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The EPA recently compiled all listed toxic chemical substance, revised them according to new controls measures and re-announced them. Minimum quantity and concentration levels for each toxic chemical were also announced. Users of toxics in quantities or concentrations below minimum levels can be subject to looser regulations.

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Feature Article

Taiwan Steps Up Promotion of Electric Motorcycles

There were 15 million motor vehicles in Taiwan at the end of 1997. Of these, two-thirds were motorcycles (including scooters), and the total number has grown at a continuously high rate for the past ten years. The number of 50cc motorcycles, for example, grew from 1.4 million in 1986 to 3.2 million by 1995 or 14.5% on average each year. Motorcycle traffic is chiefly responsible for the degradation of air quality and creation of noise pollution in Taiwan's urban areas.

According to EPA estimates, motorcycles generate 330,000 tons of carbon monoxide (CO) and 90,000 tons of hydrocarbons (HC) each year, or 12% and 8% of total annual emissions respectively. The situation in urban areas is even more serious. In Taipei, motorcycles account for approximately 35%, 60% and 3% of CO, HC and nitrogen oxide (NO_x) emissions respectively.

To stop the steady growth of motorcycle emissions, the EPA has in recent years put controls on petroleum products and carried out phased tightening of motorcycle emission standards. Although these controls are the strictest in the world, the continued lack of a comprehensive mass transit system makes motorcycles an indispensable mode of transport. As the number of motorcycles continues to grow, the effectiveness of total emission controls will be limited. Government agencies have, therefore, concluded that energy-conserving, low-polluting electric motorcycles should be developed to replace high-polluting two-cycle ones.

Although Taiwan got off to an early start in electric motorcycle development, its efforts have been fraught with problems including battery limitations, high prices and the lack of an electric motorcycle infrastructure. In the 1990s, the government began to support development efforts in earnest. The R.O.C. Energy Commission entrusted the Industrial Technology Research Institute (ITRI) to conduct electric motorcycle core technology R&D. The EPA developed a series of incentives and the National Science Council (NSC) has been actively working to integrate the resources related to electric motorcycle technology. As electric motorcycles are relatively environmentally friendly and given their market potential, it is estimated that annual production value will reach about NT\$50 billion by 2010. In January, 1998, Premier Vincent Siew ordered the listing of electric motorcycles as one of six industrial technology areas of national importance. Premier Siew also called for the acceleration of electric motorcycle development efforts following approval of the *Electric Motorcycle Development Action Plan* by the Executive Yuan.

The commercial development of electric motorcycles faces daunting challenges such as battery power limitations, life and recharge speed limitations, high market prices and insufficient battery recharge stations and facilities. Government agencies responsible for overcoming these obstacles include the NSC, Ministry of Economic Affairs (MOEA), EPA and Ministry of Transportation and Communications (MOTC). The NSC and MOEA are in charge of integrating the scope and results of existing research and accelerating R&D work and foreign technology acquisition while the EPA and MOTC are in charge of promoting electric motorcycle use. The EPA has the following duties:

- Establish a rational system of subsidies: To address the limited number and high price of electric motorcycles, the EPA formally announced the *Electric Motorcycle Original Purchase Subsidy Implementation Guidelines* in September, 1995. To establish an electric motorcycle infrastructure, the EPA drafted the *Electric Motorcycle Recharging Equipment Subsidy Implementation Guidelines* that subsidizes government agencies, academic institutions, factories and office buildings for installing battery recharging equipment.

The EPA's current method for calculating subsidies focuses separately on the battery and the rest of the vehicle. The price of electric powered motorcycles typically exceeds gas powered ones by about NT\$21,000 mainly due to the high battery cost. The maximum subsidy for the vehicle less the battery is NT\$5,000 (price differential) while that for the battery depends on its functions. The maximum subsidy amount per unit is NT\$25,000, with total subsidies in the 1999 to 2002 period expected to hit NT\$5 billion.

- Promote and educate: Since 1996, the EPA has commissioned educational programs at schools, sponsored free test rides and provided press releases to the media.
- Establish favorable regulations: The EPA has formulated subsidy rules and is currently drafting the *Government Agency Electric Motorcycle Purchase and Installation Work Guidelines* that list electric motorcycles for priority purchase by government agencies. According to the *Third Stage Motorcycle Emission Standards* that went into effect on January 1, 1998, two of every 100 motorcycles built or sold each year after 2000 must be electric powered. According to the *Fourth Stage Motorcycle Emission Standards* announced on August 5, emission standards after 2003 will be tightened even more, spelling the end of the road for two-stroke motorcycles. These measures bode well for the future of electric motorcycle use in Taiwan.
- Create a favorable environment: The EPA has paid special attention to establishing an electric motorcycle infrastructure. Apart from the aforesaid recharging equipment installation subsidies, the EPA selected Hsinchu as a pilot city this year for installation of 56 recharging stations (including 756 recharging bays) and helped five motorcycle retail outlets install battery exchange stations (where spent batteries can be immediately exchanged for recharged ones). In addition, the EPA commissioned ITRI to commence planning and installation of electric motorcycle infrastructure in other municipalities, beginning with Taipei. A total of 1,000 recharging stations and 200 service stations are planned for Taipei, Chungli, Hsinchu, Taichung, Chiayi, Tainan and Kaohsiung by 1999.

Although there are only about 1,000 electric motorcycles on the road today, the EPA's promotional efforts in Hsinchu are expected to add 500 to that number by the end of August this year. A target of 10,000 vehicles has been set for 1999 and mass production levels set for 2003. In terms of manufacturers, several local manufacturers already have models on the market, while Kymco (Kwang Yang Motorcycle Co.) has completed a prototype and plans to enter mass production in March, 1999. Another model planning to use ITRI technology will be built by a six company joint venture that includes Sanyang and Yamaha. Market competition is beginning to take shape as the subsidies, assistance and promotions set in motion by the EPA are in place and producing results.

Although the road has been long, the dawn of electric motorcycle use in Taiwan is now in sight, and prospects for this “emerald among green products” look good.

A Look Inside the EPA

The Bureau of Air Quality Protection and Noise Control

According to the *Environmental Protection Organization Statutes*, the EPA's Air Quality Protection and Noise Control Bureau is primarily responsible for formulating air, noise and vibration pollution control policies and regulations, foul odor and stationary source air pollution control, vehicle air pollution control, non-atomic energy-free radiation control planning, assistance and supervision and other duties related to air and noise pollution control. In terms of organizational structure, the Bureau has a General Director, Deputy General Director and two Senior Specialists. Reporting to them are four Divisions, each with a Director and supporting staff. In addition, fourteen staff were retained to support *Air Pollution Control Fund* work. The Divisions have the following responsibilities:

Division I:

1. Develop, promote, oversee, carry out and assess air quality protection policies, projects and plans.
2. Develop, amend, explain and disseminate air quality protection regulations.
3. Investigate air pollution distribution and impact. Collect, manage, analyze and report related information.
4. Research and develop air pollution investigation and verification methods. Collect, manage and apply related information.
5. Investigate air quality. Collect, manage, analyze and report related information.
6. Compile an annual report on national air quality protection.
7. Plan air pollution control fee levying and use.
8. Items related to global atmospheric air quality.
9. Other items.

Division II:

1. Develop, launch, oversee, carry out and assess stationary pollution source air pollution and foul odor control policies, projects and plans.
2. Develop, amend, explain and disseminate stationary pollution source air pollution and foul odor control regulations.
3. Investigate stationary pollution source air pollution and foul odors. Collect, manage, analyze and report related information.
4. Research and develop stationary pollution source air pollution and foul odor control technologies. Collect related information.
5. Develop, guide, oversee and carry out stationary pollution source air pollution and foul odor control measures.

6. Issue proof of use certificates that permit the duty-free import of air pollution control equipment by non-manufacturing institutions and organizations.
7. Permit, register and plan the management of stationary pollution sources.
8. Other items related to stationary pollution source air pollution and foul odor control.

Division III:

1. Develop, launch, oversee, carry out and assess vehicle air pollution control policies, projects and plans.
2. Develop, amend, explain and disseminate vehicle air pollution regulations.
3. Investigate vehicle air pollution. Collect, Manage, analyze and report related information.
4. Research and develop vehicle air pollution technologies. Collect related information.
5. Develop, guide, oversee and carry out vehicle air pollution control measures.
6. Issue proof of use certificates that permit the duty-free import of air pollution control equipment by non-manufacturing institutions and organizations.
7. Issue emissions qualification certificates that permit the manufacture and import of new vehicle models.
8. Other items related to vehicle air pollution control.

Division IV:

1. Develop, launch, oversee, carry out and assess noise, vibration and non-nuclear radiation control policies, projects and plans.
2. Develop, amend, explain and disseminate noise, vibration and non-atomic energy-free radiation control regulations.
3. Investigate noise and vibration pollution. Collect, manage, analyze and report related information.
4. Research and develop noise and vibration pollution control technologies. Collect related information.
5. Develop, guide, oversee and carry out noise, vibration and non-nuclear energy free radioactive pollution control measures.
6. Issue proof of use certificates that permit the duty-free import of noise and vibration pollution control equipment by non-manufacturing institutions and organizations.
7. Issue vehicle noise pollution qualification certificates that permit the manufacture and import of new vehicle models.
8. Produce an annual report on national noise and vibration pollution controls.
9. Other items related to noise and vibration pollution controls.

Executive Yuan Approves National Environmental Plan

The *National Environmental Protection Plan* was approved by the Executive Yuan and implemented on July 2 of this year. In line with the *Comprehensive National Land Development Plan*, it sets short-, medium- and long-term goals leading up to 2011 that include preventing public nuisances, improving health, raising the quality of life, creating a peaceful and meaningful living environment, conserving natural resources, pursuing sustainable development, actively participating in global environmental affairs and supporting global environmental protection measures. Specific environmental quality, pollution reduction and management targets will be incorporated into a comprehensive quantitative standards system to track and evaluate existing policy goals.

Taiwan's *National Environmental Protection Plan* was approved by the Executive Yuan on July 2 of this year, establishing the future direction of environmental policy in Taiwan. Its comprehensive indicators and strategies set environmental quality targets and the methods for achieving them by 2011.

The *Plan* was developed to meet international environmental trends, strive for national sustainable development, realize economic and technological development alongside environmental and ecological protection as stated in the constitution, continue with the *Current Environmental Protection Policy Guidelines*, raise national competitiveness and support implementation of the *Comprehensive National Land Development Plan*.

The *Plan* establishes national guiding principles for environmental protection and sets targets for environmental evaluation, load analysis and improvement, and regional and phased improvement strategy development.

The primary objectives of the *Plan* are as follows: 1) Prevent public nuisances; improve human health, raise the standard of living and create a peaceful and meaningful living environment; 2) conserve natural resources and pursue sustainable development; 3) and actively participate in global environmental affairs and support global environmental protection measures. The *Plan* also sets the following specific targets:

1. Reduce the number of days with poor air quality (PSI > 100) to below 1.5% of the environmental standard.
2. Reduce the number of time periods with excessive noise pollution to below 10% of the environmental standard.
3. Raise the proportion of unpolluted waterway sections (RPI < 2) to above 70%.
4. Raise the sewer connection rate to 26%.
5. Reduce accumulated air pollutants by 8.311 million metric tons.
6. Reduce water pollutants (BOD) by 2,568 metric tons daily.
7. Recycle 990,000 metric tons of waste annually.
8. Incinerate 90% of waste (in line with the waste incineration priority policy).

The environmental protection strategies will be implemented through command and control, economic and social mechanisms. Command and control mechanisms include quality standards, emission standards, emissions permits, pollution source monitoring and illegal pollution source penalties. Economic mechanisms include the levying of fees (taxes), deposits, tradable permits and quotas, financial incentives, legal liabilities, Eco-labeling and public investments. Social mechanisms include the provision of

information, communications and monitoring opportunities and educational dissemination.

Environmental protection work has evolved from public nuisance control to the pursuit of a harmonious living environment and preservation of cultural heritage. Urban and rural environment improvement requires a unified effort from all municipal and local authorities. For this reason, the *Plan* outlines 15 supporting plans to be developed and launched by relevant municipal and local authorities. For example, the *Acceleration of Sewer Installation and Connection* aims to improve polluted waterways, the *Comprehensive National Land Development Plan Act* will promote the conservation and equitable development and distribution of national land and the *Integration of Transportation Development and Environmental Protection* encourages and promotes low-polluting vehicles and transportation methods. These kinds of mutual support are necessary to strengthen environmental protection and raise the quality of life.

The *National Environmental Protection Plan* established a clear and quantifiable environmental indicator system. As environmental quality, pollution (reduction volumes) and management targets are related, the set of indicators has established a feasible basis for managing and examining the complex *Plan*.

The EPA has developed the *Plan* with great care. Every question was attended to by the relevant Division Director and involved concrete analysis of the current situation, future strategy and attainable objectives.

Vice Premier Liu Chao-Shiuan instructed the National Sustainable Development Council to create a taskforce to audit the *Plan* on a regular basis. He also instructed the EPA to compile information on its progress and produce an *Annual Environmental White Paper*.

Garbage Collection Fee Rates to be Set Locally

Controversy over the reasonableness of current waste disposal fee rates has prompted the EPA to draft an amendment that gives local authorities the discretion to set fee rates. The draft stipulates that cost calculations and levying methods should suit local conditions and excludes culvert and street cleaning costs from unified waste disposal cost calculations. The *Waste Disposal Act* will also be amended to reflect these changes. The draft is expected to reach the Executive Yuan by September. As for the Taipei City Government's doubts over the need for annual waste disposal rate increases, the EPA saw nothing wrong with the current policy and will not consider changing the policy for the time being.

Controversy surrounding the reasonableness of water usage-based waste disposal (including collection and processing) fee rates prompted the EPA to draft an amendment to the *General Waste Items Collection and Processing Levying Fee Rate Regulations* on July 14. The draft gives local authorities the discretion to set fee rates according to local needs. This lets sticky regulatory matters get solved at the local level and thus eases regulatory burden at the central level.

The draft revises Article 3 and adds Article 10-1 to the *Regulations*. Article 3 gives local authorities the discretion to set their own waste disposal fee rates. The street sweeping and cleaning, culvert cleaning and flushing, produce scrap and box disposal and waste accumulation point disinfecting work costs will be removed from the scope of national unified cost calculations. Local authorities will instead set their own fee

rates according to local attributes, economic conditions and profit and loss factors. Article 10-1 gives Taipei and Kaohsiung Cities under the Central Government and cities and counties under the Taiwan Provincial Government the discretion to set other fee rates that can be registered with the EPA following Central or Provincial Government-level approval.

Participants at a public hearing on July 14 expressed approval with the proposed draft. There was some dissent however. One representative suggested that waste disposal fee rate calculation and levying discretion include municipalities and counties but not towns so that waste disposal fee rates are not too scattered. Another noted that the authorization scope in Article 10-1 was unclear and suggested that the EPA clearly declare whether waste disposal fee rates can be based on water usage, quantity or actual costs so that local authorities allow local use participation.

In addition, some academics noted that Article 11 of the *Waste Disposal Act* clearly stipulates that the *Fee Rate Levying Standards and Regulations* are set by the central competent authority in consideration of the costs and expenses associated with local waste disposal methods and equipment. They suggested that passing waste disposal fee rate setting authority to local authorities might be illegal according to the *Act*.

The Taipei City Department of Sanitation questioned the need for annual waste disposal rate increases. Deputy Director Hong Cheng-Chong said creation of a favorable environment for privatizing the waste disposal industry was the key reason for raising waste disposal fee rates to the same level as their costs. Deputy Director Hong noted that as there are over 40 private waste disposal organizations in Taipei, the current fee rates at 75% have already achieved their goal and should not be raised.

The EPA will use comments made at the public hearing as the basis for making more detailed revisions to the *Regulations* and will move quickly to amend the *Waste Disposal Act* where relevant.

Regarding the Taipei City Government's suggestion not to adjust the fee rates, the EPA noted that the 100% reflection of disposal fees in the fee rates has been their long-standing policy. It is inline with the polluter pays principle and creates favorable conditions for waste reduction, resource conservation, upgrading of waste disposal standards and waste disposal industry privatization. Therefore, the EPA has no plans to amend the announced 12.5% annual fee rate increase.

The Draft is expected to reach the Executive Yuan in September at which time concerns over legality will be addressed. As the Draft has already received tacit approval from the Executive Yuan and provided a consensus can be reached with the relevant parties that includes resolution of the concerns over legality, the Draft should be approved, formally announced and implemented soon thereafter.

Industrial Parks to be Checked for Groundwater Contamination in FY 1999

Due to the high frequency of groundwater and soil contamination incidents, the EPA will investigate Taiwan's 20 industrial parks. Targeted sectors include the petrochemical, electronic, and agro-chemical industries, as well as gas stations. Test targets include volatile organic compounds (groundwater) and volatile organics, BTEX (benzene, toluene, ethylbenzene and xylene) and heavy metals (soil).

The problem of soil and groundwater contamination in Taiwan has persisted since the highly publicized RCA soil contamination incident. Recently, a Philips Electronics Factory in Hsin-chu County was found to have high concentrations of tetrachloroethylene in its groundwater. Industrial parks in Kuanyin (Taoyuan County), Pingchen and Chungli and Chinese Petroleum Corporation's (CPC) Taoyuan oil refinery are also said to have high concentrations of heavy metals in their groundwater and some test wells have revealed high concentrations of phenol carcinogens.

To ascertain the degree of groundwater contamination, the EPA has allocated NT\$16 million to commission the Environmental Protection Center under the Provincial Government's Department of Environmental Protection to check each of Taiwan's 20 industrial parks for groundwater and soil contamination.

Targeted sectors include petrochemical industrial parks, gas stations, agrochemical factories and industrial parks that have received public complaints. Specific targets include industrial petrochemical parks in Tashe, Renwu, Linyuan, Toufen and Chongyang; the Hsinchu Science-based Industrial Park; industrial parks in Yung-an and Youshi (Taichung County) that have received public complaints or have contamination problems; and industrial parks in Linhai, Tayuan, Chungli, Longte, Chuanhsing, Nankang and Pingtung. Other targets include CPC's oil refineries in Kaohsiung and Taoyuan and Rongmin Chemical's agrochemical operations.

As for testing levels of groundwater contamination, limited funds prevent the drilling of new test wells. Existing test wells, privately owned wells near the industrial parks, or water collection wells of companies will be used. Volatile organic compounds will be the primary test target pollutant with 10 water samples collected from each factory area or a total of 200 water samples.

In terms of soil contamination, initial plans call for the installation of 10 sampling sites in each factory area with three to five deep soil samples taken at each sampling site. It is estimated that a total of 30 to 50 samples will be taken at each factory area. Initially, 150 groundwater and 450 soil samples will be tested. This will be followed by a more concentrated investigation of areas found to be contaminated. As the test targets are chosen according to the characteristics of each factory area, tests will focus on volatile organic compounds, BTEX (benzene, toluene, ethylbenzene and xylene) and heavy metals.

In addition, the EPA will also make a request by letter to CPC that it carry out oil leak inspections at all of its gas stations on a regular basis. In the future, all 568 CPC gas stations will be screened.

This round of inspections is focused mainly on gathering information on groundwater and soil contamination. Apart from contamination treatment work still being carried out, such as that for the RCA case, the EPA will immediately notify the local auditing department to set controls in motion should tests reveal groundwater or soil contamination.

EPA to Review Eco-Label System Inline with ISO Standards

With ISO 14020 approval expected before year-end, Green Mark Committee members have recommended that Taiwan's eco-label system specifications be amended to reflect the latest international developments. They noted that, as the *Government Green*

Purchasing Statues will soon be in effect, now is the time to completely review the eco-label system.

During a routine Green Mark Committee review meeting, the development of eco-label specification standards was discussed with much enthusiasm. Green Mark Review Committee Chairman Professor Ku Yang said that to prevent future ISO standards from posing international trade barriers, Taiwan should take action now. Some committee members also pointed out that the overall environmental performance and lifecycle of products was not thoroughly investigated during early-stage formulation of eco-label specifications. ISO 14020 implementation threatens to undermine public confidence in Taiwan's eco-label system. Green Mark Committee members urged that eco-label system specifications be amended to reflect the spirit of ISO 14020.

A part of the ISO 14000 series of environmental management system standards, ISO 14020 covers product eco-labeling and declaration standards. The standards are divided into nine major principles and deal with environmental label and declaration affixing, ordering, scope of contents and international trade relations. Among them, the fourth principle stipulates that environmental labels must consider the entire lifecycle of the product or service and all aspects related to each product lifecycle stage in order to reflect its overall environmental performance.

Professor Ku noted that the FDIS version of ISO 14020 had been previously proposed and will be formally announced in June, 1999. Furthermore, apart from progressing faster than the 14025, the DIS version of the 024 and 021 series is also being voted on by member nations. Passage of 14020 will encourage overall progress of the 020 series. Although the 020 series will be used only as reference documents rather than as certification or registration standards, it may later be combined with ISO 14001 as the most convincing piece of evidence that a product is environmentally sustainable.

Article 96 of the soon to be implemented *Government Green Purchasing Statues* will greatly aid promotion of the eco-label system. Now is the time to fully review eco-label system trends and specification setting vis-a-vis the rest of the world and committee member suggestions will be an important direction for further EPA discussion.

EPA Conducts Over 3,000 Air Pollution Technical Assistance Cases

The EPA has continued to assist firms with air pollution source improvements. Over the past two years, more than 3,000 technical assistance cases were conducted. A large proportion of them were in control equipment construction and repair, and control equipment operation and maintenance. Firms carrying out improvements or those that have not submitted an improvement plan will be listed for future control and auditing.

To help firms improve their pollution emissions and to change the perception that environmental authorities perform only a disciplinary role, the EPA has assisted firms with carrying out pollution improvements since EPA Administrator Tsai Hsung-Hsiung took office. In terms of air pollution control, the EPA's Air Quality Protection and Noise Control Bureau has promoted the *Stationary Pollution Source Improvement Assistance and Control Plan* since July, 1997.

Of 3,002 cases of technical assistance conducted over two years ending in June, 1998, 2,422 required performance of improvement measures. Among them, 571 had submitted and initiated a pollution improvement plan, 395 had completed but not

submitted a plan and 1,493 had not completed a plan. Municipal/county environmental authorities have urged the latter group to complete and submit their improvement plans. The required improvement measures fall into the following categories:

1. Control equipment operation and maintenance
2. Control equipment construction and repair.
3. On-site environmental management improvement.
4. Manufacturing process equipment operation and maintenance.
5. Manufacturing process improvement assistance.
6. Manufacturing process equipment construction and repair.
7. Other technical or assistance services.

The combined area control equipment construction and repair and on-site environmental management improvement accounted for a large proportion of the improvement plans (see table).

Common problems were identified over the course of conducting the cases and in 1997, the EPA began to address them by engaging in pollution control technology research and development (R&D) work. To help firms solve pollution emission problems the EPA has already held 40 meetings that explain pollution technology and demonstrate pollution control equipment. By 1998, the following pollution control technologies had been developed:

1. Economical organic waste absorption and emission system technology.
2. Dye and ceramic manufacturing industry air pollution optimum volume reduction technology.
3. Development odor and organic gas processing technology.
4. Cement industry nitrogen oxide (NO_x) control technology estimate integration.
5. Small- and medium-scale incinerator microscopic toxics control technology.
6. Industrial NO_x reduction filter technology.
7. Synthetic leather PU dimethylformamide (DMF) recycling technology.

The EPA will keep tracking the 1,493 companies that have not completed or are carrying out a pollution improvement plan and municipal/county environmental authorities will continue pressing them to complete their improvement work.

R.O.C. to Strengthen Groundwater Pollution Control

On July 22, the National Council for Sustainable Development (NCSD) convened the *Symposium on Sustainable Groundwater Management* attended by parties from all circles. Resolutions reached at the meeting included strengthening of groundwater monitoring and controls and acceleration of the *Sinkhole Control Implementation Project*.

On July 22, the *Symposium on Sustainable Groundwater Management* was convened by the Executive Yuan's National Council for Sustainable Development (NCSD) and presided over by Minister of State Huang Ta-Chou. The event was attended by more

than 70 individuals from related government agencies, academic institutions, businesses and environmental groups.

The symposium included discussion topics on groundwater control strategies in Taiwan, groundwater and water resource sustainable management strategies, and trends in the sustainable development of groundwater in Taiwan and abroad. EPA Water Quality Protection Bureau General Director Roam Gwo-dong, Ministry of Economic Affairs (MOEA) Water Resources Bureau Director Hsu Shiang-Kueen and Professor Chen Chia-Hsun delivered the following resolutions:

1. Groundwater quantity and quality protection is an important link in the quest for sustainable development. Groundwater management work should therefore emphasize control over treatment and remediation. The government will accelerate and strengthen groundwater monitoring and establish a monitoring network and database.
2. Groundwater protection work must be accelerated through the following steps: Formulate mechanisms for tracing groundwater pollution treatment responsibility, standards for polluted groundwater treatment work and water quality protection measures for natural groundwater replenishment areas as part of a complete groundwater quality protection system. Strengthen potential groundwater contamination source management, groundwater quality monitoring and investigation, contaminated area human health maintenance and defense, and groundwater use planning and management.
3. Strengthen the prevention of sinkholes caused by excessive groundwater extraction by accelerating the *Sinkhole Control Implementation Project*, integrating related agencies and through the comprehensive planning of sinkhole area land use.
4. Strengthen groundwater contamination treatment and rehabilitation work through strengthening of groundwater contamination control knowledge, training management, contamination removal technology acquisition and improvement, and supervision of rapid removal and treatment work carried out by the polluter.
5. In the pursuit of sustainable groundwater management, emphasize the formulation of partnerships with government, business, academia and the general public. Strengthen promotion/education, forging of consensus and joint conservation of water resources.

Environmental groups suggested formalizing the many opinions expressed at the symposium into concrete implementation measures. Minister Huang instructed the Water Resources Bureau to consider each of the suggestions when drafting strategies.

After the resolutions were approved by the NCSD on July 11, Minister Huang instructed related agencies to implement the resolutions and the Executive Yuan's Research, Development and Evaluation Commission to regularly audit the results of implementation efforts.

EPA Revises Controls Governing Listed Toxic Chemicals

The *Toxic Chemical Substances Control Act* amended last year added new group and quantity mechanisms to toxic chemical control. The EPA has since compiled all listed toxics, revised them according to the new controls and re-announced them. Apart from classifying toxics according to their toxicity characteristics, minimum quantity and

concentration levels for each toxic chemical were also announced. Users of toxics in quantities or concentrations below minimum levels can be subject to looser regulations.

The *Toxic Chemical Substances Control Act* amended in November, 1997, added group and quantity mechanisms to toxic chemical (hereafter referred to as toxics) control. Group controls classify toxics according to their toxicity characteristics into the following groups that are regulated accordingly:

1. Type I (environmentally persistent toxicity)
2. Type II (chronic toxicity)
3. Type III (acute toxicity)
4. Type IV (potential risk)

The EPA compiled toxics listed over a period of more than six months and announced toxicity group classification and use of 64 listed toxics groups on July 7 which brought all announced toxics under the control of the *Act*.

The key change in the new announcement was the establishment of toxicity groups. The EPA announced that each toxic chemical would be classified as Type I, II, and III according to its toxicity characteristics and would be regulated accordingly.

In addition, toxics that have the same toxic element and therefore are regulated together are classified with the same number. For example, #55 toxics contain chromium trioxide, potassium dichromate, sodium dichromate and all chromides with Cr (VI), #46 contain cyanide with free CNy and #35 contain aniline and its salts.

Another change was the setting of minimum control levels. Although some toxics have minimum quantity control levels, all have minimum concentration control levels. If the total quantity or concentration of toxics used at any time or place falls below the minimum levels, toxics users can report to the local competent authority for exemption from Articles 8, 11, 16 and 17 of the *Act*.

Past EPA toxics announcements stipulated that users of toxics in concentrations below minimum levels would be exempt from regulation. The new announcement establishes a three-tier system of minimum concentration controls. Users of cadmium, for example, in concentrations below 1%, between 1% and 5% or above 5% would be exempt from regulation. Those users regulated but not listed for quantity control limits or be subject to full regulation respectively.

Apart from group and quantity controls, the new announcement also adds prohibited uses to some toxics. For example, toxics containing mercury are prohibited from use in grain insecticide manufacture. Toxics containing sulfcadmium are prohibited from use in plastic dyes. Toxics containing benzene are prohibited from use in hexachloro-cyclohexane. Toxics containing chloroform are prohibited from use in fire retardant and in 1999, toxics containing sodium dichromate will be prohibited from use in water treatment agents (chromide system anti-corrosive).

The new announcement also revised toxic chemical management measures with the following key changes:

1. Strengthen use and release quantity reporting and management: Toxics users must declare basic information within 30 days of the new announcement and register use with the local competent authority in accordance with regulations. Users of toxics in quantities above a specified level must also annually declare release quantities.

2. Information release principles: Users of Type I, II and III toxics in quantities above a specified level must submit a harm prevention and response plan to the local competent authority which must be made available to the general public for reference.
3. Organizations using toxics prior to the recent announcements were required to complete container package, use site and facility sign improvements prior to July 31, 1998. Holders of manufacturing or import permits are exempt from permit change if they submit documents to the local competent authority prior to April 30, 1999.

Holders of vendor permits must apply for permit change prior to April 30, 1999. Organizations using toxics prior to the recent announcements that have a toxics permit, valid registration document, have completed basic toxics information declaration registration, or that should apply for registration or a permit must apply to the local competent authority for registration or approval prior to December 31, 1998.

The new announcement abolishes controls governing the original 64 groups and 114 types of toxics and sets the basis for all toxics control in the future.

EPA Middle Management Reshuffled

The EPA recently reassigned its Division Directors to broaden their ability to analyze diverse environmental issues and to cultivate a cooperative spirit between Divisions.

On July 1, the EPA recently reassigned 14 EPA Division Directors or 47% of some 30 total positions. Affected Bureaus included Air Quality Protection and Noise Control, Water Quality Protection, Solid Waste Control, Toxic Chemicals Control, Comprehensive Planning and Performance Evaluation and Dispute Management. Plans originally called for one Division Director from each Bureau to move to another Bureau and resulted in at least every second Director trading seats with another. The list of candidates originated from the personnel department where suggestions from each Division Director were submitted. The list was discussed by all relevant parties and signed and approved by the EPA Administrator (see Table).

Candidates were chosen by General Directors according to years of service, job fit and relevant educational background. The primary reason for most reassignments was to give Directors a chance to broaden their knowledge of diverse environmental issues.

Division Directors bear the two-fold pressure of policy formulation and technical implementation. This position is therefore an important and trying link in EPA operations. Professional ability is important in environmental affairs, but the diverse nature of environmental problems makes cooperation between personnel of different disciplines and across Divisions essential to solving such problems. The EPA hopes the reassignments will strengthen Division Directors' capability to analyze "big-picture problems" and cultivate a spirit of cooperation to raise administrative efficiency.

The EPA will study the viability of the present Division Director structure and may make a second round of reassignments in the next six months.

<i>Name</i>	<i>Former Bureau and Division</i>	<i>New Bureau and Division</i>
陳文德 Chen Wen-Te	Toxic Chemicals Control, Division IV Director	Toxic Chemicals Control, Division II Director

林建輝 Lin Chien-Hui	Toxic Chemicals Control, Division II Director	Toxic Chemicals Control, Division I Director
馬念和 Ma Nian-Ho	Water Quality Protection, Division II Director	Water Quality Protection, Division I Director
張莉珣 Chang Li-Hsun	Water Quality Protection, Division I Director	Water Quality Protection, Division II Director
宋以仁 Song Yil-Ren	Solid Waste Control, Division III Director	Solid Waste Control, Division II Director
黃基森 Hwang Ji-Sen	Solid Waste Control, Division II Director	Solid Waste Control, Division III Director
牟麗娥 Mou Lih-Er	Comprehensive Planning, Division I Director	Comprehensive Planning, Division II Director
邱濟民 Chiu Chi-Ming	Performance Evaluation and Dispute Management, Division I Director	Air Quality Protection and Noise, Control, Division IV Director
張永裕 Chang Yung-Yue	Toxic Chemicals Control, Division I Director	Water Quality Protection, Division III Director
黃揮原 Hwang Hui-Yan	Solid Waste Control, Division IV Director	Comprehensive Planning, Division I Director
劉瑞祥 Liu Jui-Hsiang	Water Quality Protection, Division III Director	Toxic Chemicals Control, Division IV Director
蘇國澤 Su Guo-Zer	Air Quality Protection and Noise Control, Division IV Director	Solid Waste Control, Division IV Director
曾正茂 Tseng Cheng-Mao	Comprehensive Planning, Division II Director	Performance Evaluation and Dispute Management, Division I Director
賴瑩瑩 Lai Ying-Ying	Solid Waste Control, Division I Senior Specialist	Solid Waste Control, Division I Director

News Briefs

EPA Takes Over UV Ray Forecasting Efforts

Following completion of a trial year of ultraviolet (UV) ray forecasting by National Taiwan University's Global Change Center and the Environmental Quality Committee, the EPA in July took over daily forecasting work and ongoing expansion efforts. The EPA plans to install 10 to 12 systems in 1999 and more in each successive year as part of efforts to establish a comprehensive UV ray forecasting network in Taiwan.

Fuel Sulfur Content Limit to be Lowered In Pingtung County

To improve air quality in the Kaohsiung-Pingtung Air Quality Area, the EPA recently concluded discussions with relevant agencies to bring stationary pollution source fuel sulfur content in Pingtung County under control and reduce its lower limit from 0.1% to 0.05%. The lower limit, which uses the new emission volume based air pollution fee rate levy method will save firms about NT\$100 per kiloliter in fees. The measure will be announced in July and implemented in August at which time Pingtung County will be

the ninth administrative region to have such a limit, following Taipei City/County, Kaohsiung City/County, Keelung City and Taoyuan County.

Taiwan Makes Contributions During “Year of the Ocean”

In June, 1998, Taiwan was appointed “lead shepherd” of the APEC Marine Resource Conservation (MRC) Working Group for a two year term. To carry out related work, Taiwan established an MRC Working Group Secretariat (WGS) composed of marine resource conservation academics, experts and relevant authorities. At its first meeting convened by the EPA, the WGS resolved to carry out the major resolutions reached at the 11th APEC Marine Resources Conservation (MRC) Working Group Meeting. Resolutions relevant to Taiwan included the organization of a Marine Information Symposium held in Taipei in July, 1998, the promotion of the Coastal Integration and Management Plan and the Land Source Activity Marine Environment Pollution Prevention Global Action Plan and assistance with the filming of an educational movie entitled “Marine Resource Protection.”