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Executive Yuan Approves Draft Amendments to Noise Act

The ROC Executive Yuan recently approved amendments to the *Noise Pollution Control Act*. Revisions to the Act strengthen controls on all types of sites, as well as noise generation in residential areas. The draft revisions set control standards based on site type, noise source, and location. In terms of penalization, the new amendments also strengthen the authority of environmental agencies. The draft amendments will now be sent on to the Legislative Yuan for review.

On January 19, the Executive Yuan approved draft amendments to Taiwan's *Noise Pollution Control Act.* This round of amendments is the first time the Act has been updated in eight years. The contents of the Act has been increased from 4 Chapters and 26 Articles to 8 Chapters and 66 Articles. In addition to updating existing articles, the revisions include new controls on low-frequency noise pollution sources. This would include machinery such as water cooling towers, air coolers, and air conditioning systems, as well as on bothersome noise sources such as firecrackers and indoor remodeling.

The proposed amendments shifts responsibility for the subsidy, distribution and administration of the aircraft noise control fee to competent aviation authorities, and relegates environmental agencies to the delineation of aircraft noise prevention zones. It is expected that these amendments will be submitted for review to the next session of the Legislative Yuan.

Taiwan's *Noise Pollution Control Act* was promulgated in 1983 and later amended in 1992. Over the past 8 years, living conditions in Taiwan have evolved but noise pollution controls have not kept pace. In response, the EPA added a number of regulatory articles that address recent societal changes. In terms of work site controls, the EPA has expanded the scope of control from "work sites, construction and equipment" to encompass all site types. Additionally, noise control standards have been defined according to type of work site, nature of the noise, control areas, and control periods.

The draft amendments have also taken into consideration noises that may disturb the peace. In addition to setting controls on the activities that generate such noises, the amendments also target sources of low-frequency or temporary noises such as air coolers and air conditioning systems. Even though such noises may be low in volume, they still impart discomfort, and therefore the amendments have brought such noises under the scope of control.

Also worth noting are changes that have been made to noise pollution inspection procedures. Because noises are ephemeral in nature, and because noise levels are often reduced when pollution inspectors arrive, 70% of noise complaints cannot be appropriately verified. This has posed a great deal of difficulty in the inspection and prosecution of violators. The new amendments address this by allowing inspection personnel to order facilities suspected of generating noise pollution to turn on the equipment in question while inspectors are present. Should the Legislative Yuan pass the amendments, this approach will become the basis for inspection and penalization.

Discussions Held on Draft of Technical Guidelines for Toxic Substance Risk Assessment

In order to standardize environmental impact assessment (EIA) of toxic substances, the EPA proposed draft technical specifications for toxic substance risk assessment. In the future, EIAs for development activities involving designated toxic substances must include a health risk assessment performed according to specifications in the draft. Draft content includes, the assessment models, parameters, procedures and methods, and stipulates that quantified risk assessment must include carcinogens, non-carcinogens, and acute toxicity, three different types of health risk.

On December 14 the EPA called a meeting to discuss draft technical guidelines for toxic substance risk assessment. Relevant organizations and representatives from companies involved with carrying out environmental impact assessments (EIA) were invited to discuss the contents of the draft.

According to the EPA draft, during future EIAs of development activity, if after project completion regular operation will result in emissions of designated toxic substances that pose a threat to the health of exposed residents, a health risk assessment must be carried out in accordance with the draft specifications.

The assessment process is site specific and consists of seven steps: (1) description of facilities, (2) modeling, (3) selection of exposure pathways, (4) calculation of toxic substance concentration, (5) estimation of exposure quantities, (6) risk quantification, and (7) analysis of uncertainties.

The current draft stipulates a general assessment scope of 6km from the pollution emitting facilities. However, if a legally designated water source protection zone or water systems related to a water sources are involved, the assessment scope will most likely be extended to 10km or even further.

The draft designates different mathematical models to use when calculating risk, which vary based on the different environmental mediums involved. When

choosing a model, organizations performing an EIA should state their reasons for selecting that model and the usage criteria. If an organization chooses to use a non-designated model, materials must first be submitted to and approved by the proper environmental agency.

After modeling is completed, the draft stipulates that assessment of exposure quantities must include inhalation, ingestion, and skin contact as pathways for the introduction of toxic substances to the human body. Furthermore, the quantified risk value must include carcinogenic and non-carcinogenic health risk, as well as risk from acute toxicity.

Because these specifications are highly technical, representatives from companies which perform EIAs were mainly concerned with it's feasibility. The EPA stated that it would consider recommendations from all parties and make further revisions to the draft, after which the EPA will call another meeting of relevant organizations for further discussions.

EPA Announces Principles for Approving Subsidies to Home Appliance Recycling Facilities

The EPA has set guidelines for reviewing sites that apply for subsidies to recycle home appliances. Organizations that wish to apply must provide a promissory note for 3 million NTD. Once approval has been granted, recycling firms will be required to collect appliances from specified locations within one months time. The subsidized quantity approved in the application will be from one to three times a firm's permitted treatment quantities.

To encourage the recycling of discarded home appliances, the EPA on December 15, 1999 announced the *Principles for Approving Home Appliance Treatment Applications*. Firms applying for subsidies to recycle home appliances need to follow these principles.

According to the EPA's announcement, discarded appliances which fall under the scope of these principles include television sets, washing machines, refrigerators, and air conditioners. When applying for subsidies, interested firms must submit proof first that they have the capacity to process televisions and refrigerators and must either—

1. be a certified public or private home appliance treatment organization
2. be a permitted resource recovery factory for discarded home appliances, or
3. conform with other EPA approval methods.

To ensure that applicants process home appliances in accordance with regulations, they are also required to sign a one-year promissory note in the amount of 3 million NTD.

In terms of subsidy amount limits, firms can be eligible to receive subsidies for one to three times their permitted treatment volumes. The total amount treated, however, cannot exceed 100,000 units. Firms that currently treat less than their permitted volumes, or under 50,000 units, can apply for the subsidy provided they present valid certification from an auditing/certifying organization.

Subsidies will be granted for use within a certain time frame. Within a month of being notified that their subsidy application was approved, firms must collect discarded appliances from specified locations. Appliances not collected within this time frame will not be covered by the subsidy. Moreover, firms that cannot within three months properly treat the volume for which they applied will have a corresponding sum of money deducted from their promissory note balance.

The EPA further indicated that subsidies will be available until the current stockpile of collected appliances has been exhausted.

PET Bottle Deposit to be Lowered

During a public hearing at the Legislative Yuan it was indicated that the deposit currently offered for recycling of PET bottles will be reduced to 0.5 NTD per bottle. Although PET bottle recycling rates are now extremely high, the reduction was partially due to a growing deficit in the Resource Recycling Fund. The Solid Waste Bureau will consider totally doing away with the deposit in another six months, in which case a "lottery" system would be established to encourage recycling.

At a January 18 "State of the Recycling Fund" public hearing at the Legislative Yuan, Director General of the EPA's Bureau of Solid Waste Control, Shu-Chiang Fu, indicated that in March or April, the EPA will reduce the recycling deposit rate for PET bottles to 0.5 NTD per bottle. Following another review of the situation in half-year's time, the EPA may consider dropping the PET bottle deposit system all together. This change in policy has been precipitated by the maturation of the PET bottle recycling market. Moreover, the current deposit stimulates a very high rate of

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return of the bottles which is resulting in serious overpayments from the recycling fund.

Assistant Executive Secretary of the EPA's Resource Recycling Foundation, Chih-Hsiu Shen, indicated that when Taiwan's recycling system was first initiated, there was only one legal processing firm. At that time, PET bottle manufacturers had to subsidize the recycling process. However, after many years of recycling promotion, bottle recycling channels have become very mature. Recycling firms now pay for collection of waste PET bottles. In light of these developments, it is necessary to review whether the bottle deposit system should be continued.

In addition, the PET Bottle Recycling Fund runs a monthly average deficit of more than 40 million NTD. This large overdraft is mostly due to the discrepancy between the rate structure for subsidies given out by the Recycling Fund and the rate structure for fees collected by the Fund from manufactures. The deficit is further exacerbated by underreporting of business volumes on the part of the PET bottle producers.

Reports indicate that out of the few materials for which deposit systems have been established, only the recycling rate of PET bottles remains very high – about 140%. In addition to establishing a special task force that can enforce auditing of under reporting, the EPA is also reviewing the benefits of the deposit system. Director General Fu recently stated that it is necessary to reconsider a system that utilizes deficit spending to achieve high rates of recycling.

The Bureau of Solid Waste Control is also looking into a complementary program to lessen the impact that removal of deposits might have on the entire recycling system. This program would create a lottery system much like the one used to encourage customers to ask for purchase receipts. The public will earn award coupons when waste bottles are delivered to recycling points. The coupons will contain numbers, and winning numbers with monetary prizes will be announced periodically.

Installation of Gas Vapor Recovery Equipment to be Strictly Enforced

Volatile organic compound (VOC) emissions from Taiwan's 1,800 gas stations comprise 6% of total stationary source VOC emissions islandwide. Recently, the EPA has been financially assisting gas station operators to install VOC recovery equipment. This assistance will end in March of this year, however, and the EPA has already drafted regulations requiring the installation of such equipment. The EPA will steadfastly enforce compliance on this issue.

Taiwan has a total of 1,800 gas stations. Annual fugitive volatile organic compound (VOC) emissions from these facilities exceed 28,000 tons. This is more than nine times the amount of VOCs emitted by Taiwan's semiconductor industry and seven times the amount emitted by all dry cleaners across the island. Six percent of all stationary source VOC emissions in Taiwan originate from gas stations. To address this problem, the EPA in March 1997 began a three year program to assist gas station operators to install vapor recovery equipment. To date, more than 600 million NTD has been provided in subsidies. Following expiration of this program in March of this year, installation of such equipment will be strictly enforced.

To test gas station VOC emissions, the EPA contracted the Center for Industrial Safety and Health Technology (CISH) of the Industrial Technology Research Institute to sample vapor emissions from 52 gas stations. The testing showed that ambient air in and around gas stations that have not installed vapor recovery equipment contains benzene at average concentrations of 0.45 parts per million (ppm). These levels clearly exceed the International Workplace Health and Safety Association standards of 0.1 ppm. Gas stations that have installed vapor recovery equipment, on the other hand, have benzene levels about ten times lower – 0.05 ppm – in surrounding air. The aforementioned study also looked at worker exposure levels and found that vapor recovery equipment reduced such exposure by more than 80%.

Gas station VOC emissions contain a range of substances harmful to human health such as benzene, toluene, xylene, and styrene. Of these, benzene is the most toxic and has been proven to be carcinogenic. It also leads to high blood toxicity, system toxicity, and gene toxicity, and can cause leukemia and damage human chromosomes. To reduce exposure on the part of the workers and neighboring communities, public health experts and environmental groups are urging the government to require gas stations to install vapor recovery equipment.

Since 1993, the EPA has been pushing gas stations to install vapor recovery units on fuel nozzles, and on March 13, 1997 the EPA began providing subsidies to gas stations to do so. For station operators that voluntarily installed vapor recovery systems, the EPA made available annual subsidies. These, however, will stop

on March 12 of this year. To enforce compliance with equipment requirements, the EPA recently completed draft regulations. These controls will target gas stations with higher sales volumes and will be phased in over several years.

The EPA stated that 773 gas stations have already installed nozzle vapor recovery equipment and that VOC emissions have therefore been reduced by 12,200 tons. This amount comprises about 55% of total gas station VOC emissions. Only a few private gas station operators have maintained an attitude of resistance and chosen to violate the rights of their workers and neighboring communities to breath clean air.

Because environmental awareness of the general public has been growing rapidly, the EPA has been cautiously urging gas stations that have not installed vapor recovery equipment to face the truth. The public may soon protest such stations or even demand compensation from them. The EPA's job is to ensure environmental quality and the health of the people and will, therefore, resolutely enforce vapor recovery equipment requirements. The EPA has made it clear that it will not back down on this point.

Mandatory Recycling of Fluorescent Lightbulbs On the Way

Because discarded fluorescent lightbulbs contain mercury they have a significant impact on the environment. Although fluorescent lightbulbs have been a mandatory recycling item, the EPA did not enforce it due to the immaturity of recycling techniques. Now as these techniques reach maturity, the EPA is working on a plan for comprehensive recycling of fluorescent lightbulbs. As far as recycling channels are concerned, the EPA plans to use the lightbulb take-back channels already established by businesses in coordination with local trash clearance systems.

Because fluorescent lightbulbs are glass products that contain mercury and fluorescent brightening agents, as far back as August of 1990 the EPA classified them as municipal waste that should be recycled, according to Article 11, Section 2 of the *Waste Disposal Act*. However, due to a dearth of basic information and immature management techniques, no recycling regulations were announced for fluorescent lights at that time.

However, because of outside concerns about the environmental impact of fluorescent lightbulbs, the EPA began a series of research on the problem. As conditions become ripe, the EPA has proposed a new recycling program for fluorescents, and on December 21 called a public hearing to gather outside opinions on the issue.

During the public hearing the EPA proposed three possible alternatives for the program:

1. Fluorescent lightbulb recycling program: Only fluorescent lightbulb products are listed for recycling and require application of the recycling mark.

2. Mercury containing lightbulb recycling program: Only lightbulbs containing mercury (including fluorescents and other high intensity bulbs) are listed and require application of the recycling mark. Would also include increased in public education as to which bulbs must be recycled.

3. Comprehensive lightbulb recycling program: Recycling of all lightbulbs (including fluorescents, high intensity, and regular lightbulbs). Bulbs with higher mercury content would require higher disposal fees and application of a special recycling mark. This would encourage businesses to manufacture or import low mercury bulbs and remind the public to use low mercury bulbs as well.

As far as the recycling system, the EPA has taken into account that in the current Taiwanese production and marketing system, 100% of lightbulbs are sold through consignment. As a result, most domestic producers have had some type of product take-back system instituted for many years. For this reason, the EPA has given priority to assisting consignees make use of these take-back channels in coordination with local trash collection to carry forward comprehensive recycling.

In response to the EPA's proposal, representatives at the December 21 public hearing, including industry, local environmental agencies and environmental groups, almost without exception approved of the third proposed program for comprehensive lightbulb recycling. Only in regards to the actual recycling system to be implemented was their no clear consensus between the various parties. In terms of the processing of waste lightbulbs, because there are of yet there no qualified processing agencies, the EPA pointed out that they would first look at existing foreign technologies and then assist in the set-up of professional lightbulb recycling plants.

Due to the lack of organizations capable of processing discarded lightbulbs, the EPA stated that it will first form a working group with the Industrial Development Bureau, the Industrial Technology Research Institute and other Taiwanese industry representatives to plan the opening stages of lightbulb recycling. The first stage will focus on overall planning for the fluorescent bulb recycling system and processing organizations.

Feature Article

Toxic Chemical Management: Past Achievements and Future Policy

The EPA has already listed 199 types of toxic chemicals to guard against the many dangers posed by these substances. Future policies will focus on the management of toxic substance use, hazard prevention and disaster prevention and response.

Toxic chemical substance (TCS) management in Taiwan began on January 26, 1986 with the promulgation of the *Toxic Chemical Substances Control Act*. After 10 years of regulating TCS, on November 29, 1997 extensive revisions were made to the original Act. Some of the major revisions include:

1. Adoption of a TCS classification system
2. Adoption of a quantity based TCS management system
3. Adoption of permit, registration and simple approval systems
4. Stricter regulations for disaster prevention and response
5. Stronger fines to discourage violations

To tighten the TCS screening and management system, on August 1, 1997 the EPA announced the *Guidelines for Screening Toxic Chemical Substances*, which increased the transparency of the TCS listing process. Because enterprises can obtain in advance the names of chemicals being considered for listing, they are able to prepare for possible changes at an early stage and lower the impact to their business. As of the end of 1999, the EPA has listed 199 types of TCS. Among these, 44 are banned from use, and 35 are listed as Class IV TCS (suspected toxics). Furthermore, in the near future over 50 additional types of TCS will be listed, a pace abreast of Europe, the US, and Japan.

As TCS management comes on track, over the next two years EPA policy will focus on:

1. Picking up the pace of TCS listing
2. Strengthening management, auditing and assistance for the use of Type I-IV TCS
3. TCS hazard assessment and prevention, and building of materials flow data
4. Implementing TCS disaster prevention and response plans
5. Promoting risk management and disaster prevention in the use of TCS
6. Progressively building disaster prevention and response techniques for all TCS items; fortifying disaster response organizations; and establishing mechanisms for disaster recovery and remediation

Long-term TCS management policies will focus on formulating a total-quantity-control system for TCS release, expanding the TCS toxicology database, establishing environmental background data for Taiwan, and assessing domestic environmental exposure. In addition, efforts will be made to carry through short term work begun on the TCS risk management and disaster prevention system; the building of disaster prevention and mitigation skills for all TCS items; and establishment of mechanisms for disaster recovery and remediation. At the same time, in order to fulfill its international responsibilities, the EPA will strengthen control of illegal production, export and sale of TCS in accordance with international conventions.

First Privately Run LPG Station in Greater Taipei Opens

The difficulty in setting up liquid petroleum gas (LPG) fill stations has created a bottleneck in getting LPG cars on the road. In response, the EPA has worked with the Ministry of Economic Affairs and other agencies to loosen up regulations that increase the willingness of businesses to apply to set up LPG fill up stations.

Greater Taipei's first privately run liquid petroleum gas (LPG) fill up station began service for taxicabs on December 23. The EPA noted that promoting LPG as a fuel for motor vehicles is an important policy for the agency. To speed up the process, on July 13, 1995 the EPA announced administrative guidelines for subsidizing the upgrade or substitution of regular cabs for LPG ones. The guidelines use economic incentives from the Air Pollution Fund to encourage cabs to switch to LPG.

The EPA points out that from the opening of subsidies up until November of 1999, subsidies have been given to help a total of 24,539 cabs switching over to LPG. Of these, 14,238 were in the Greater Taipei area, 8,655 in Taipei City, and 5,583 in Taipei County.

However, because the number of LPG refill stations has not grown apace of the number of LPG cars, promotion of LPG vehicles has hit a bottleneck. The EPA has actively offered suggestions to the Energy Commission of the Ministry of Economic Affairs (MOEA) on how to break through the current impasse. These suggestions have been aimed at revision of unreasonably strict regulations that would help out LPG taxis with no place to refill. After a number of meetings and negotiations between various departments, the regulations governing set up of gas stations and

LPG stations have been revised. Now, gas stations and LPG stations can be set up together and the total required area reduced significantly. Furthermore, the installation of private LPG storage facilities has been permitted so that shipping and construction industries, factories or other organizations can install such facilities with central government approval.

The EPA noted that the regulatory revisions have significantly raised businesses willingness to set up LPG stations. Currently, three model LPG stations have been set up and commissioned by the China Petroleum Corp. (CPC) in Taipei City, Taichung City, and Kaohsiung, as well as one station in Chiuching (Tainan County). The LPG station on Binchiang Road in Taipei, which began operations on December 23, 1999 is the first privately run LPG station in the Greater Taipei area, and can service over 1,600 gas powered vehicles per day.

Stricter Emergency Response Regulations Proposed for Toxics Shipments

Two accidents involving the shipment of toxic chemical substances last year have forced the EPA to plan stricter disaster response controls. Factories will have to reformulate emergency response plans and strengthen training for shipping companies. In addition, the EPA will consider changing the law to require companies have someone on site within 30 to 60 minutes of the accidents occurrence. The changes would also encourage companies to use joint response systems and move towards plans for a three tiered response organization.

The EPA has recently quickened the pace of toxic chemical substance (TCS) listing. As the number of listed TCS progressively grows, the how to prevent potential accidents has become a TCS management priority.

For example, last year there were two separate accidents in May and October involving shipments of vinyl chloride monomers (VCM). In the May accident, a VCM shipping truck was involved in an accident but without any leakage. In the October accident, a broken safety valve that leaked VCM required emergency response, traffic control and inter-industry support to resolve the problem.

After these two incidents, on December 15 the EPA called the companies involved to examine their disaster prevention and response measures. After hearing out their responses, the EPA observed that although they had immediately informed local environmental agencies after the accidents occurred, emergency response personnel arrived late on the scene making it obvious that their disaster prevention and response measures were not fully in place. Under these circumstances, the EPA asked the companies to redraw their emergency response plans, after which the EPA would invite experts to review them. If necessary, the plans may be provided to other companies for reference.

The EPA's Bureau of Environmental Sanitation and Toxic Chemicals Control pointed out that emergency response plans developed by most companies are geared towards internal factory scenarios. However, if an accident occurs while TCS are on route, because the accident site is removed from the source factory, emergency response plans never have a chance to come into play. For this reason, there is a need for companies to join with operations of a similar nature and form joint response systems to provide mutual assistance.

An official noted that disaster response systems can be divided into three levels. The first level is a simple inquiry system that provides information over the telephone on how to handle accidents. The second level is used to dispatch experts with experience handling accidents immediately after occurrence to provide information onsite. The third and highest level provides experts and equipment to undertake actual onsite treatment work.

Recently, under the urging of the Taiwan Responsible Care Association and the Industrial Technology Research Institute's Center for Industrial Safety and Health Technology (CISH), a number of chemical industry companies jointly participated in establishing a level one disaster response information system. Furthermore, this year an EPA plan commissioned to CISH will begin work establishing a level two response system.

However, to truly get disaster prevention and response in place, the EPA emphasizes that companies must unite with organizations of a similar nature to form a joint system for mutual support. In the future, this should move towards the establishment of a full three level system. The EPA stressed that because the timing is not yet right in Taiwan, in the short term more assistance will be provided to help companies with response systems, but in the future the EPA will consider legal amendments making joint response systems mandatory.

Furthermore, the Toxics Bureau noted that in regards to emergency response time, the EPA is considering further legal revisions to require companies provide an onsite response within 30-60 minutes of an accidents occurrence.

EPA Studies Control Policies for Environmental Hormones

Due to outside concerns over the danger of environmental hormones, the EPA has announced that of 70 suspected environmental hormones, controls have been placed on 17 that are apparently toxic and another 22 have been listed for screening. In the future the EPA will look at the results of tests and assessments from abroad as the basis for further controls.

Broad press coverage of a recent symposium on environmental hormones organized by Taiwanese environmental groups has drawn public concern over the dangers posed by these substances. The Bureau of Environmental Sanitation and Toxic Chemicals Control expressed that, in fact, control of environmental hormones is already underway in Taiwan.

The term "environmental hormones" refers to a group of substances classified as external endocrine disrupters that can interfere with an organisms' normal physiological functioning. All mammals (including humans), birds, fish, and invertebrates have endocrine systems, made up of glands and hormones. Because certain chemical substances found in the environment act much like hormones, if taken into the body they may be assimilated by internal organs where they emit false biochemical signals that may disrupt important physiological functions, such as reproduction and growth. Because these substances are not created through internal bodily need, but enter the body through the external environment, Japanese scholars have designated them as "environmental hormones."

The EPA noted that prevention of hazards from environmental hormones involves the control of source materials, improvements to the manufacturing process, understanding the effects to human or animal body functions and possible exposure pathways, establishment of screening and testing techniques, pollution control and legal amendments. Because this effort implicates a wide range of bodies and regulations, cooperation between government agencies, industries and academic circles is essential. With properly timed consultations on legal amendments or control methods, Taiwan will be able to meet standards similar to those in advanced nations.

The EPA expressed that although environmental hormones are now a hot topic, they require a tremendous amount of human and material resources to research. To make matters even more difficult, even the effects of suspected substances are not clear. For this reason the EPA leans towards following research and control developments abroad and making any necessary responses. The EPA has already commissioned academic organizations to organize a symposium on environmental hormones to gather materials, however further controls on environmental hormones will depend on the course of developments abroad.

EPA Phases Out Leaded Gas Vehicles

In light of the prohibition on the sale of leaded gasoline in Taiwan, in October of 1999 the China Petroleum Corporation made available a lead-substitute fuel additive. However, the EPA is urging owners to replace vehicles that require leaded gasoline as soon as possible due to their higher emissions levels.

On January 1, islandwide controls came into force banning the sale of leaded gasoline, and the EPA has again reminded owners of vehicles burning leaded gasoline to quickly upgrade to vehicles that use unleaded gasoline.

Lead has been proven to cause nerve-muscle disorders, anemia, kidney disease, and high blood pressure, as well as to slow brain development in children. After the major source of lead emissions was identified as tetraethyl lead-containing gasoline, many countries throughout the world implemented bans on leaded fuel.

In Taiwan, unleaded fuel first became available in 1986. By April 1987, a policy to completely replace leaded with unleaded fuel entered its initial phase. As part of this policy, the EPA informed automobile manufacturers that they should perform advance hardening treatment on all engine valves in preparation. On July 1, 1990 all new cars sold in Taiwan were required to run on unleaded fuel, and on January 1, 2000 a complete ban on leaded gasoline was brought into effect. In commenting on this policy, the EPA indicated that this ten year lead time should have provided sufficient time for vehicle owners to upgrade to unleaded fuel cars.

As for leaded fuel vehicles still on the streets, the EPA has stated that most of these can directly use unleaded fuel. Cars and motorcycles produced after January 1, 1988 should all have received engine valve treatment. Only about 70,000 cars that cannot burn unleaded fuel remain on the road today, and although the number for motorcycles older than 11 years is not known, it is likely not very large. Moreover, two-stroke motorbikes lack valves and should therefore not suffer from engine valve problems.

People that do not desire to replace their vehicles can continue to drive their cars provided they take certain measures. For example, they can have their engine valves hardened so that they can then burn unleaded fuel without damaging their engines. Also, the

China Petroleum Corporation (CPC) will made available a lead substitute additive in October of last year. This additive prevents engine valves from becoming worn.

In addition to the lead emissions problem, leaded fuel vehicles are also more likely to lack catalytic converters. These cars and motorcycles can only comply with first phase emissions standards. Even if they were maintained in top condition, they could still not comply with the second and third stage, hydrocarbon, and nitrogen oxide emissions levels. For the sake of clean air, therefore, the EPA hopes that all car owners will seek to comply with the new regulations by phasing out use of their older vehicles.

Hybrid-Electric Busses Hit the Streets

In an effort to improve air quality, the EPA has been implementing a "hybrid-electric bus program." On January 21, the first of these busses rolled onto the streets of Taipei as part of the demonstration phase of the program. Depending on the reaction of commuters and the city government, full-scale use of the busses should proceed in the near future.

In a concrete effort to improve urban air quality, the EPA has been formally promoting a "Hybrid-Electric Bus Program," and on January 21 of this year, the first busses rolled onto Taiwan's streets. To encourage public participation in the roll out of this program, and to provide a taste of this form of transportation, the EPA has implemented a web-based promotional program whereby the public can participate in a drawing for a free bus pass (the deadline for registering was January 17). Winners can ride for free on the new electric busses until the end of April this year.

Current city busses are all powered by diesel fuel, the emissions from which pollute the air and threaten public health. In the past, electric busses could only travel a limited number of miles before requiring a battery charge. The newest busses, imported from California, utilize hybrid-electric technology. Unlike diesel busses, when started up or near bus stops, the hybrids will not emit a large, polluting burst of exhaust. To supplement electric power, the busses utilize a 40 kilowatt diesel powered engine to drive an electric generator that charges the onboard batteries. Moreover, when braking, momentum is used to return a partial charge to the batteries. This energy can then be used for acceleration and maintaining forward momentum of the bus.

The EPA is currently undertaking a demonstration project with the Taipei City Public Transportation Bureau. Initially, the new busses will be used on the city's Number 20 route. For ease of dispatch, the bus project will be headquartered at the end of the Number 20 line, Sung-Teh bus station. Busses on this route stop at major points of interest in the city such as the World Trade Center, the Chiang-Kai Shek Memorial Hall, the Sun Yat-Sen Memorial Hall, and the Presidential Building. The EPA is also undertaking a commuter awareness campaign to encourage public participation. The public can log onto the EPA's website and apply to win a pass for riding the electric busses free of charge. The passes will be good between January 21 and the end of April.

The EPA's Bureau of Air Quality Protection and Noise Control recently stated that due to the large price of the hybrid-electric busses, only two can be put on the road for demonstration purposes. Bringing more into use will depend on the reaction of the public and the budget of local governments.

News Briefs

EPA Designates National Cleanliness Week

As a means of greeting the new year, the EPA has especially designated the week proceeding Chinese New Years Eve as "National Cleanliness Week." This year, Cleanliness Week fell between January 28 and February 3. To complement the custom of thorough house cleaning that occurs at the end of the lunar year, the EPA called on the general public to help clean up the environment. Important efforts included cleaning away of disease vector breeding sites (such as standing water) and properly separating and recycling refuse. The EPA also stepped up enforcement of the Waste Disposal Act's Article 7 which requires the proper clearance and handling of waste materials.

Environmental Police Make Strong Showing

On July 1, 1999, the EPA established the Environmental Protection Police Force as a means of strengthening regulatory enforcement. Three units of the Force were established in northern, central and southern Taiwan, and given the task of investigating high-profile pollution cases. By the end of December, the Force had penalized a number of violators of environmental regulations. Actions included issuing 319 administrative fines, delivering 134 cases to the courts for prosecution, and the arrest of 232 suspected violators. As a result, illegal waste dumping has already significantly decreased. Clearly, the effectiveness of the Environmental Police Force cannot be denied.

8th Annual Green Business Awards Announced

Results for the 8th Annual Green Business Awards were announced recently. At the awards, China Motor Corp. and nine other enterprises were honored for environmental excellence. Because the award encourages businesses to continue their good work in improving environmental performance, the EPA has continued to sponsor the award ceremonies and organize a seminar to exhibit the environmental practices of award winning companies.

To encourage companies to do better environmentally, on the morning of December 23 the EPA held award ceremonies for the 8th Annual R.O.C. Green Business Awards. The EPA also arranged for representatives from award winning companies to meet with the President and receive his personal words of praise.

According to the EPA Bureau of Performance Evaluation and Dispute Settlement, the award was designed by the EPA to commend industrial organizations that have made a contribution to environmental protection in Taiwan. The EPA also hopes that follow up activities to exhibit practices from award winning organizations will encourage other companies to follow their lead and establish industry models for exemplary performance. At the exhibit industries can learn from each other how to improve their pollution prevention techniques, and hopefully stimulate the determination and confidence necessary to raise environmental quality across the board.

Director General of the Performance Bureau, Te-Po Tung, pointed out that the R.O.C. Green Business Award began in 1992, and each year one nomination and commendation event are held. Nominees are chosen from organizations or companies in all industrial circles. As of the present, the Awards have been held for eight years and showcased a total of 90 companies that have demonstrated excellence in environmental protection. The environmental concepts seeded by these 90 companies have taken root in industrial circles, and statistics show that there are already over 560 organizations that have received ISO 14000 certification in Taiwan. That ranks Taiwan No. 5 in the world in ISO 14000 certification, and No. 2 in Asia where it is second only to Japan. The EPA believes that this phenomena can be linked to the promotion of the Green Business Award.

The ten organizations that received awards this year include: China Motor Corporation, Cheng Loong Corp.'s Miaoli Plant, Applied Materials Taiwan, Taiwan Sugar Corp.'s Nanchiao Sugar Plant, Taiwan Semiconductor Manufacturing Co.'s No. 2 Plant, Tuntex Petrochemicals Inc., Hsinnan Construction Co.'s Pintung Plant, Texas Instruments, TSMC.Acer Semiconductor Manufacturing Co., and Kuangyuan Paper Mafg, Co. Ltd.

The Performance Bureau noted that there were five main selection criteria for this years awards, including:

1. Environmental Planning and Management (including overall environmental planning and conduct, set up of dedicated environmental units and personnel training, and specific conduct in environmental management)

2. Promotion of Waste Reduction (including specific waste reduction and resource recovery and reuse practices, waste reduction measures, waste reduction system, management and training, conduct in waste reduction and specific accomplishments)

3. End-of-Pipe Treatment Results (including the state of investment in pollution prevention facilities, operation and maintenance conditions for pollution prevention facilities, pollutant emissions vs. emissions standards, efficiency of pollution prevention facilities and response measures, and audit and disciplinary records)

4. Waste Treatment and Final Disposal (including proper waste treatment, completeness of waste treatment facilities, maintenance of the environment surrounding waste treatment site, and R&D on waste treatment and final disposal)

5. Promotion of Environmental Concepts and Education (including conduct promoting environmental concepts, products promoting environmental concepts, and specific actions promoting environmental education)

Additionally, the EPA has designed a webpage and publication to display the accomplishments of this years award winners to the public. Sign up of candidates for the 9th Annual Green Business Awards will begin February 3, 2000, and all companies demonstrating excellence in environmental protection are welcomed to participate. In February, the EPA expects to hold a symposium to exhibit successful practices from this years award winners. The symposium will foster a meaningful exchange of experiences to prepare the way for even greater achievements in pollution prevention and environmental protection.

Drinking Water Protection Zones Now Viewable Online

Drinking water statutes require the delineation of protection zones for sources of drinking water. Currently, initial inspections have been completed on over 350,000 hectares of land considered for protection zones. Now the EPA has publicized data on the internet for those areas that have been confirmed as protection zones to provide timely access to accurate information. The public can now conveniently check this information online at anytime.

Information on water quality protection zones for

drinking water sources is now available online! *Drinking Water Management Statutes* in Taiwan require the delineation of water quality protection zones for sources of drinking water in order to ensure the safety and quality of the public's drinking water. At the present, under EPA direction, inspections have been completed on 350,000 hectares of land, and 126,000 hectares have already been declared as protection zones.

In the past, information about drinking water protection zones was often sought by businesses and academic agencies. To facilitate access and to cut copy and delivery costs, the EPA's Bureau of Water Quality Protection recently made this information available online, including the full listing document for each declared protection zone, and the scope and map of the protected area. The public need only get online and they can check all of the currently listed water quality protection zones for sources of drinking water and required well distances. The EPA notes that procedures to list those water protection zones that have not yet been announced should be completed successively over the next half year, and the information subsequently put online.

Additional protection zones are currently being drawn up for the special Taipei water source region (Taipei County), Touchien stream (Hsinchu County), the upper flow of the Tachia stream (Taichung County), and the upper flow region of the Wuhsi stream (Nantou County). Planning for these areas should be done before the end of the year 2000. However, because of last years "9-21 Earthquake" and resulting topography changes in central Taiwan, the completion schedule for areas located there is uncertain.

In addition, an EPA official pointed out that the greatest difficulty of the delineation process comes from public expectations for monetary compensation. Under this public pressure, work by local governments delineating protection zones has not proceeded smoothly. This makes improving local communications the key challenge for future management of water quality protection zones for sources of drinking water.

Quality of Life Ratings for Taipei, Kaohsiung Raised

In its annual survey of the most livable cities in Asia, *Asia Week* magazine significantly raised the ranking of both Taipei and Kaohsiung. The EPA indicated that due to appropriately targeted environmental improvement programs, the environmental factor of the magazine's ranking has greatly increased. This development has confirmed the success of Taiwan's implementation of environmental protection policy.

Since 1996, *Asia Week* magazine (published by CNN) has been ranking the most livable cities in Asia. In 1996, out of 40 major Asian cities, Taipei was ranked outside of the top ten. In 1997, Taipei moved into tenth position, and one year later, it jumped to fifth place. In the recently published results for 1999, however, Taipei was listed as the second most livable city in Asia. Kaohsiung has also been moving up in the listings, from fourteenth place in 1998 to eleventh place in 1999.

Categories	Overall Ranking Taipei	Kaohsiung
overall score	2	11
average income US$	8	6
educational spending	2	8
Pollution	7	20
hospital beds per 1000 people	7	8
criminal cases per 10,000	24	20
GDP growth	11	1
unemployment rate	6	12
average class size	6	14
life expectancy	4.0	10.0
commute time	9	36

Source: Asia Week, "Asia's Best Cities 1999"

The report accompanying the ranking pointed out that the air quality of the greater Taipei region had clearly improved. Several years ago, the deplorable state of traffic conditions in Taiwan's capital city made mobility into a test of patience. Rat infested heaps of rubbish obstructed sidewalks and air quality seemed to deteriorate daily. Taipei has turned the corner, however. Air quality has clearly improved, sidewalks are clean, and the amount of green space has dramatically increased.

According to *Asia Week*'s report, clean air, a vibrant economy, beautiful scenery, and abundant points of interest are the main criteria for selecting the "most livable cities." To develop an objective and comprehensive indicator, eight factors were considered and given varying weights. These included

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economic opportunity (15%), quality of education (15%), environmental quality (15%), health care (15%), communications and transportation (10%), personal safety (10%), affordability of housing (10%), and recreational opportunities (10%).

The EPA indicated that the environmental quality factor includes the following elements: total suspended particles, concentration of sulfur oxides (SO_X), and the ratio of wastewater treatment capacity to population size. The weighting of this factor was set at 15%. Despite the rapid growth of Taiwan's economy, air quality has been improving year-to-year due to the effective implementation of control measures. Pollutants for which concentration levels have been reduced the most include SO_X and particulates. This development contributed greatly to the boosted livability ranking of both Taipei and Kaohsiung.

According to EPA monitoring data, concentrations of particulate pollutants in Taipei's air were already fairly low, and over the past four years, levels have dropped 9% further (from 56 ug/M^3 to 51 ug/M^3). SO_X levels have declined 33%, from 9 parts-per-billion (ppb) to 6 ppb. Air quality in Kaohsiung has also been improving. Particulate levels have fallen 16%, from 92 ug/M^3 to 77 ug/M^3, and SO_X levels have declined from 20 ppb to 13 ppb, a drop of 35%.

EPA data suggests that the largest sources of particulate pollutants in Taipei include construction activities, road dust, oily smoke from restaurants and motor vehicles. SO_X pollution mostly comes from vehicle emissions and industrial activities. Sources of particulate pollutants in Kaohsiung are similar to those in Taipei, although the cement and steel industries also contribute. Sources of SO_X pollution in Taiwan's major southern city include such heavy industries as steel manufacturing, power generation, and petroleum refining operations.

In response to local variations in air pollution type and quantity, the EPA has been implementing improvement policies targeting specific air quality regions. In addition to deepening analysis of local pollution sources, more precisely calibrated control measures have also been undertaken. This approach has clearly resulted in significant achievements. And, as demonstrated by the higher rankings of Taipei and Kaohsiung in *Asia Week*'s survey, appropriate policies can concurrently enhance both environmental quality and economic development.

Upcoming Activity Notice

Green Purchasing Training Seminars for procurement personnel in government agencies will be held to introduce the new Government Procurement Act and the Greenmark
Place: Hsinchu and Tainan Science Parks
Time: March to June
Registration : Contact Mr. Ma (°¨¸gz), Environment and Development Foundation. Tel. (02) 2325-5223

Seminars on Promoting Multimedia Educational Software for UV Rays
Place and Time: Taoyuan, (March 11); Kaohsiung, (March 21); Taichung, (March 25)
Registration : Please contact Gu Gangchi (Åúfò) at the EPA's Bureau of Environmental Monitoring and Data Processing. Tel. (02) 2311-7722 xt. 2337

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Dr. Hsung-Hsiung Tsai, Administrator,
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Editor-in-Chief
Dr. Chea-Yuan Young, Director General,
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Editors
Dr. Y.F. Liang, Dr. Shawn Chang,
Lee-Kuo Hsiao, Bruce Berkman

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Environmental Policy Monthly
Environmental Protection Administration
Office of Science and Technology Advisors
41, Sec. 1, Chung-Hwa Rd.
Taipei, Taiwan, R.O.C.
tel: 886-2-2311-7722, ext. 2203
fax: 886-2-2311-5486
e-mail: epm@sun.epa.gov.tw

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