

# For the Sustainable Development of Chemical Industry...

## Why isn't Korea's chemical industry getting enough attention?

The Korean chemical industry of today generally receives two extreme criticisms concerning its future. Firstly, is the question of whether the chemical industry will provide mankind with endless improvements and convenience, not only in its current state, but also in the future, with relation to new chemical developments and materials such as digital information material, nano-chemical, bio-engineering and advanced compounds. The other is the assertion that the chemical industry will exhaust energy, destroy the ozone layer, cause air pollution and bring about issues such as the release of dioxin and hormones into the environment, thus imperilling the future of mankind. This assertion also covers issues of health and safety in the chemical industry's work environment and treats the chemical industry as the typical 3D industry.

Unfortunately, the later criticism is the one predominant among the Korean people. This is very unfortunate for chemical industry workers. This negative national awareness is addressed as a more serious issue in colleges and universities that educate future engineers for the chemical industry.

Anyone in the chemical industry should consider this issue deeply. Overseas in advanced countries the image of chemical industry is not negative, as the high value-added development of the industry and the convenience of living it produces are emphasized. In developing countries it is welcomed as the key industry that solves shortages of living necessities and brings great prosperity to the national economy.

Then why is Korea's chemical industry not getting enough attention from the people?

In advanced countries, issues relating to the environment, safety and health of the chemical industry are considered very seriously since the chemical disaster in Bhopal, India, the mid 80s. Since then these issues are treated as a matters of primary concern by all business managements. Unfortunately, it is fact that to a certain degree development has been preferred to the issues over environment, safety and health in Korean chemical industry.

**Responsible Care** is the movement formed to address these issues and to promote them to everyone related to the chemical industry, from CEOs to plant operators and cargo drivers and to get them involved in changing the chemical industry into a more environment-friendly and safe industry. This is closely related to the lives of individual workers in the industry and it is the Korean chemical industry's long-term task for sustainable development.

## Need of full cooperation and care from top-level management

KRCC (Korea Responsible Care Council) was established to promote the Responsible Care movement for Korean chemical industry in 1999, and now we are fully prepared to begin the long journey to improve the environment, safety and health issues of Korean chemical industry.

The 4 major tasks given to KRCC this year are ① to confirm the Code of Management Practice for members ② to hold conventions to help understanding RC and instill RC culture ③ to establish the standard for using the RC logo ④ to establish information exchange channels between members and the council.

This will include the final draft of the Code of Management Practice (4 Codes) which will be distributed to members during the first half. Between April and June we held several "Responsible Care Conventions" in Seoul, Yecheon and Ulsan to exchange opinions on the necessity and implementation of RC. We have also established the standards for using the RC logo, allowing members to use the logo from the second half of this year. We opened our homepage in March to promote real-time information exchanges and have issued quarterly newsletters.

Because of these processes we are sure that there is a common understanding of the 'what' and 'why' of the RC movement. The remaining question is how do we implement the RC movement.

For the second half, we are planning to prepare for the actual implementation of RC. Each company will establish concrete and systematic action plans based on RC guidelines and the manual written by a group of experts in the chemical industry. This has been summarized by the council and an appropriate RC checklist compiled.

To draw success from these efforts, we need the full cooperation and care from top-level management to provide the firm ground for the orderly implementation of the RC movement in plants, and for RC coordinators and environment safety agents to fulfill their duties.

We would like to ask members of the Responsible Care movement to give continued support and effort, and care with responsibility, so that the people of the nation will support the chemical industry and thus assure that its development is sustainable.

Thank you.

June. 2001.

Chairman No Ki-ho

Korea Responsible Care Council



## Role of RC and Future Directions

Today's chemical industry has great influence over people's lives and the environment. In other words, it has made great contributions to improve the quality of living from eradication of famine and diseases, to living necessities, transportation and leisure. However, it is also true that the chemical industry has the potential to have an enormously negative influence on safety and the environment if fails to be systematically controlled.

As we all aware, chemical disasters such as the dioxin leak in Seveso, Italy in 1976 and the methyl - isocyanate leak in Bhopal, India in 1984 have given the public a negative perspective and created concerns about the chemical industry.

Following these disasters, members of the world's chemical industry began to give great importance to the Responsible Care (RC) movement. Business owners began to take responsibility for protection of the environment, safety and health throughout the entire life cycle of their products, from development to manufacture, distribution, utilization and disposal. They became committed to devising and implementing environment, safety and health measures, in which they exchanged information for continuous improvement in order to cope with the negative aspects of chemical production.

Recently, members of the domestic chemical industry have established the Korea Responsible Care Council to facilitate the immediate implementation of RC and sustainable development for the industry. In addition to complying with government regulations in order to become the 46th member of RCLG (Responsible Care Leadership Group) in September 20th 2000, it has given an opportunity for the Korean chemical industry's RC movement to be recognized internationally. This opens up an opportunity for the domestic chemical industry to co-operate with the international chemical industry and to change the negative perspective on the domestic chemical industry to positive. This is a very significant step for the industry.

In the new millennium, more attention is being given to the quality of living and resolving issues of safety and the environment. This is an important step in moving towards an advanced society. Therefore

we need to develop and retain a public and autonomous control system to prevent any chemical disasters from occurring. We need to establish objectives for improving the environment, safety and health like the RC movement is doing, and to participate in RC activities. We need to inform others about the Korean chemical industry's efforts to achieve this.

In particular, consulting firms consider safety and environment issues in addition to financial structure when evaluating domestic companies after IMF. This illustrates the fact that the improvement through RC will give great benefits to the economy. We believe the only way to overcome the negative perception of seeing the chemical industry as part of the old-fashioned economic system, the major cause of environmental contamination, the 'dead angle area of safety' and most unsafe industry, and to recover the trust of the people and have flexibility in coping with overall regulations for the chemical industry is to strengthen and improve safety, environment and health controls through continuous RC activities.

Currently the domestic and international environment, safety and health related regulations and agreements are becoming more important and having greater influence on our trade. For this reason the RC movement promoted by the chemical industry is the most systematic and effective solution for the obstructions to the future of chemical industry. We will search for the ways to ensure the complete implementation of the RC movement through SMS (Safety Management System), the quality-environment-safety system (ISO 9000, ISO 14000, KGS 18000), and for the active and spontaneous participation of the companies. In addition, the companies shall do their best to promote the RC movement and to elevate its effectiveness. We wish great prosperity be with KRCC and all other parties concerned.

Thank you.

June 2001.

President Bang Yong-seok  
Korea Gas Safety Corporation



# Resolution on the “Process Safety” Code

May 10th 2001, 2001’s First Meeting of the Board of Directors



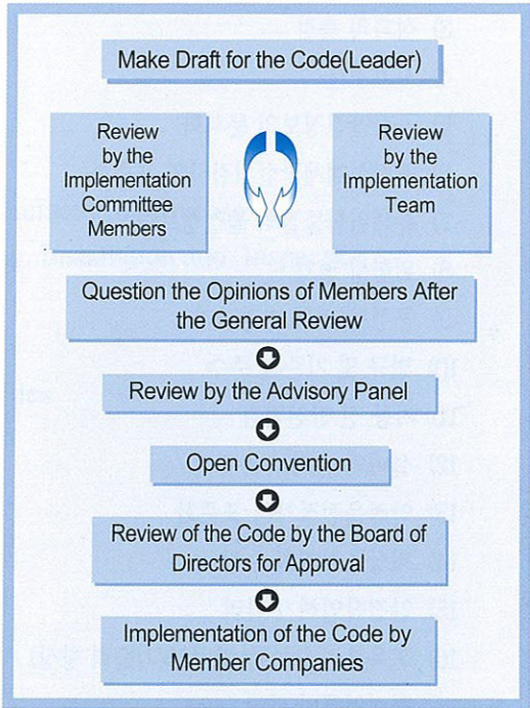
Among 4 KRCC Codes, the “Process Safety” Code was confirmed by the written agreement of the board of directors (May 10th 2001). The establishment of RC guidelines and checklists is one of the primary projects being promoted by the council this year. KRCC will make the drafts for the remaining 3 Codes concerned with the Pollution Prevention, Employee Health & Safety and Emergency Response, and they will be distributed during July following the authorization procedure. As the “Code of Management Practice in Process Safety” was the first Code to be established, there was a certain amount of trial and error and the following shows the process of how it was arrived at and what it is concerned with:

## 1. Code Resolution Process

### - For Code of Management Practice in Process Safety

- First meeting on Process Safety Code (June 16th 2000)
  - Responsible Care Code Arrangement Meeting
  - Decision to make Process Safety referring to ACC standards and considering actual circumstances in Korea.
- Second meeting on Process Safety Code (July 21st 2000)
  - Completed the draft for Process Safety based on the drafts made by Hanwha chemical, LG Chemical and SK.
- Adjustment of Process Safety code items
  - Revise terms and phrases
- Third meeting on Process Safety (February 9th 2001)
  - Decisions on the evaluation standards and checklist
  - Reviewed the evaluation standards for 17 items of Process Safety code(led by Samsung General Chemicals), and decision on the checklist that will be commonly used by member companies.
- Review by Advisory Panel and Process Safety subcommittee.
  - February ~ March 2001

### Resolution Procedure





- Accepted the resolutions from the 3 meetings with Process Safety advisors and additional advice from Korea Gas Safety Corporation.
- Final review by the Implementation steering Committee with opinions from all members.
  - Meetings relating to the code.
  - Final review on details. Written up as KRCC' s Process Safety Code (draft).
- April 16th 2001. Presented the code to the board of directors at their first meeting in 2001, where it was approved.
- June 2001. Distributed the Process safety code to members

## 2. Contents of Code

- Purpose
  - Describes the purpose, principle and major points of the Process safety.
- Relationship to Guiding Principles
  - Describes how the "process safety" supports guiding principles of Responsible Care.
- Management Practices
  - Describes 17 items required to achieve the purpose of process safety
    - 1) Participation of Management Staffs
    - 2) Setting the Objectives
    - 3) Measuring the Performance
    - 4) Investigation of Accidents
    - 5) Documentation of Safety Information Relating to Manufacturing Process
    - 6) Standardization of Safety in Designing, Manufacturing, Installation and Inspection
    - 7) Documentation of Dangerous Materials, Information
    - 8) Evaluation on Danger
    - 9) Controlling Changes of Manufacturing Process-Facilities
    - 10) Compliance with Regulations and Standards
    - 11) Safety Inspection Before Operation
    - 12) Repair and Maintenance Management of Facilities
    - 13) Standardization of Safe Operation
    - 14) Establishment of Emergency Management Plan
    - 15) Management of Authorizations for Safe Operation
    - 16) Education & Training (Improve Performance/Technological Strength)
    - 17) Management of Cooperative Companies



## Resolution on the Standard for Using Responsible Care Logo

- March 7th 2001, The Second General Meeting

The Second General Meeting in March 7th adopted the standards for using the RC logo as well as determining the logo that is to be used commonly by members. This is designed to strengthen ties among members and to maximize international public relations by using a single visual image to represent Responsible Care.

Although the Responsible Care Leadership Group (RCLG) under the International Council of Chemical Associations (ICCA) manages the international use of the RC logo; member countries can use their own logo to show their uniqueness.

KRCC gathered ideas from member companies and decided on the image, in Korea's unique colors, of a person covering the molecule with both hands, representing the chemical industry's spirit of protection and care for the mankind. The color of the molecule is deep yellow and the two hands covering the molecule are green. The color deep yellow is a very attention-getting color, it not only represents the safety of the chemical industry but it also makes us imagine a scene of crops fully ripened in a field in fall. Also the color green will best represent the environmental concern of the Responsible Care movement because it represents nature and the environment.

The logo has been approved by the general meeting and made into an illustrator file and from now on all members can use the mark according to the Standards for Using the Logo, after they submit their Responsible Care Implementation Plan.



The Logo & Mark of KRCC



## Responsible Care - Lecture & Convention Tour

- April, May, June -



The council held conventions in the Seoul, Yosu and Ulsan areas, concentrating on chemical plants, in order to promote the lecture tour for RC agents and publicize RC, the two major goals in 2001.

### Introducing Example Implementation of Responsible Care (April 27th 2001, Seoul Convention)

The first convention was held in the atrium of the Federation of Korean Industries with 60 or more environmental safety workers, on the theme of "How to implement RC in the work place?" focusing on case studies. Rohm and Haas Korea's Executive Director, Kim Dong-kyun and Bayer Korea's Responsible Care General, Kim Bum explained how they adopted RC and how they implemented RC based on their experiences, including employee training. Team Leader Yoon Chun-seok of Samsung General Chemicals, the leading party of the Process Safety Subcommittee, described 17 management practices and 70 criteria of the Process Safety and presented examples of implementing the Process Safety Code in his own company.



### Training on Controlling Management Practice Code and Checklist (May 25th 2001 Yosu Convention)

The second convention was held in Yosu, Jeollanam-do with 70 or more environmental safety agents on the theme of "How to manage the RC Management Practice Code and Checklist?" Lee Chang-kyu, Head of the Center for Chemical Plant Safety of Korea Occupational Safety and Health Agency, emphasized in his address, the importance of RC in the chemical industry, and encouraged participants to promote the



RC movement. Dow Chemical Korea's EH&S Leader, Hwang Mu-yeong and Dow Corning Korea's RC representative, Billy Kim explained the implementation of RC and their management experience in setting up goals to reduce the rate of calamity per standard working hours and to reduce exhaustion by 50%, as well as self-assessment as per the code. Oh Hyo-sun, Dept. Manager of CAPRO, the leader of the Pollution Prevention Subcommittee, explained the procedure in making the Pollution Prevention Code and suggested 14 management practices and 43 criteria. Participants discussed the implementation of RC with speakers in the question and answer period.



## Self Assessment & Research on Improvement (June 22nd 2001, Ulsan Convention)

An RC convention was held at the Ulsan Chamber of Commerce on the theme of "Assessment and Analysis for RC Implementation". Chairman No Ki-ho mentioned in his greeting speech that the chemical industry can achieve sustainable development and recover positive national awareness through the RC movement, and asked for active participation in implementing RC. Dupont's Dept. Manager, Lee Jae-kon, and Korea BASF's Dept. Manager, Kim Kyung-ok explained in detail about their company's implementation of RC; such as converting the assessment method, assessment standard and corresponding code into points to make a Radar Chart and analyze the annual assessment result. Lee Hyung-sik, Dept. Manager of Honam Petrochemical, the leader of the Emergency Response Subcommittee explained 10 management practices and 35 criteria.





Responsible Care Implementing Cases

BASF Company Ltd.

The chemical industry can give a great contribution to the welfare of the mankind, but it can also have negative effects on the environment and health if not controlled properly. A disaster that occurred in Bhopal, India in 1984 caused by a gas leak, has proved the importance of safety and control for chemical materials. Since then society has given great attention to the chemical industry and questioned its social responsibility, which has eventually threatened its viability. To cope with this social distrust, the world's chemical industry developed and implemented the RC program and BASF joined it.

1. Company Overview

BASF Company Ltd. in Korea (CEO & Chairman: Yoo Chong-Yul), which is 100% affiliated with Germany's integrated global chemical firm, BASF, is a typical foreign-investment company in Korea. It was established as three separate companies in Korea BASF Urethane Co., Ltd. (formally Hanwha BASF), Korea BASF Styrenics (formally Hyosung BASF) and BASF Korea. They merged in December 1998. Currently the company has its main office in Seoul and 1,040 employees are working at 4 plants in 3 areas (Ulsan, Yosu and Kunsan), and 45% of their total products produced are exported to overseas countries such as China and Southeast Asia.

■ Plant Information

Plant	Employees (persons)	Product & Manufacturing Capacity (ton)		Major Usage
Ulsan Plastics Plant	268	ABS:	200,000	Interior & Exterior Materials for Automobiles, Materials for Electronics & Toys,
		PS:	212,000	General Purpose & Shock-Absorbing Polystyrol
		EPS:	70,000	Insulation, Shock-Absorbing Materials and Packaging Materials
Ulsan Chemicals Plant	110	PTHF:	30,000	Spandex fiber,
		BDO/THF:	50,000	Polyurethane /Solvent,
		Polyol:	30,000	
Yosu Plant	169	MDI:	100,000	Construction Material, Insulation, Seat Cushions, Synthetic Wood, Automobile Interiors, Bumpers, Bowling Balls, Sports Tracks, Ski Plates, Synthetic Leather, Elastic Fiber, Refrigerator Materials, Wire Coating, Paint and Adhesives
Kunsan Plant	200	Lysine:	90,000	Animal Feed, Enzyme and Carotenoid

\* This column will randomly select a company from members and they will explain how they implemented RC, in order to share information and increase the understanding of RC through the examples of companies in Korea that have implemented it.



## 2. Responsible Care Process:

The reorganization of the system and rules started from 1999 under the flag of "One Company Culture", after the 3 companies merged on December 31st 1998. We obtained satisfactory results despite many difficulties. The integration of the management systems concerned with quality, environment, safety and health made great contributions to the reorganization and it also enabled full implementation of the RC program from the following March. The following shows how our company implemented RC.

March 1999.	Held kick-off meeting for the promotion of RC activities
May 1999.	Established an RC promotion plan and organized the Steering Committee
July 1999.	Made a self assessment checklist
August 1999.	Implemented self assessment for all plants, Improved defects shown in the self assessment and integrated the evaluation standards
September 1999.	Re-implemented self assessment, MSDS discussion
October 1999.	Made MSDS and RC implementation procedure
December 1999.	Implemented RC training for employees, Made RC promotion plan for 2000, Revised self assessment checklist
January 2000.	Reviewed RC performance for 1999
June 2000.	Reviewed RC performance for first half of 2000
August 2000.	Implemented self assessment in all plants
October 2000.	Discussed how to improve the self assessment checklist
December 2000.	Reviewed RC performance for 2000 and made promotion plan for 2001.
January 2001.	Implemented 2001's Integrated QM&EM Audit
May 2001.	Implemented internal RC audit

## 3. RC Organization

Organized the RC Working Group with the RC Steering Committee comprised of the CEO, presidents and heads of the Environmental Safety Division of each site, to promote RC in May 1999. Each site organized a separate Site RC Committee to be headed by the site manager.

### ■ RC Organization

RC Steering Committee reviews and authorization of RC Code, yearly / short and long term RC steering plan and performance monitoring. The RC Implementation Group deals with the establishment of procedures and standards, supporting self assessment at each site, data collection, education and training,

internal audit and reporting of plans and performance to actively promote RC. Site RC committee deals with the self-assessment of their site and the establishment of an RC Steering Plan.

4. Performance

As the result of 2 years of our efforts, we attained a number of international standards in the environmental, safety and healthcare fields. We developed MSDS for all manufactured products and used materials, product handling procedures, emergency management procedures, safe operating procedures and a variety of environmental, safety and healthcare related systems, as well as for personal protection equipment and health & hygiene.

■ Authorization

Plant	Environmental Section	Safety & Health Section		
	(ISO14001)	(KOSHA2000)	OHSAS18001	KGS18001
Plastics Plant	1999. 5. 26	2000. 2. 23	2001. 5. 30	2001. 6. 25
Chemicals Plant	2000. 11. 22	2000. 2. 24	2001. 5. 30	2001. 6. 25
Yosu Plant	1998. 4. 28	2000. 5. 17	2001. 5. 30	2001. 4. 17
Kunsan Plant	expected in 2002	expected in 2003	-	-

■ Self Assessment

The evaluation based on the self-assessment checklist is carried out in the following order and the result is summarized in a Radar Chart to confirm Weak-points and reflect on the implementation plan for the following year.

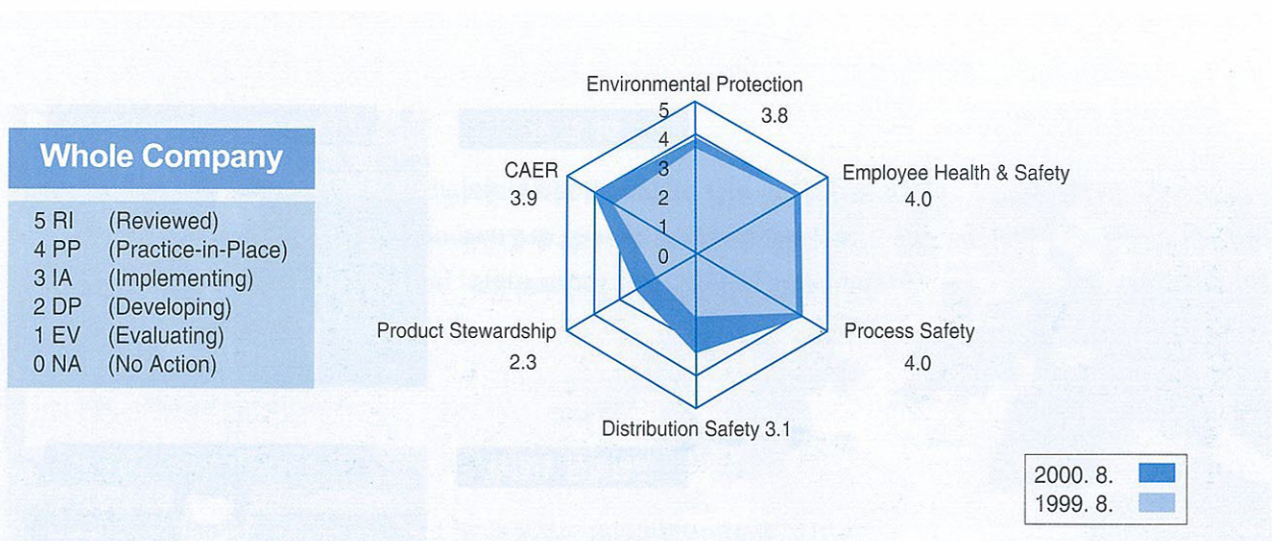
- 1) Organize the evaluation team for each Management Practice Code
- 2) Evaluation per criteria according to the following grade
  - NA(Not applicable) : Not applied, or not applied to corresponding organization
  - EV(Evaluation) : Evaluation of the difference between existing SHE practice and the requirements for developing RC (initial self-assessment stage is included here)
  - DP(Developing Plan) : Establish solution or plan to resolve problems appearing in the assessment
  - IA(Implementing Action Plan) : Solution or plan for weak-points is established, approved and its practice is implemented. The progress to full development is under 100%.



RC IMPLEMENTING CASES

- PP(Practice in Place) : Implementation is completed and maintained continuously
  - RI(Re-evaluating Implementation) : Continuous improvement. Analyze the validity of corresponding plans and review ways of improvement
- 3) Write evaluation basis and points (0-5) for each assessment standard
  - 4) Calculate points for each management practice code and make Radar Chart, confirm current level
  - 5) Analyze the assessment result, establish improvement measures and set up objectives
  - 6) Implement improvement measures, confirm progress and achievement

■ Assessment result



5. Future Plan

The RC program is an independent program that promises that companies will fulfill their social responsibilities to employees, customers, related personnel and local society by expanding their environmental and healthcare program. This has been implemented by most Korean chemical companies for a long period of time. In so doing we strengthen our ties with local residents and public organizations in order to establish the corporation image of prospering with the local society. We will also develop an organic and co-operative system with related companies in order to exchange opinions and information in order to recover and improve public awareness of the chemical industry.



## KRCC The 2nd General Meeting Sangeui Club, March 7th 2001

The 2nd General Meeting of KRCC was held at Sang-eui Club in Korea Chamber of Commerce on March 7 with 60 participants including representatives of member companies and guests. The meeting elected LG Chemical's CEO, No Ki-ho, as the succeeding chairman, made a resolution on the budget and approved the standards for using the logo.

### Farewell Address

In his farewell address the first chairman Lee Jeong-ho asked members of the chemical industry to give full cooperation and response to the environmental safety issue, more responsibly and spontaneously.

### Inauguration Speech

New chairman No Ki-ho spoke of his aspirations concerning the exchange system for the Code of Management Practice and promotion of major projects, and asked members to strengthen their ties.

## Code of Management Practice Subcommittees Meetings for Writing the Drafts

The 4 subcommittees under the Implementation Committee (president: Hur Won-joon), organized to establish the Code of Management Practice, made the drafts for the Code of Management Practice through a number of meetings. The Pollution Prevention Subcommittee (led by CAPRO) presented content of the draft code in May at the convention after having a working-level meeting for the draft (February 29) and a review meeting (April 27). The Emergency Response Subcommittee (led by Honam Petrochemical) called first and second meetings on May 25 and June 22 respectively after the preparatory meeting on May 10 for the draft.



## KRCC Business Plans for the 2nd Half-Year 2001

KRCC will exert all possible efforts to establish detailed action plans of each member followed by the completion of the 4 codes of Management Practice instructions in the 2nd half of the year. In addition, KRCC will continue to educate them for details on RC implementation and promote the spread of actual cases participating in international RC-related conferences.

### Details are as follows.

#### → To publish RC instructions, collect and evaluate reports

1. To develop RC instructions
  - Examples of RC promotion system and working plan by Codes, points to prepare for self-evaluation checklist, and glossary.
2. To publish Code Standards and checklists.
3. To establish methods and standards for verification in relation with RC promotion.
4. To find excellent promotion items.

#### → To distribute logo & mark

1. To establish standards for the right to use logo and mark.
2. To invite members to attach logo and present instructions for use.
3. To distribute logo files and badges.

#### → International Activities

1. To participate in RCLG2001 meeting (8/27-29, Mexico).
2. To participate in APRC2001 (10/23-26, Republic of Indonesia).
3. To exchange information with international RC organizations.

### 사무국 소식 From Secretariat

KRCC에서는 오는 8월 27일부터 29일까지 멕시코에서 개최되는 2001년 RCLG회의에 참가할 예정이다. 이번 회의는 RCLG 가입 후 처음 참가하는 것이며, 본회의에서 논의될 내용은 RCLG운영 규칙 조정, RCLG전략 실행의 경과, 그리고 UNEP RIO+10 보고서에 있어 RC의 기여부분 등에 대한 것이다.

Representatives of Korea Responsible Care Council will attend the 2001 Responsible Care Leadership Group meeting in Mexico on 27-29 August 2001. This is the first RCLG annual meeting that KRCC participate in as a full member. Topics which will be covered in plenary are about an update of the RCLG operating rules, progress on the implementation of the RCLG strategy and Responsible Care contribution to the UNEP RIO +10 report etc.