



## Plan for Government and Industry Cooperation in Correspondence to International Environmental Regulations

The upcoming year 2007 is buoyed by new industry aspirations and developmental plans. However, this outlook is dampened by the significant burden facing the chemical industry from the get-go.

With origins found in the REACH system initiated by the European Union, the entire world has been immersed in a movement for the promotion of environmental protection and human health and welfare. The chemical industry, which most often accounts for a significant portion of development of national economies, has been subjected to a series of environment-related regulations that will most likely slow its development and weaken competitiveness.

Even without REACH, in 1943, Japan was the first country in the world to enact chemical substance regulations (chemical substance assessment system). The U.S. enacts the Toxic Substances Control Act (TSCA), and China also enforces chemical substance regulations (for chemical substance import, import/export of toxic chemical substances, and environmental management).

In 2003, with the aim to legislate a new law on chemical substances, the REACH (Registration, Evaluation, and Authorization of Chemicals: new European chemical substance management system) system was passed in the European Union. In the two years following, ongoing deliberations resulted in the passing of a revised plan on November 17, 2005. The deliberation and revision process continues today with the expected enactment date set for April 2007.

If any company produces and/or imports substances in a quantity of one ton or more per year, it assumes the responsibility to submit a report on usage safety. Information on each chemical substance must be submitted to the European Chemicals Agency (ECA) upon substance registration.

In following, as the REACH regulations will cover all production in European Union countries as well as exports to European Union countries, the impact on the industry is expected to be immense. Every country is considering measures to deal with this system.



With the continuing progression of the REACH regulations, in the case of Japan, a small chemical substance basic policy issues board (covering economic industry-related industry structure review and chemical/bio businesses) was convened in May 2006 comprised of 18 specialists from academia, related industries, legal fields, the media, and NPO's. This board continues to examine chemical substance-related environmental changes and international trends to discuss countermeasures and priorities.

In Korea as well, the Ministry of Environment has begun operation of a REACH response center, among other measures designed to generate countermeasures for REACH that are increasingly becoming more active. In the past month, the Ministry of Environment held a REACH seminar for the industry in conjunction with the Korean Chamber of Commerce and Industry. Through this seminar, a council was organized and plans for the holding of a forum were prepared.

Considering such domestic and foreign circumstances, it becomes evident that the chemical industry has no choice but to determine and prioritize the key issues out of the myriad issues facing the industry and address it first.

The key issues consist of ① the acquisition and maintenance of safety information as a premise for risk management, ② the optimization of the risk assessment system, ③ the scheme to transfer safety information and risk assessment results to the supply chain, and ④ the independent risk management by related staff based on safety information and risk assessment results. To successfully address these issues, personnel with excellent risk assessment and management abilities must be developed, and an intellectual foundation must be maintained via continuous research-focused investment. In addition, the promotion of risk communication and the establishment of an ideal risk management system for chemical substances should not be neglected.

Even with such various domestic and international depressing factors, exports have surpassed the US\$300 billion mark through the dedicated efforts of the industry. The government should thus positively support and spare no expense in promoting the joint cooperation between industrial, academic, and research organizations to address REACH-related issues and promote continued development of the chemical industry.

Furthermore, in light of the increasingly difficult management environment, environmental regulations within a reasonable scope are required so as not to weaken business activities. In following, the chemical industry is entreated to work and invest voluntarily to promote human welfare and brighten the future.



# Chemical Frontier Festival

## – Learn, Share, and Enjoy!

Jin-Young Kim  
Korean Minjok Leadership Academy

※ Editor's note : Jin-Young Kim is a high school student who was the prizewinner of KRCC chairman at the ceremony of awarding of the 3rd Chemical Frontier Festival on Oct. 20

After seeing a notice about the Chemical Frontier Festival I came to conduct an experiment; however, I did so mainly because before finding the notice I wanted to study the current pollution of the Nakdong River, which has been an ongoing issue in the region where I live. Yerah, my partner, already knew that the current pollution of the downstream Nakdong River was serious as she lives in Busan, and this research needed to be accelerated. We began to prepare an action plan for the experiment, buoyant with hope that we might be able to do something positive for the community.

First, we placed a top priority on research about the current pollution of the Nakdong River. As the term 'pollution' requires much time to research and is too broad in scope to be simply called pollution, we tried to focus on one specific type of pollutant by reducing the scope in detail. In the meantime, we undertook research once again about a major incident, the 'Phenol pollution accident of the Nakdong River'. While studying phenol pollution cases overseas as well as that of the Nakdong River, we realized that the potable water pollution by phenol problem has grown to be serious once again. However, we found that it was very difficult to measure the phenol concentration in the river. Therefore, we intended to develop biological indicators in order to more easily find the phenol concentration.

More time was required for the selection of a biological indicator. For a biological indicator to appear, it must be able to survive in a non-fixed environment that can be subject to pollutants, and it must be easy to find. The extra time required is due to the various pharmaceutical conditions that entail differences according to the level of pollution.

An organism that coincided with such conditions was found, and it was none other than the object of our research, *Anabaena*. This blue-green algae is a photosynthetic organism that can be found in most any environment, and it contains the protein phycocyanin. After noting that the quantity of this protein changed and showed high sensitivity to pollutants and other such environmental stress factors, we decided to develop this into a bio-indicator.

However, even after solidifying this goal, our experimentation was as listless and unstable as a boat without a sail. With hopes for good results, we took measures of PC (phycocyanin) quantity, but the results were complete failure. We changed and revised techniques often in following experiments, as well as constantly tweaked values. Though we did not perform experiments on a



daily basis, the steady experimentation went on for one month all too soon. Looking back, mistakes were continuous in terms of mishandling and breaking of flasks and other equipment and exercising insufficient care with injections, etc. Thus, even though correct procedures were followed, there were many times when the results were erroneous.

The most difficult aspect was the fact that once the *Anabaena* was cultured and used in an experiment, the time required to make another culture was close to one week. Time was of the essence, and thus this may have caused an even more rushed mentality. However, as the nature of experimentation is that things often do not go as planned, we had no choice but to continue forward.

Our efforts were finally rewarded with the fifth experiment. We compiled the data and drew a graph. We generated a graph after inputting all values into an MS Excel spreadsheet. The result presented an almost unbelievable line extending downward. After having seen lines of results that rose and dipped, we had a line that went down. Yea—Ra and I were so overjoyed that we embraced. However, the experiment was not yet complete. We had succeeded once out of five experiments, and the experimental data needed to be validated. In the end, the experimental data proved valid. Our experiment was a qualified success.

Nevertheless, the success of the experiment was not everything. Our original goal was to develop living indicative species; therefore, we needed to apply this to everyday life. We collected water nearby by visiting many watercourses in the Daegu area with the help of others over several days.

Also, collection was not so easy. Muddy water created by excessive summer rain suppressed the proliferation of *Anabaena*, and we had to wait for the muddy water to settle. Around the end of the summer, we started collecting water again. Under the strong summer sun, we wandered about the river and watercourses. When coming down from the dam, we had a difficult time and came close to being injured owing to the steep slope, and we were dripping with sweat because of the hot weather. However, the saying goes that sweet follows bitter. As a result of measuring the optical density after such hardships, we were able to measure the pollution level of the watercourses and the river where we collected some samples.

I felt confident with the test results as there was not much difference between the pollution level values from our data and the values from the complicated measurement method for phenol pollution level that is used currently. While being delighted at heart, I almost lost my senses owing to the time I had to spend organizing the newly-collected data for almost the entire following week.

What I felt most sorry about in conducting the experiment was that I could not make it perfect as I did not have much time. The pollution level of the place where we collected our samples and made a comparative analysis was relatively extremely low; therefore, we did not solve the problem as to whether *Anabaena* will play a role as a living indicator where the pollution level is serious. We had to obtain precise values in comparison with actual data by collecting water from a more polluted





place, such as waste water from a plant, and measure the absorbance of *Anabaena*, but we lacked the ability to obtain waste water from a plant directly. This was a great regret to us and the preparation period was over.

Nonetheless, the Chemical Frontier Festival does not urge us to conduct our experiment all through our summer vacation. The visit to a petrochemical plant during my vacation was very exciting. The only opportunity that I had to visit a plant was in fact a visit to a Coca Cola Plant in my elementary school days.

The Susan Plant of Samsung Total Inc. looked like a great heap of pipes; however, when I heard that when this plant is blacked out for just one second, the loss will be simply over 0.1 billion won, I could not help but discard my thought that 'they were just a heap of pipes'. Everything that I could see after entering the plant was enough to excite my curiosity.

Moreover, it was amazing to see a system where almost all the processes were carried out automatically. There was even a machine that could tell that the weight was incorrect even when the difference was only different by the weight of a single coin. While listening to diverse explanations, I realized that almost all parts of the materials around us are chemical products. Susan Plant even created a park within the plant site by using purified water. It was an opportunity to witness with my own eyes and confirm that chemical industrial companies are not indiscreet enough to discharge waste water. The visit to Susan Plant instilled in me a new image of the chemical industry.

I was filled with new emotions by participating in the Chemical Frontier Festival in person. In the welcoming statement, it was the title, Chemical Frontier Festival, that was particularly emphasized, and among others, the most important part was being told 'Festival'. This should mean sharing and enjoying what we learn rather than competing with others. The opening ceremony was followed by a welcoming statement, and then there was a time for poster presentations. I was glad to exchange greetings with friends that I have known before participating in the festival, as we prepared the poster presentation.

Although I thought that I was fully aware of many parts with confidence, the judges directed me to approach the theme from different perspectives by posing sharp questions frequently, as I had expected. There was a board game cafe and a caricature while waiting for presentation time after taking part in a draw to set the order for the presentations. However, there was not much time to enjoy them. Initially, I thought I was given a long time; however, I soon realized that it was unreasonably short to be prepared perfectly.

I felt under stress as I began the presentation. I had to deliver everything about our experiment within a time limit in front of three judges. Although it took a much shorter time for the presentation than when we held a practice, we exchanged questions and answers for quite a long time, and when I left the place, I felt proud as well as somehow feeling empty and pitiful. During



the remaining time, I strengthened my friendships with students in other teams that I had met by enjoying a game in the board game cafe. And then, the festival was over. On my way home, I received an experiment note, caricature photo frame, and a poster as souvenirs along with the memory of short meetings with other students.

We gained the fruits of our labors in only one day after two months of endeavor. However, the one thing that we felt sorry for was that we could not fully appreciate the works of others. In fact, we probably could not look back at them as we had to be prepared for the presentation of our own team however, it was mainly because we were hardly given an opportunity to look at the works of others or listen to their explanations. When presenting posters, all participants were not themselves as they had to practice for the presentation and introduce their works to the judges.

Having heard that we were one of eight teams for the presentation, I thought that the participating students would also be fairly allowed to view the contest along with the judges; however, we were not privileged to listen to or share the other students' presentations. There were many works that were practical and drew my attention, such as the maturation effect of cinnamon or wall paper that has color changes according to the pollution level; however, I was not very satisfied and felt sorry that we merely had to glance at the research procedures and results. I thought that it would be great if we could have had an opportunity to share information with others in the next contest as it is called a 'festival'.

We gained much. We barely had an opportunity to conduct the experiment since there was almost no time to conduct research under a theme of our own choosing in our class at school, and we felt by doing this that we could make something practical through this experiment through this festival. Furthermore, it was an unforgettable memory to be in this festival because we met with other students who produced results about every single theme that we easily overlook in our daily lives, and became close to them while talking with them.

Since it was a competition, we would like to offer our thanks to everyone who gave us this opportunity, more than that we were happy to receive an award. Thank you.

The Dream of the Future Made by Chemistry: Under the emblem, this yearly event was launched in 2004 through the joint sponsorship of five member companies, including Samsung Total Petrochemicals, SK Corp., LG Chem, Hanwha Chemical, and Honam Petrochemical, in conjunction with the Ministry of Education and Human Resources Development. Targeting high school students nationwide, this event is a contest of proposals regarding chemical exploration in nine separate areas including the environment, energy, life, etc.

Students submit proposals over a span of approximately six months. An average of approximately 1,000 teams participate every year. After a careful and fair evaluation process, the main event host approximately 40 teams for award designation.

The KRCC participates as a sponsor, and has given an RC Council award (silver medal) ever since the second contest (2005). In the 2005 event, the RC Council award went to the 4 Leaves Team comprised of Hwajung Kim and Kwanwoo Park, students from the Chonnam Science High School, for their entry entitled 'Can a plant extract be used to eliminate mildew?'.  
*(Note: The text in this box is a translation of the original Korean text.)*



### ● Dongwoo Fine-Chem and the Beautiful Store Team Up for “Beautiful Saturday”

The Beautiful Saturday event, sponsored jointly by Dongwoo Fine-Chem (CEO: Hee-Chol Moon) and the Beautiful Store, was held on October 28, 2006 at the Beautiful Store outlets in Seoul (Anguk Store), Pyeongtaek (Anjung Store) and Iksan (Yeongdeung Store).

Through the goodwill and interest of the employees at Dongwoo Fine-Chem, approximately 3,000 items were donated for sale, translating to a total profit of 7,533,800 KRW. These earnings are set for allocation to assist the needy during the Beautiful Store's periodic profit distribution. In the spirit of sharing and caring to create a beautiful world, this event is set to be held annually.

\* What is Beautiful Saturday?

: Items are accumulated from companies, organizations, agencies, and groups that share in the Beautiful Store's philosophy of caring and sharing. The items are donated for sale via the outlets of the Beautiful Store on a specially designated Saturday, when employees volunteer directly to come to the stores and help sell the items. All profits are earmarked to help the needy.

### ● Bayer Korea's Environment Ambassadors Program

Beginning from 2004, Bayer Korea (CEO: Wilfried Heider) has operated an Environment Ambassadors Program in conjunction with the Korean Federation for Environmental Movement. This year saw the selection of the third annual Bayer Environment Ambassadors.

The selection process for Bayer Environment Ambassadors begins with the submission of essays on key and timely environmental issues by university and graduate school students. The first stage involves the evaluation of these submissions. Students that make it through the first stage are invited to participate in an environmental camp held in August. The camp, which is the second stage of the selection process, is held over the course of four days and three nights and involves a wide variety of lectures and hands-on learning experiences. Through the second stage, around 10 participants are selected as Bayer Environment Ambassadors. These Environment Ambassadors are awarded an environmental tour to Germany and given the opportunity to access learning as well as participate in the Ecominds Forum that is held in Asia every two years.

This year, three representatives from Korea were chosen. They were included in the 48 Bayer Environment Ambassadors from 16 countries that participated in the environmental tour that was held from November 6th in Germany. As part of the tour program, the Environment Ambassadors were provided with a demonstration of processes from manufacturing to waste treatment, having the opportunity to directly view all environmental protection measures in every step. This represents the fulfillment of Bayer Korea's social responsibility for promoting the proper understanding and education of environmental issues, as well as falling in line with its corporate sustainable management as a company in Korea.





## ● 2006 Open! Fun world of chemistry

- Event Description: Offered a variety of experimental and learning activities regarding chemistry to children, targeting mainly sixth grade students in the cities of Ulsan, Yeosu, and Seosan, the main areas in which petrochemical complexes are located. This event embodied a social responsibility activity by the chemical industry to educate children and promote interest in the field of chemistry and the chemical industry.
- Main Organizer: Korea Responsible Care Council
- Sub Organizers: Amenity Science Research Association  
Ulsan Life Science Curriculum Research Association  
Gathering of Chemistry Enthusiasts  
Makers of Interesting Science
- Sponsors: Ministry of Commerce, Industry and Energy; Agency for Technology and Standards; Ulsan Metropolitan Office of Education; Korea Petrochemical Industry Association  
Lotte Daesan Petrochemical; Rohm and Haas Korea; Samsung Total Petrochemicals; LG Chem; Yeochun NCC; KP Chemical; Dow Chemical Korea; Hanwha Chemical; Honam Petrochemical  
Korea Kumho Petrochemical; Daelim Industrial; Korea Petrochemical Industry; Tongsoh Petrochemical; Dongwoo Fine-Chem; DuPont Korea; Bayer Korea; Samnam Petrochemical; SK Corporation; Cheil Industries  
Kumho Polychem; Kumho P&B Chemicals; Namhae Chemical; Degussa Korea; Samsung BP Chemicals; Samsung Fine Chemicals; Aekyung Petrochemical; Exxon Mobil Chemical Korea; LG Dow Polycarbonate; LG Petrochemical; LG MMA, Yongsan Chemicals; Isu Chemical; Kolon Chemical; Polymirae Company; BASF Company; Korea Alcohol Industrial; Korea Polyol, etc.
- Ulsan Event
  - Date: Sep. 23, 2006 (Sat.) 10:00~17:30
  - Venue: Ulsan Nambu Elementary School
  - Participation: Approx. 590 students from 45 Ulsan elementary schools
  - Program: Six experiment booths and chemistry playground, experiential video hall







■ Yeosu Event

- Date: Oct. 14, 2006 (Sat.) 10:00~17:30
- Venue: Yeodo Elementary School
- Participation: Approx. 580 students from 30 Yeosu elementary schools
- Program: Six experiment booths, experiential video hall



■ Seosan Event

- Date: Oct. 28, 2006 (Sat.) 10:00~17:30
- Venue: Seosan Farmers and Fishermen Cultural Sports Center
- Participation: Approx. 550 students from 14 Seosan elementary schools
- Program: Five experiment booths, experiential video hall



● Climatic Change Countermeasures Seminar(The 9th KRCC Academy)

In conjunction with the Korea Petrochemical Industry Association, the KRCC opened the 9th KRCC Academy last August 24th from 9:30AM at the Special Conference Room 1 in the Federation of Korean Industries. With a theme centered on the petrochemical industry's calculation of greenhouse gas inventories and management initiatives, the seminar was attended by approximately 50 participants including Chairman Bum-Sik Chong. The academy included discussions on The trends and proposed measures for the framework convention on climate change, Registration system for the greenhouse gas reduction business, Inventory building of a company's greenhouse gases, Analysis of industry processes in greenhouse gas emission , etc.





### ● Petrochemical Environmental Safety Seminar(The 10th KRCC Academy)

In conjunction with the Korea Petrochemical Industry Association, the KRCC opened the 10th KRCC Academy last September 27th from 9:30AM at the Central Conference Room in the Korea Chamber of Commerce and Industry. With a theme centered on the policies and proposed countermeasures of the chemical industry for environmental stability, the seminar was attended by approximately 60 environmental safety specialists. The academy included discussions on Improvements for safety management of high pressure gases in chemical plants, Chemical substance management initiatives corresponding to domestic/overseas changes, Chemical substance management for the improvement of industrial health, etc.



### ● The 11th KRCC Academy(RC Annual Workshop)

The Korea RC Council held the 11th KRCC Academy from November 30th to December 2nd in the Grand Ballroom at the KAL Hotel in Jeju-do, Korea. The event was attended by approximately 70 participants including Chairman Bum-Sik Chong. The academy went on to include discussions on the Profits of integrated management of safety, health, environment, and product quality, Proposal for improvement of chemical process safety, Responsible Care auditing, Construction planning for greenhouse gas management systems, Development of a consolidated responsible care code, etc.



### ● Sponsorship of the 3rd Chemical Frontier Festival

The 3rd Chemical Frontier Festival was sponsored by the KRCC and organized by five member organizations consisting of the Samsung Total Petrochemicals, SK Corporation, LG Chem, Hanwha Chemical and Honam Petrochemical, in conjunction with the Ministry of Education and Human Resources Development.

The awards ceremony of the event was held on October 20th at 5:00PM in the Dynasty Hall of the Shilla Hotel in Seoul. The winners of the Honorary KRCC award were Jin Young Kim and Yea-Ra Cho, students at the Korean Minjok Leadership Academy.