

## **REPORT**

# **IUPAC Safety Training Program**

at

**DOW Benelux,  
Terneuzen, The Netherlands**

**03.02.13 to 15.02.13**

Principal Persons at DOW Terneuzen

**Roeland Andriaansens, Dominique De Wispelaere,**

**Al Ribes and Carolyn Ribes**

Prepared by

**John Ochieng Mumbo**

Senior Compliance and Enforcement Officer  
National Environment Management Authority  
(NEMA) - Kenya

## Contents

1. Introduction .....	3
Objectives of the program .....	3
2. The Scope of Training.....	4
3. Environmental Health and Safety at Dow Benelux Terneuzen .....	5
4. Relevance of the Safety Procedures at NEMA.....	6
5. Implementation of Safety Procedures at NEMA.....	7
6. Use of information at home obtained from Training.....	7
7. Plans for sharing knowledge with stakeholders in education.....	9
8. Conclusion and Recommendations .....	9
Closing statements.....	12

### Principal Persons at Dow Benelux Terneuzen

Roeland Andriaansens	-	Dow Terneuzen Responsible Care Leader (Sponsor and Host)
Dominique De Wispelaere	-	Dow Training Coordinator
Carolyn Ribes	-	Dow/IUPAC STP Program Coordinator
Al Ribes	-	Dow/IUPAC STP Program Assistant Coordinator

## **1. Introduction**

Safety and environmental protection measures is an emerging area in Kenya. New regulations and guidelines that regulate the safety of workers from exposures and risks associated with work environment have been enacted. The risks include those the communities leaving around the industrial facilities are exposed to in the event of an accident. National Environment Management Authority (NEMA)-Kenya is one of the regulators with the mandate to ensure prevention of environmental and human risks and accidents associated with industrial production of chemicals.

Environmental Health and Safety (EH&S) as is commonly understood in developing countries is considered insignificant and mostly the responsibility of the public relations officers. These officers sometimes may have inadequate skills and have to work with limited resources. Chemical production and management is a high risk activity that requires an elaborate safety and environmental protection measures managed by trained personnel with adequate resources. The hazards and risks, including disasters cannot be overemphasized.

The initiative by International Union of Pure and Applied Chemistry (IUPAC) through the Safety Training Program in an industrialized country will provide knowledge that will enable planning and implementation of safety practices and programs in developing countries. Dow Benelux at Terneuzen in The Netherlands is a perfect setting for this training. The Company has a dedicated EH&S department with skilled personnel, a well-defined management structure and equipment. EH&S activities are integrated in the daily operations of the company to be done by both staff and visitors alike.

### **Objectives of the program**

- To enable safety experts from developing countries to learn about safety and environmental protective measures by visiting and working in plants of IUPAC Company Associates in the industrialized world.
- To promotes interactions between developed countries and the developing world to disseminate state-of-the-art knowledge on safety and environmental protection in chemical production

## 2. The Scope of Training

Training was delivered by the staff of Dow Benelux and the following topics were covered;

*a. Safety equipment*

- Personal Protective Equipment,
- Alarms, sensors, safety warning devices

*b. Management requirements*

- Operating Discipline Management System
- Contractor Safety Policy
- Management of change

*c. Compliance to EH&S regulations*

- Compliance to environmental health and safety regulations and implementation of requirements

*d. Emergency preparedness and response*

- Use of automated devices e.g. low oxygen level detection, fire detectors etc.
- Linkage between security, fire department and EH&S
- Weekly drills and testing of alarm system and other safety devices

*e. Trainings on safety*

- Behavior based performance
- Influencer models, reason model

*f. Hazardous materials*

- Management of laboratory and hazardous waste
- Remediation technologies for contaminated sites

*g. Strategic planning*

- Use of target setting and management plans
- Prioritizing safety

*h. Process safety*

- Risk management strategies
- WHATIF, HAZOP, LoPA, QRA, Root Cause Analysis etc.

*i. Reactive chemicals*

*j. Industrial hygiene Safety*

*k. Business rotational programme*

*l. Site visits*

### **3. Environmental Health and Safety at Dow Benelux Terneuzen**

Dow has a fully-fledged department for safety and security issues. This department falls under a broader section responsible for compliance and safety issues headed by Responsible Care Leader. The other departments under this section include compliance management, environment health and safety delivery (EH&S), emergencies services and security and environmental health and promotion services.

Safety issues have been fully integrated and being implemented like any other routine activity. The uniqueness can be seen the first time a visitor or a new staff enters the premises of the industry and has to go through a safety briefing on the likely risks one can encounter and what to do when they happen. This is followed by a mandatory test which one has to pass before being issued with an entrance certificate by the security personnel at the gate.

Some other outstanding measures include;

- An alarm communication system with warning speakers in the buildings I was able to visit. The system is checked every Monday to ensure its working. It is interlinked to the security system and the fire department thereby providing opportunity to hear an incident real time for immediate action.
- An operational fire unit with trained staff able to respond within 4 minutes of incident reporting. It has linkage with municipal fire department in the event help is needed to manage accidents beyond its capability.
- A number of training programs on safety.
- Management of change system procedures to implement a change to an activity deemed to cause safety concerns to the worker.
- An operational contractor policy with a checklist list of conditions that contracted services to meet before being awarded a contract by Dow.
- Use of personal protective equipment, sensors, organic vapor monitor etc. for personal safety and to prevent accidents.
- A system for management of hazardous wastes including in the laboratory waste.
- Safety control measures in place such as first aid kits, water shower systems, alarm bells, fire extinguishers, emergency dial number, fire assembly points, fire drills etc.

- Use of signs to indicate danger, a staff trained on first aid, emergency exits, hazardous chemicals etc.
- Tasks risk analysis for new tasks to evaluates risks and proposed measures to prevent, minimize or eliminate them
- An occupational and industrial hygiene center that focuses on factors that may have adverse effects on workers through anticipation, recognition, evaluation and control.
- Strategic planning through use on internal long term targets incorporated in a management plan designed to minimize the number of accidents within the company within a given period. These targets include those set by the regulatory agencies.
- Reactive chemical experts evaluate or identifies hazards associated for chemicals manufactured or used at each plant to prevent proactively accidents from taking place
- Process safety, basically risk management in the company.

#### **4. Relevance of the Safety Procedures at NEMA**

NEMA-Kenya has staff at the national level and regional levels. Our activities are administrative but involve site visits and inspections to ensure compliance to our environmental regulations. The risks are predictable at the work place but vary significantly depending on the facility, industry or site being inspected. A number of measures are applicable to NEMA though some are already in place. The following procedures will be useful to NEMA as an organisation:

- Emergency preparedness and response procedures.
- Documentation of safety procedures
- Loss of prevention principle
- Risk management procedures and methods such as HAZOP, LoPA, QRA etc
- Use of alarm communication system with warning speakers in the buildings that should be integrated with security personnel thereby removing the burden from a person or a unit to manage or operate the incident hotline and emergency situations.
- Use of models such as behavior based performance (BBP), influencer model and six ( $\sigma$ ) sigma model to address the behavior and intrinsic values in person to remove barriers and enable people appreciate safety issues.
- Management of change procedures to make a change or changes to an activity deemed to cause safety concerns to the worker.

- Setting or developing internal long term targets in a management plan designed to minimize the number of accidents within a given period.
- Use of sign for communication e.g. to indicate danger, direct one to personnel or staff trained on first aid, to show emergency exits, hazardous chemicals etc.
- Tasks risk analysis for new tasks to evaluates risks and proposed measures to prevent, minimize or eliminate them
- Use of personal protective equipment when carrying out inspections or working in environment that present danger

## **5. Implementation of Safety Procedures at NEMA**

NEMA has a management structure and annual working plan that are used to implement internal policies and activities. Activities that would involve the institution and financial commitment require the approval of the management. Once approved, they can then be a programme, project or an activity in the work plan to be implemented within a year or longer or short-term periods. Specifically, these procedures can be implemented as follows:

- Making safety and health in the strategic plan with well-defined targets and financial resources for its implementation
- Training of management staff to prioritize safety and health in the institution
- Using publicity materials e.g. ‘the Eco-flash’ to communicate safety issues
- Advice and demonstrate how the existing safety committee be strengthened with resources and to identify coordinators at departmental, sectional and regional levels with the mandate to implement and give feedback on safety and health issues
- Recommend models for behavior and attitudinal changes with respect to safety
- Recommend an operational model for management and administration of EH&S

## **6. Use of information at home obtained from Training**

The use of information obtained during this trained has been arranged in three-fold, immediate, mid-term and long-term. What shall be implemented almost immediately with minimal resource requirements is considered immediate, those that may need some resources but can be done as medium-term and those that require prior planning, significant resources and management commitment as long-term. These have been summarized in these three broad categories with activities as done below;

**a. Immediate**

- *Trainings on tools for EH&S*
  - Task risk analysis
  - Management of change
  - Documentation of procedures
  - Event and action tool
- *Improving safety standards in laboratories*
  - hazard symbols
  - labeling, Emergency dial number
- *Inspection of laboratories and chemical facilities*
  - Prioritize safety
  - Scope of areas to look for during inspection widened
- Redesign or change approach on education and training with emphasis on behavioral change and intrinsic values
  - Influencer model, Reason model
  - Behavior based performance
  - Regular meetings to discuss safety
- Review of environmental impact assessment (EIA) and environmental audits (EA) of chemical industries.
  - Knowledge on information to look for widen
  - Prioritize safety

**b. Medium term**

- Improving safety standards in laboratories
  - Installation of safety devices and equipment
  - Document laboratory procedure
- Building or setting up a laboratory incorporating the necessary safety precautions
- Development of guidelines for inspection of laboratories
- Training of stakeholders with a mandate on safety and health
- Advice and demonstrates to chemical industries to set-up safety and health unit/ section/ department



### **c. Long term**

- Prioritize safety in core activities within the strategic plans, annual plans, trainings and performance contract
- Include EH&S as a strategic objective within the strategic plan
- Integration of emergency security services(ESS) and EH&S
- Include remediation of contaminated sites as an activity under rehabilitation of degraded sites
- Policy on safety development

## **7. Plans for sharing knowledge with stakeholders in education**

I have singled out the education sector to partner with on safety issues partly because NEMA has an environmental education, information and public participation through stakeholders can be trained on safety but also due to the power education has in changing attitudes and behaviors. Education curriculum can be re-oriented to have safety instilled at an early age there by having a society inclined with the positive attitude towards safety.

- Guidelines development for trainings on safety
- Inclusion of safety practices into curricula at all education levels
- Safety education before first year practical and before industrial training postings
- EH&S essential for non-science-based students
- Policy on general safety

## **8. Conclusion and Recommendations**

The objectives of the training were met, specifically

- Learning about safety and environmental protective measures
- Useful interactions, exposures and knowledge was acquired on safety and environmental protection in chemical production

### **a. Training and accommodation arrangements**

The hosts did an exemplary job in ensuring that i arrived without problems at Terneuzen in The Netherland. Accommodation was already prepared at Hampshire Hotel Churchill Terneuzen, one of the leading hotels in the town. I was picked at Brussels airport by a taxi booked on my request from Brussels to Terneuzen.

Carolyn and Dominique ensured we were engaged right from day one. My colleague and I were provided with an office. We had access to internet and telephone. Lunch was provided courtesy of Dow and in each occasion we were accompanied by a staff from DOW EH&S. Al and Carolyn picked us every morning and at the end of each day dropped us at the hotel.

Our visit in the company was made known using our photo on the Company's facebook site and on the internal TV communication screens. The program coordinators also organized activities for us over the weekend. We were taken out on Saturday to a carnival to experience the Dutch culture and on Sunday, we had the opportunity to visit Brugge in Belgium, UNESCO cultural site. I sincerely appreciate the hospitality accorded to me by our hosts.

#### **b. Things that were done well**

The matrix below provided a summary of what was done well:

<b>No.</b>	<b>Issue</b>	<b>Comments</b>
1	Arrangements	<p>The items below were adequately addressed:</p> <ul style="list-style-type: none"> <li>• Travel from airport to hotel</li> <li>• Hotel reservations</li> <li>• Sessions with training experts</li> <li>• Transport from Hotel to Dow and back</li> <li>• Office space with internet and telephone</li> <li>• Meals at work and hotel</li> </ul>
2	Topics Covered	<ul style="list-style-type: none"> <li>• The topics were adequate in content and context. They were complemented with laboratory and site visits.</li> <li>• A presentation of what was learnt by trainees was made to the management of Dow Benelux at the end of the training.</li> <li>• A certificate of recognition of completion of the training was issued at the end of training after the presentation.</li> </ul>
3	Written information	<p>Some written materials were given;</p> <ul style="list-style-type: none"> <li>• Chemical laboratory safety and security: <i>a guide to prudent chemical management</i></li> <li>• Chemical laboratory safety and security: <i>a guide to prudent chemical management-Toolkit</i></li> <li>• Publicity materials and some power point presentations.</li> </ul>

**c. Suggestions for improving the IUPAC Safety Training program:**

The recommendations mentioned below are not specific to the training at DOW but may be used for future trainings. IUPAC should develop a framework upon which companies can develop the training specific to needs of the participants who may be from universities, industries, regulators etc. Here are some recommendations:

No.	Issue	Comments
1	Arrangements	Ok
2	Topics Covered	<ul style="list-style-type: none"><li>• Develop modules to be covered in during training and provide a time schedule.</li><li>• These modules can be written of the certificate issued to the participant after the training.</li><li>• I recommend a safety training on the management and transportation of chemicals or hazardous materials on the road beyond the production facility</li><li>• I recommend training on safety issues specifically to management of hazardous and toxic waste. Exposure to risks in the developing countries when handing this type of waste has not been addressed.</li></ul>
3	Written information	<ul style="list-style-type: none"><li>• A package of training materials for each of these modules to be issued at the beginning of the training.</li><li>• These materials can be supplemented with materials or presentations that will be issued by the host company, if available or possible</li><li>• Materials issued will be determined by training a given industrial facility.</li><li>• The scope of training should not be limited to laboratory safety related issues but also other fields such as management of large spills and fires, management of hazardous wastes, detecting and prevention of accidents such as gas leaks etc.</li></ul>

## Closing statements

I wish to thank IUPAC for granting me this opportunity to visit one of leading chemical companies in the world to attend training on Safety and environmental protection measures. It was an experience both to learn but observe implementation of activities in this respect. I have acquired knowledge to help me overcome challenges we face when implementing safety issues in Kenya. I also sincerely appreciate the hospitality of DOW and the opportunity it availed for me to meet and learn from its experienced staff some of whom were very senior personnel in the company. As a regulator, I learned these inspiring quotes;

*“The costs of managing risks cannot be compared to the costs of losing a business through risks that can be prevented”*

Roeland Andriaansens,  
Responsible Care Leader, Dow Benelux, Terneuzen

*“Safety and environmental preventive measures are costs of doing business”*

Carolyn Ribes,  
Dow/IUPAC STP Program Coordinator