also based on international guidelines	We benchmark what we do annually to ensure our understanding is based on local best practice	We regularly conduct internal and external reviews against national and international best practice to ensure our understanding is thorough

Planning Effectiveness						
	0 points	1 point	2 points	3 points	4 points	5 points
Understanding and Application level	Understanding how to plan			Application of this understanding in practice		
Do your plans incorporate this understanding?	No	We have developed preventative measures for high priority hazards but do not have coordinated plans	We have developed preventative measures for all hazards but do not have coordinated plans	We have developed coordinated action plans that identify actions for each preventative measure	The action plans detail who is responsible for each measure and the timelines for action	Action plans are periodically reviewed for consistency and effectiveness
Do you understand how your plans will achieve your objectives and targets for controlling these hazards/ reducing these off site risks?	No	We make plans and targets separately so they are not always aligned	We make plans and targets separately but we review them to ensure that they are aligned	We link the process of making plans and targets to ensure the plans will help us achieve our objectives.	We ensure our plans and targets are aligned and reviewed regularly internally and make improvements where necessary	We ensure our plans and targets are aligned and reviewed regularly. We communicate to staff and other stakeholders to ensure they understand how the plans will help us meet targets.
Do your training and awareness plans build on your understanding of your chemical hazard risks?	No training	We understand the link between training and risk assessment but at the moment our training is a separate function to our risk management	We understand that training needs to be linked to risk assessment but at the moment we only link it by providing training on the most important issues as understood through our chemical hazard identification process.	Training addresses all significant risks identified through our risk assessment	Core training addresses all major risks and we have also developed a series of extended training packages which reflect other elements of identified chemical hazards	We have a comprehensive training programme which reflects our chemical hazards management. We also update this regularly and invite staff to highlight additional areas on which to provide training.

## Annex: Implementation Dashboard Worksheets

Planning Effectiveness						
	0 points	1 point	2 points	3 points	4 points	5 points
Understanding and Application level	Understanding how to plan			Application of this understanding in practice		
Do you understand the impact of chemical hazards in relation to your overall business strategy?	No	We understand accidents caused by chemical hazards can have a serious impact on the whole business but treat chemical hazard management as a separate issue	We understand the importance of linking chemical hazard management to other elements of the business but it is not considered in relation to our overall strategy	We connect chemical hazard management to many related areas but it is not viewed as a strategic issue affecting the whole value chain	We consider chemical hazard management as an issue across the whole value chain but do not really engage with all relevant stakeholders along the chain	Chemical hazard management is treated as an issue that affects the whole value chain, our partners and supplier, customers and community and we develop plans with this in mind
Have you developed risk prevention activities for the risks posed by chemicals hazards related to your onsite and offsite activities, to the products and services you market, along the value chain?	No	We understand the importance of risk prevention activities on site but do not have any formal plans or activities	We understand the importance of risk protection onsite and have developed risk prevention activities for all serious hazards on site.	We have developed comprehensive on site risk prevention activities. We recognize the importance of offsite issues but have no formal offsite activities	We have developed comprehensive on site prevention activities and some activities in the wider supply chain	We have developed comprehensive activities for all serious chemical hazards on site and up and down the supply chain
Does your understanding of the costs associated with managing your chemical hazards and the costs savings associated with reducing risk influence your strategies and plans?	No	We only pay attention to the short term cost situation	We are aware that the costs associated with managing risks need to be balanced against longer term savings and sometimes consider this in an informal way in our planning	We consider costs and savings from reducing risks in major planning decisions	We conduct an evaluation of operating costs/savings associated with reducing risk (including indirect operating savings e.g. increased productivity, reduced waste) and build this into decision making	We regularly conduct an evaluation of Return on Investment (associated with reducing risk) over a various periods (3/5/10 years) and build this into decision making
Calculation	Total score _____ / 7					=

Planning Effectiveness						
	0 points	1 point	2 points	3 points	4 points	5 points
Improvement and Innovation level	Monitoring			Improvement and Innovation		
Do you have systems in place to monitor and improve your understanding of your risk prevention activities?	No	We monitor our activities on an ad hoc basis and make changes after review	We monitor our processes on a regular basis and make changes as required	We have a comprehensive and regular process that leads to a coordinated response to improvements	We systemically monitor, assess and improve our risk prevention activities across our value chain in partnership with our relevant stakeholders	We systemically monitor, assess and improve our risk prevention activities across our value chain in partnership with our relevant stakeholders and also allocate extra resources to identified hotspots
Do you have systems in place to monitor and improve your understanding of the need for and value of training?	No	We monitor our training on an ad hoc basis and make changes to individual courses after review	We monitor our processes on a regular basis and make changes to individual courses as required	We periodically review our training needs and revise our training strategy and approach as well as the content of individual courses	We involve stakeholders in our periodic review and revision of our training strategy and approach	We conduct a periodic value and impact assessment of our training
Calculation	Total score _____ / 2					=
Total (Awareness and Commitment + Understanding and Application + Improvement and Innovation)						=

## Annex: Implementation Dashboard Worksheets

Implementation						
	0 points	1 point	2 points	3 points	4 points	5 points
Awareness and Commitment level	Awareness of what needs to be implemented			Using the available information to enhance implementation		
Have you trained your employees to reduce chemical hazard risk?	No training	We are aware that key personnel need training. We have trained managers and supervisors on the basics of chemical hazard risk	We are aware that all staff need training. We have given staff basic training to address issues including operating instructions, chemical hazards, hazard communication and labelling, safe handling of hazardous chemicals, and emergency preparedness	We link our training to our plans and have given staff training on wider aspects of chemical hazard management including stakeholder engagement, risk communication, chemical product stewardship, and environmental impacts	We have trained managers and supervisors on the relation between hazard risk and core business strategy	We have trained staff on the importance of hazard risk management across the whole value chain
Have you trained your business partners and suppliers to reduce chemical hazard risk?	No training	We are aware that our partners need training and suggest to them that they obtain appropriate training.	We are aware that our partners need training. We have trained some partners but only when specifically requested	We have given partners basic training to address issues such as transport, chemical hazards, hazard communication and labelling, safe handling of hazardous chemicals, and emergency preparedness	We link our training to our plans and have given partners training on wider aspects of chemical hazard management including stakeholder engagement, risk communication, chemical product stewardship, and environmental impacts	We have linked this training to staff training to increase the understanding of everyone



Implementation						
	0 points	1 point	2 points	3 points	4 points	5 points
Awareness and Commitment level	Awareness of what needs to be implemented			Using the available information to enhance implementation		
Have you trained your customers to understand and reduce chemical hazard risk?	No training	We are aware that our customers need training and suggest to them that they obtain appropriate training.	We are aware that our customers need training. We have trained some customers but only when specifically requested	We have given customers basic training to address issues such as transport, chemical hazards, hazard communication and labelling, safe handling of hazardous chemicals, and emergency preparedness	We link our training to our plans and have given customers training on wider aspects of chemical hazard management including stakeholder engagement, risk communication, chemical product stewardship, and environmental impacts	We have linked this training to staff training to increase the understanding of everyone
Do you manage chemical hazard risk according to the procedures you have in place?	No	Staff are aware of the procedures but we do not monitor if they are followed	Staff are aware of the procedures in most cases but some corners are cut when we are under pressure	We ensure that procedures are systematically followed	We ensure that procedures are systematically followed and lapses noted	We ensure that procedures are systematically followed, lapses noted, and corrective actions implemented
Do you provide chemical hazard risk information on your products?	No information	Some of our product information meets legal and contractual information requirements as well as international industry standards and codes	We are aware of the importance of labelling and providing risk information. All of our product information meets legal and contractual information requirements as well as international industry standards and codes	Some product information also includes product specification including hazardous material information and emergency response information and also provides instructions for transport, storage, use and disposal	All product information also includes product specification including hazardous material information and emergency response information and also provides instructions for transport, storage, use and disposal	We have a systematic product information plan which is monitored to ensure all products meet all of the previous requirements
Calculation	Total score _____ / 5					=

## Annex: Implementation Dashboard Worksheets

Implementation						
	0 points	1 point	2 points	3 points	4 points	5 points
Understanding and Application level	Understanding how to implement			Application of this understanding in practice		
Do your staff, customers, business partners and suppliers, and communities understand your approach to chemical hazard management and your performance?	No	We communicate our approach to staff but do not monitor if they fully understand	We communicate to staff and seek feedback to see how much is understood	Line managers are responsible for validating staff understanding and clarifying uncertainties	We also review our approach with partners and suppliers during engagement with them and validate their understanding	We also review our approach with communities during engagement with them and validate their understanding
Have you extended chemical hazard management into your procurement processes?	No	We make suppliers aware of the issues surrounding chemical hazard management and encourage them to improve	For certain high risk suppliers chemical hazard management is discussed as part of the procurement process (although not as a contractual qualification), but for most it is not considered as highly important	Chemical hazard management is addressed as part of the procurement process for all relevant suppliers but at present there is no associated contractual qualification	Good chemical hazard management has been embedded in our procurement processes for all suppliers as a contractual qualification but we do not play a big role in helping suppliers improve	Good chemical hazard management has been embedded in our procurement processes through contractual qualifications and a system for evaluating supplier performance. We help suppliers improve by providing training and responding to their concerns.

Implementation						
	0 points	1 point	2 points	3 points	4 points	5 points
Understanding and Application level	Understanding how to implement			Application of this understanding in practice		
Do you communicate the results of audits/ inspections concerning safety issues to your employees, business partners and suppliers, customers and communities?	No communication	We are aware of the importance of audits and communicate to our staff that they have happened	We are aware of the importance of audits and communicate the most important results of inspections to our employees	Audits are key to improvement and communications on safety issues to employees clearly explain both the hazard and the risk (and what is tolerable risk in this area) to place results in context	Audits are key to improvement and communications on safety issues explain the implications and required response to employees, business partners, suppliers	We ensure our safety issue communications are targeted and designed to match the needs and interests of each type of employee, business partner, suppliers
Calculation	Total score _____ / 3					=

Implementation						
	0 points	1 point	2 points	3 points	4 points	5 points
Improvement and Innovation level	Monitoring			Improvement and Innovation		
Have you benchmarked and aligned your procedures with best practice?	No	We monitor our practices against our internal procedures	We review our practices against local standards and guidelines	We participate in a formal local or regional benchmarking process and make amendments to practice based on the results	We have benchmarked ourselves against best practice found in international standards and guidelines and make amendments to practice based on the results	We have participated in a formal international benchmarking process and make amendments to practice based on the results

## Annex: Implementation Dashboard Worksheets

Implementation						
	0 points	1 point	2 points	3 points	4 points	5 points
Improvement and Innovation level	Monitoring			Improvement and Innovation		
Do you have systems in place to monitor and improve how you communicate about chemical hazard management?	We do not communicate	We review comments people sometimes send us	We monitor informally what they think of our communications	We ask for feedback when we send out communications. We review anything we receive and make improvements where appropriate	We have systematic processes in place to gather and analyse feedback on our communications and build the analysis into decisions on improvements	We seek and discuss feedback on communications when we engage with stakeholders and involve them in helping us improve
Calculation	Total score _____ / 2					=
Total (Awareness and Commitment + Understanding and Application + Improvement and Innovation)						=

Evaluation and Communication						
	0 points	1 point	2 points	3 points	4 points	5 points
Awareness and Commitment level	Awareness of the issue			Using the available information to improve		
Do you evaluate your performance and management systems?	No evaluation	We have a list of performance targets.	We have set deadlines for each target.	We have processes in place to gather relevant performance data which is fed into decision making	We assess performance periodically (minimum semi-annually) and take action to improve weak areas	Additional assessments and improvements are made when procedures are new or following an incident and are linked into amendments to action plans
Do you have independent audits or certifications of your performance and systems?	No assurance	We conduct internal audits of our performance	We conduct internal audits of our systems	We have external audits of our performance	We have achieved ISO 9001	We have also achieved ISO 14001 and/or OHSAS 18000

Evaluation and Communication						
	0 points	1 point	2 points	3 points	4 points	5 points
Awareness and Commitment level	Awareness of the issue			Using the available information to improve		
Do you communicate externally and obtain independent assurance of these communications?	No external communications	We communicate externally through our website	We communicate externally through leaflets on specific issues	We communicate externally by producing a comprehensive report of our performance on an annual basis	We compliment our annual report with an independent assurance provider (individual, panel or formal provider) who provides an opinion on whether the external communications have addressed all material issues, whether the company has engaged stakeholders adequately, understands the issues completely and have responded appropriately	We compliment our annual report with an independent assurance provider (individual, panel or formal provider) who provides an opinion on all the aspects at the previous level and also provides forward looking recommendations
Calculation	Total score _____ / 4					=

## Annex: Implementation Dashboard Worksheets

Evaluation and Communication						
	0 points	1 point	2 points	3 points	4 points	5 points
Understanding and Application level	Awareness of the issue			Using the available information to improve		
Are the results of evaluations, audits and assurance used to improve your understanding, plans and actions?	No	We look at them when we receive them and address immediate concerns	We log issues that must be addressed and assign responsibility	We integrate issues raised into existing action plans	We systematically identify, prioritise and address issues arising from evaluations, audits and assurance	We monitor the success of improvements implemented as a result of audits, evaluations and assurance
Do you have a system for handling inquiries and complaints concerning safety issues from the public?	No system	We have clear contact information for those wishing to complain	We have a clear process for handling complaints and communicate this	Handling the complaint involves engaging relevant internal stakeholders and the complainant. We respond to the complainant within a set time	We prioritise complaints. Handling the complaint involves engaging independent facilitators, external experts, site visits and policy reviews if required	All aspects of the previous level plus public communication of results if in the public interest
Calculation	Total score _____ / 2					=

Evaluation and Communication						
	0 points	1 point	2 points	3 points	4 points	5 points
Improvement and Innovation level	Monitoring			Improvement and Innovation		
Do you evaluate as part of a continual improvement cycle?	No	We monitor the results of all audits and evaluations on an ad hoc basis	We informally review the results of all audits and evaluations against systems	The results of all audits and evaluations are formally included in management systems to drive continual improvements	The results of all audits and evaluations are formally included in management systems to drive continual improvement. This evaluation is subject to internal review and audit	The results of all audits and evaluations are formally included in management systems to drive continual improvement. This evaluation is subject to external review and audit
Calculation	Total score _____ / 1					=
Total (Awareness and Commitment + Understanding and Application + Improvement and Innovation)						=

1 Chemical product stewardship is the practice of making health, safety and environmental protection an integral part of the life cycle of chemical products (ICCA Product Stewardship Guidelines, 2007)