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Feature Article: Expanding Taiwan's Air Quality Monitoring Umbrella

In 1990, Taiwan began putting in place an air quality monitoring network. By 1998, in addition to establishing a monitoring center, the network has been expanded to include 72 air monitoring stations, two monitoring vehicles, and a quality assurance laboratory. The monitoring stations currently include general air quality monitoring stations, three industrial air quality monitoring stations, five traffic air quality monitoring stations, two air quality monitoring stations in national parks, and four background air quality monitoring stations. In addition to traditional monitoring, the EPA has also been actively promoting the development of community air quality monitoring stations as a means to gradually establish small-scale air quality monitoring data.

Since 1980, a total of 19 monitoring stations in urban areas across the island have been automatically monitoring air quality. Large-scale changes such as road expansions and the widespread construction of tall buildings, as well as other changes brought about by a rapidly developing society, have created difficulties for accurately sampling air quality in many areas of Taiwan.

Since its establishment in 1987, the EPA has been actively promoting air quality monitoring activities. In 1990, the EPA contracted a well-known foreign consulting company to begin planning the development of a Taiwan area air quality monitoring network. In developing this plan, the consulting company took into consideration Taiwan's population size, the distribution of emissions sources, the status of land use, and weather patterns. Initially, by September of 1993, the development of 66 air quality monitoring stations, two monitoring vehicles, a quality assurance laboratory, and a monitoring center had been completed. In 1998, the monitoring network was further expanded to include 72 monitoring stations.

The monitoring site plan calls for partitioning Taiwan into 200 grid cells and then determining the appropriate number of monitoring stations per cell based on each cell's population size and density, economic activity, and other special characteristics of the given locale. The efficacy of setup costs and operation and maintenance requirements will also be considered to determine station siting priority.

Currently, Taiwan has five different types of monitoring station. Most stations are general air quality monitoring stations and are mostly located in areas of high population density and in areas with relatively high pollution concentrations. Second most numerous are industrial air quality monitoring stations. These were sited

according to relative land area size of Taiwan's 70-plus industrial parks and the seriousness of air pollution in surrounding areas. Most were situated downwind from industrial parks with relatively serious air pollution levels.

Other types of monitoring stations include five traffic air quality monitoring stations situated in areas with high traffic flow levels. These stations provide information helpful in evaluating the effectiveness of vehicle exhaust control methods and determining the status of pedestrian exposure to exhaust gasses. Within two national parks in northern and southern Taiwan, two monitoring stations provide large-scale air quality data. There are also four background air quality monitoring stations. Two background monitoring stations are located in northern Taiwan and mostly monitor whether significant pollutants frequently drift over from neighboring countries. The other two stations are respectively located in areas upwind from Taichung and Kaohsiung metropolitan areas in order to provide background air quality readings for these areas.

The monitoring stations analyze a range of different constituents, such as sulfur dioxide, nitrogen oxides, carbon monoxide, ozone, particulate matter, and hydrocarbons. Weather characteristics, such as wind direction and speed, are also measured to help with air quality analysis. Traffic monitoring stations are equipped with traffic flow meters in order to analyze the relationship between traffic flow and pollution concentrations.

Monitoring stations also measure several other items. Stations are equipped with acid rain monitoring instruments to understand and track this increasingly serious global problem. Instruments to measure sunlight and atmospheric pressure have also been added in order to assist in air quality analysis and modeling. Other additions have included ultraviolet light (UV-B) sensors -- a program to be further expanded in 1999 -- and five instruments for measuring fine particulate matter (PM_{2.5}).

The EPA has recently stepped up promotion of community air quality monitoring because it significantly contributes to a better understanding of the exposure communities and the general public have to poor air quality. It also helps in the analysis of air quality in areas around major roadways, in densely populated areas, and in other areas where it is difficult to install monitoring stations.

In 1998, the EPA started planning a community air quality monitoring project using passive-style, portable personal air sampling instruments. Four communities near existing automatic air quality monitoring stations in the Greater Taipei and Kaohsiung areas were chosen for an initial sampling activity. Target indicators of the study include particulate matter (PM₁₀) and ozone. In the future, the EPA will establish domestic monitoring techniques for assessing pollution exposure and will continuously expand the scope of sampling and monitoring. These endeavors will

allow the EPA to create more accurate small-scale air quality monitoring data.

These developments have already put a new face on air quality monitoring in Taiwan. The current system has been completely automated, providing for 24-hour monitoring of air quality. The EPA will gradually improve the accuracy of air quality forecasting by actively promoting the research and development of forecasting models. The EPA will also promote the development of a long-term air quality monitoring database as a means to provide the most effective reference for setting air pollution control strategy and defining air quality standards.

A look inside the EPA: Bureau of Environmental Monitoring and Data Processing

According to the *Environmental Protection Administration Organization Statutes*, the EPA's Bureau of Environmental Monitoring and Data Processing is primarily responsible for the following activities: planning, directing, and supervising environmental monitoring activities; planning, operating, reviewing, and evaluating environmental protection information systems; operating and maintaining an environmental quality monitoring system; analyzing, processing, assessing, disseminating, safe-keeping, and utilization of environmental quality monitoring data and activities; directing and supervising the issuance of environmental quality warnings; and handling other matters related environmental protection monitoring and information.

In terms of organizational structure, the bureau has a Director General and a Deputy Director General under which there are four divisions. Each division has a Division Chief and division personnel.

The bureau's activities are divided into the two general categories of monitoring environmental quality and developing and maintaining environmental information processing software. The scope of the former activity primarily includes the following: planning and installing environmental quality monitoring systems; providing quality assurance and control and establishing operating systems for environmental quality information; setting the system for air pollution warnings and response mechanisms; researching techniques for monitoring data analysis and use; setting criteria for software development standards; researching, planning, and developing applied systems; planning and installing environmental information networks; and offering education and training for activities related to environmental monitoring and data processing.

The bureau's activities regarding software development and maintenance include establishing 27 items related to the structure of environmental information systems as a means to achieve the goal of environmental protection automation. The bureau's

mission is also to set up databases for environmental quality, pollution prevention, and environmental background data for use in the drafting of environmental programs. In order to achieve the automation of information flow within and between environmental agencies at all levels, the bureau is responsible for establishing a national environmental information network. Responsibilities also include establishing an environmental protection geographic information system, an environmental management information system, and an environmental policy support system. These systems are intended to act as references for drafting intermediate and long-term environmental plans and developing environmental management policies.

EPA Rigorously Handles Dispute Over Shipment of Mercury-Containing Sludge to Cambodia

Formosa Plastic Corporation's (FPC) illegal shipment of 3,000 tons of solidified mercury-containing sludge, classified by the Cambodian government as a hazardous substance, has led to fatalities and injuries. The EPA emphasized that FPC has already been fined by local environmental authorities for illegally exporting the waste. Because tests have revealed this waste to be toxic, the Taiwan government ordered FPC to travel to Cambodia as soon as possible to handle the situation.

Panic among local residents broke out when 3,000 tons of waste, suspected to be hazardous, was discovered near Sihanoukville, Cambodia. The Cambodian authorities accused Taiwan's Formosa Plastics Corporation (FPC) of shipping the unclassified waste to their country on November 21, 1998.

According to reports, FPC allegedly exported the solidified sludge to Cambodia without receiving authorization. From a legal standpoint, the export of industrial waste can be handled in two ways. If the waste is classified as hazardous, then the *Regulations Governing Hazardous Industrial Waste Transboundary Shipment* have jurisdiction. These regulations require the shipment of the waste to be authorized by the central government, with seven-copy waste shipment manifests being filled out and submitted to both the central and local-level competent authorities. If the waste is classified as general industrial waste, the concerned party must submit a treatment plan to local-level authorities. Once approved, the waste can be shipped according to regulations concerning the transboundary shipment of waste. To date, the EPA has not approved any hazardous waste shipments to Cambodia.

In early October, FPC had applied to the EPA for authorization to ship 5,000 tons of non-solidified mercury-containing sludge to Cambodia. FPC's application, however, had several shortcomings. The substance to be shipped was not clearly stated on the export application, and there was no documented proof of the receiving country's willingness to accept the waste, nor was there proof of the receiving

organization's ability to treat the waste. Due to these omissions, the EPA was not able to approve the application.

Consequently, on November 19, using a classification of "general industrial waste," in line with the *Standards for Industrial Waste Storage, Collection and Treatment Methods and Facilities*, FPC submitted a handling and treatment plan to local-level government authorities. This was part of an application for shipping approximately 3,000 tons of solidified mercury-containing sludge to Cambodia. The following day, without receiving authorization from the Kaohsiung County Government, FPC shipped off the solidified sludge.

Having discovered this situation on December 2, the Kaohsiung County Department of Environmental Protection fined FPC NT\$30,000 for violating Articles 15 and 24 of the *Waste Disposal Act*. Subsequent analysis by the EPA proved that the waste sent to Cambodia by FPC was hazardous, and FPC has thereby been formally charged with violating Article 25 of the *Waste Disposal Act*.

Because this is an international incident resulting in physical harm, the EPA has notified Cambodia of its willingness to send a delegation in cooperation with a recognized third-party country or international organization. This will provide the opportunity for the two governments to reach a mutual understanding and confirmation of the actual situation.

Although Taiwan is not a signatory to the Basel Convention, the R.O.C. government will act in the spirit of the Convention because the waste FPC shipped to Cambodia has been determined to be hazardous. FPC has been ordered to handle the waste appropriately. Whether the waste is shipped to a third country or returned to Taiwan, the EPA will provide the necessary assistance.

As Taiwan is not a member of the United Nations, it cannot be a signatory to the Basel Convention. International shipment of hazardous waste can only be regulated according to domestic R.O.C. law. This is only a unilateral check on the actions of domestic firms. Article 11 of the Convention stipulates, however, that member countries can sign bilateral or multilateral agreements with non-member countries to establish a mutually recognized reporting system that can work to control the transboundary shipment of hazardous waste. The EPA formally appeals to all countries to quickly sign a bilateral agreement with Taiwan. By mutually controlling the transboundary shipment of hazardous waste, similar incidents can be prevented and bilateral environmental interests can be protected.

Non-rechargeable Batteries Targeted for Comprehensive Recycling

At a recent public hearing, all concerned parties expressed support for the EPA's

planned comprehensive battery recycling program. It is anticipated that following implementation, the number of batteries recycled will jump by more than 100 times current levels. As the scale of the recycling system rapidly expands, the EPA expects battery recycling fee rates to drop significantly. Moreover, future fee rates will be set according to the heavy metal content of batteries.

The EPA on November 11 held a public hearing to promote its program of comprehensive battery recycling and to hear the opinions of concerned parties.

As frequently pointed out by environmental groups and experts, the major obstruction to battery recycling has long been the difficulty of discerning batteries targeted for recycling from those which are not required to be recycled. This problem has dampened the general public's willingness to recycle batteries. And, when non-recyclable batteries are inadvertently put through the recycling process greater effort is needed in sorting, which unduly burdens the recycling fund.

In an EPA-sponsored study by National Cheng Kung University, researchers found that single-use batteries contain fairly high levels of heavy metals such as mercury, cadmium, and lead. Whether discarded batteries are landfilled or incinerated, they significantly impact the environment. In another study, data from international sources indicated that comprehensive approaches to battery recycling are fairly widespread. In addition to the countries of Netherlands, Switzerland, and Sweden, the European Union is currently discussing directives that require 75% of all batteries to be comprehensively recycled and will prohibit the sale of batteries that contain mercury and cadmium.

For these reasons, the EPA put forth two scenarios during the November 11 public hearing. Scenario A would require comprehensive recycling of single-use batteries and establish differentiated recycling fee rates according to heavy metal content. Scenario B would prohibit the manufacture and import of batteries that contain more than a specified level of certain heavy metals, and it would require that all other batteries be comprehensively recycled using a single recycling fee rate.

During the public hearing, battery industry representatives indicated that industry is not opposed to future comprehensive recycling policies. They expressed the hope, however, that the costs of recycling general batteries will be given more consideration in setting policy. They also emphasized the importance of improving the efficiency of the current battery recycling system. Environmental groups and recycling industry representatives are also prone to agree with comprehensive recycling. Bureau of Foreign Trade representatives stated their concern that the import limitations under Scenario B would be incompatible with Taiwan's current import regulations and feared that, should this scenario be chosen, legal adjustments would be required.

After hearing responses from these parties, the EPA has been leaning toward

Scenario A. Current rough estimates indicate that after implementing comprehensive recycling policies, the amount of batteries recycled annually will skyrocket from the current level of about 20 tons to several thousand tons. The recycling fees for non-recyclable manganese-zinc batteries and alkali batteries will increase to between NT\$0.2 to NT\$3.3 (see Table 1). Furthermore, because the scale of the recycling market is expanding, per-unit recycling costs are coming down. This will bring a 30% to 70% reduction of the recycling fee rates for batteries that must be recycled according to current requirements (see Table 2).

Setting the varying rates for specified heavy metal-containing batteries will be the next stage of the EPA's battery recycling policy.

Battery type	1 (D)	2 (C)	3 (AA)	4 (AAA)
Batteries per kg.	7	15	45	100
Per-unit recycling fee rate (NT\$)	3.3	1.5	0.51	0.23

		Estimated recycling fee rate	Current fee rate	Percent change
Single-use batteries				
	Cylindrical	23	89.45	-74%
	Button-style	199	279.51	-29%
Ni-Cd batteries		28	50.52	-45%

Scope of Submission Requirements for Toxic Substance Response Plans Publicly Announced

The EPA recently announced the *Operating Guidelines for Toxic Substance Incident Prevention and Response*. As for public disclosure of toxic substance incident prevention and response plans, the guidelines limit disclosure to Category 3 toxic substances in liquid and gaseous form.

After much effort, the EPA finally announced the *Operating Guidelines for Toxic Substance Incident Prevention and Response* on November 16, 1998. Following many discussions with industry representatives, the EPA has set standards concerning the procedural guidelines for submission and public disclosure of toxic substance incident prevention and response plans and basic information pertaining to operational incident prevention (details indicated in the table below).

As for the degree of public disclosure of information, the new guidelines limit these requirements to Category 3 liquid-phase and gaseous-phase toxic substances. The guidelines require users to submit incident prevention and response plans for the

above-mentioned substances to the relevant local competent authority.

The guidelines further stipulate that the content of the incident prevention and response plans must contain three major parts: basic information and incident prevention and response information. Basic information includes such items as relevant toxicological data, basic site information, maps of site facilities and geographical positioning, and roles and structure of the incident response team.

Information related to incident prevention should include incident area size estimations for each type of incident and descriptions of related training and drills. The recently announced operational guidelines suggest that users estimate the largest possible area affected by the incident, the potential for each type of incident, and probable outcomes. Users should study the data on actual incidents involving similar equipment and factories, and/or utilize American or Japanese disaster diffusion simulation models.

Response information should include standard operating procedures for incident response and rehabilitation activities, procedures for the release of incident related information, as well as information on response equipment and materials.

Furthermore, the operational guidelines clearly stipulate that the competent authority can appoint experts and scholars to evaluate the content and implementation status of submitted incident prevention and response plans. If improvements are deemed necessary, the user will have a limited time to make such improvements according to the results of the evaluation.

Standards for determining submission requirements for incident prevention and response plans and/or toxic substance incident prevention basic information

Category of toxic substance	Requirement A	Requirement B
Category 3		
Gaseous	Total used amount exceeds lowest control limit. This limitation does not apply for chlorine and formaldehyde use at a single site and during a single time do not exceed two metric tons.	Chlorine and formaldehyde do not exceed a total use amount of 2 tons.
Liquid	Total use amount exceeds 300 tons per year or 10 tons at any given time.	Total use amount does not exceed 300 tons per year or 10 tons at any given time.
Solid	Total use amount exceeds 1,200 tons per year or 40 tons at any given time.	Total use amount does not exceed 1,200 tons per year or 40 tons at an given time.
Categories 1 & 2		
Gaseous	Total use amount exceeds 2 tons.	Total use amount does not exceed 2 tons
Liquid	Total use amount exceeds 300 tons per year or 10 tons at any given time.	Total use does not exceed 300 tons per year or 10 tons at any given time.
Solid	No requirements.	Total use amount exceeds 1,200 tons per year or 40 tons at any given time.

Notes

- Requirement A: firms must submit toxic substance incident prevention and response plans and toxic substance incident prevention basic information.
- Requirement B: firms must submit toxic substance incident prevention basic information.
- Total use amount is defined as the total amount of a single substance used at a single site during any given time.
- If the total amount of toxic chemical substances used does not exceed the lowest control limits, incident prevention and response plans, and incident prevention basic information table are not required.
- Amount values for gaseous, solid, and liquid phase substances stated in this table are those that exist under normal temperature and pressure.

Taiwan Integrates CO₂ Reduction Models in Response to International Trends

The Fourth Session of the United Nations Framework Convention on Climate Change Conference of the Parties (COP4) concluded with the adoption of a "Buenos Aires Plan of Action" which sets the year 2000 as the deadline for finalizing work on the Kyoto Protocol mechanisms. Developing CO₂ reduction estimation models will be the most beneficial bargaining chip in related international negotiations. In this regard, the EPA will promote the integration of various models.

The Fourth Session of the United Nations Framework Convention on Climate Change Conference of the Parties (COP4) was held in Buenos Aires, Argentina on

November 3 to 13, 1998. 170 countries and 197 non-governmental organizations (NGOs) were represented at the conference. The Taiwan delegation, attending as an NGO, was headed by Hsiung-Wen Chen, Director General of the EPA's Bureau of Air Pollution Control.

COP4 was basically an extension of the Kyoto conference, providing further opportunity for discussion on issues which were not agreed to in Kyoto. The majority of the conference focused on questions surrounding the implementation of mechanisms such as "voluntary commitment" and "flexible mechanisms" as well as on "fair burden" and "sustainable development" issues. During the meeting, a large difference of opinion remained between developed and developing nations on the issues of reduction requirements and how to define reduction mechanisms. However, the U.S., which is the world's largest CO₂ producer, departed from its original reserved attitude and signed the Kyoto Protocol. Taiwan is closely observing the outcome of the U.S. change in attitude.

Additionally, even though the issue of "voluntary commitments" for developing countries has been continually rejected, Argentina and Kazakhstan expressed their support for the issue. And, according to reports, Chile, Korea, and Mexico might also support voluntary commitment. As several developing countries commit themselves to some kind of control target, the international community might use this standard to assess Taiwan's reduction targets. This possibility, therefore, warrants close attention to these developments.

A concrete outcome of the conference was the agreement to the "Buenos Aires Plan of Action" by each attending nation. This plan set 2000 as the deadline for identifying time-frames for each of the undecided items of the 1997 Kyoto Protocol. The Plan of Action includes deadlines on a number of important issues such as punitive measures, financial mechanisms, technology transfer, and utilization of Kyoto mechanisms.

Because Taiwan is not a member of the UN, it will encounter difficulties participating in related programs. According to reports, private companies are participating in the drafting of clean development mechanisms (CDM) being developed as part of the Kyoto Protocol. Taiwan should actively track this trend and lobby its allies to support the inclusion of Taiwan in the development of these mechanisms.

In addition to the long-term response measures stated above, developing and integrating local CO₂ reduction estimation model has been an important policy in Taiwan. Based on the experiences of those countries first to develop, the next ten years will still be a growth period for Taiwan's greenhouse gas emissions. In future international negotiations, Taiwan will need to convince other countries to maintain

reasonable room for Taiwan's growth. To do this relies on the support of other countries for a locally developed basis for measurement.

Taiwan has already made significant steps in this direction. The Industrial Technology Research Institute (ITRI) has already completed the construction of a model MARKAL -- Macro (Market Allocation) framework which has been certified by the International Energy Agency. Moreover, domestic economists have, in consideration of Australia's ORANI model, developed a set of localized economic model TAIGEM. In view of this, the EPA will make the integration of each theoretical model the focus of the next key phase. However, the initial direction will not be to develop a single model, but to make the model publicly available, thereby allowing competition with and mutual verification against existing domestic models. An important direction will also be the reasonable step-by-step development of database construction, parameter hypotheses, and limits. The EPA has already set up an expert advisory group to arrange multiple domestic and overseas seminars through which CO₂ estimation model development activities can be promoted.

Watercourse Area Refuse Dumpsite Remediation Plan Finally Nailed Down

The Watercourse Area Refuse Dumpsite Remediation Plan, drafted by the EPA, has been approved by the Executive Yuan. Over the next four years, the government will spend NT\$2.6 billion to solve the problem of Taiwan's 50 refuse dumpsites. Of these, five will be completely relocated, 20 will be partially relocated, 16 will be refurbished, and 9 will temporarily not be handled.

Following numerous meetings between the EPA, related environmental organizations and experts, and after long-term discussions within the Executive Yuan (EY), the EY finally passed the *Watercourse Area Refuse Dumpsite Remediation Plan* on November 17, 1998. Listing the plan as a special case, the EY has allocated NT\$2.6 billion to promote the deal with the problem of refuse dumpsites within watercourse areas.

The remediation plan has been defined as follows: Of Taiwan's 55 refuse dumpsites located in watercourse areas, including five dumpsites in Taipei County already targeted by the *Relocation and Reforestation Plan for Old Refuse Dumpsites Along the Ta-han River*, five dumpsite sites will be completely relocated, 20 will be partially relocated, 16 will be refurbished, and 9 will temporarily not be dealt with.

The watercourse area dumpsite problem has evolved into a very difficult to solve state of affairs. The major root of the problem lies in the long-standing neglectful management on the part of water resource agencies and dereliction of duty by local-level government's. In recognition of this, the remediation plan approved by the

EY specially requires the compliance and support of water resource agencies and local-level governments. Future implementation of the plan will be supervised by both the EPA and the Ministry of Economic Affairs Water Resources Bureau. The entire plan will be listed as a special case to be handled by the environmental authorities within each level of local government.

In addition, the plan requires local governments to provide matching funds. Of the NT\$2.62 billion total, the EPA will contribute NT\$1.48 billion, the Water Resources Bureau will add NT\$730 million, and local-level governments will put up NT\$470 million.

The financial difficulties faced by many local-level governments have been the largest obstacles faced in the implementation of this plan. Local government agencies have, from the beginning, been unwilling to share the budgetary burden. In response, the plan clearly identifies that the central government will provide subsidies for four years according to local-level government's willingness to support the plan. If, however, local-level governments further delay taking on their share, the central government will not provide additional support. In order to assist local-level government in this regard, the Taiwan Provincial Government's Department of Environmental Protection will be asked to modify the *Taiwan Province 3rd Stage Refuse Treatment Plan*.

The plan also calls for a large amount of garbage to be completely relocated from five dumpsites, including those in Lu-chu Village, Tou-fen Town, Kang-shan Town, Chia-yi City, and Lu-chou City. A total of 2.93 million cubic meters of garbage will be moved from these sites.

Many dumpsites will have a partial amount of garbage removed. Twelve Class A sites will have one half of their respective amounts of garbage relocated, altogether totaling 1.07 million cubic meters. From eight Class B dumpsites, another 46,000 cubic meters, or one-third of each site's refuse, will be relocated. It is estimated that within the next four years, roughly 4.47 million cubic meters of garbage will be cleared away.

Other than the refuse at a few small sites that already have plans for on-site treatment, the rest of the garbage currently in targeted sites will either be moved to town landfills or await local government's to submit more detailed treatment plans.

As for promotion of the remediation plan, the EPA will quickly establish the *Operational Guidelines for Remediation Plan Assistance* and urge local-level governments to allocate resources. In addition, local-level public works departments, within respective administrative regions and river system areas, will be asked to unify their remediation plans. These plans must undergo review and approval first by the provincial government and then by the EPA. Once the dumpsites have been

remediated, relevant local-level water resource authorities will take on maintenance and management responsibilities.

Recycling Improvement Measures for PET Bottles and Discarded Tires Confirmed

The EPA is actively developing response measures to the PET Bottle Recycling Fund's red ink and the severe over-accumulation of discarded tires. PET Bottle Recycling Fund subsidies will be decreased, the forty-sixty split will no longer be used, and the recycling rate will be brought down to 70%. Discarded tires will be differentiated into those collected before and after the end of 1997. The primary plan is to treat targeted tires in country; the supporting plan will be to send them abroad for treatment. Domestically treated tires will either be chopped or pressed. Removal of the breeding environment for disease vectors, such as mosquitoes, will be priority.

On November 27, 1998, the EPA convened the second meeting of the Resource Recycling Management Fund Committee. The major agenda items were to draft response measures to the PET Bottle Recycling Fund's NT\$700 million deficit and the over-accumulation of 170,000 tons of discarded tires.

The PET Bottle Recycling Fund has been in the red for some time now. Prior to July 1998, the fund was, on average, overdrawn by NT\$50 million per month. On July 1, changes in the structure of the Resource Recycling Fund earmarked 40% of the fund as non-operational, thereby causing the monthly deficit to jump dramatically to NT\$90 million. The EPA analyzed the large financial losses being incurred and identified several key reasons. Primarily, payments (in the form of subsidies) were rapidly exceeding receipts (from recycling fees). This was compounded by the problem that the trust fund of the payments was only 60% of fund income. In addition, the certified recycling rate exceeded 100%. To counteract these problems, the EPA has drafted many response measures.

First, a look at the PET Bottle Recycling Fund. Future recycling deposit (on bottle return) will be completed paid out of the trust fund. The 40-60 split will no longer be used and the amount of subsidy payments will be reduced. These measures will serve to maintain the balance of subsidies and income. According to estimates of future recycling volumes, the trust fund should be able to maintain a payment -- income balance. Nonetheless, should a deficit still exist, the EPA is prepared to inject emergency funding of NT\$150 million.

Furthermore, to prevent the lowered subsidies from jeopardizing the normal operation of the recycling system, and to improve the effectiveness of comprehensively recycling containers of different material, the EPA will utilize the non-operational fund's "Subsidized Recycling Point Maintenance Fee" to adjust

recycling point subsidies upward to at least NT\$600.

The subsidy for containers of other materials will also be adjusted. For example, the recycling deposit for plastic containers will be raised by NT\$2. This will cause PVC container subsidy deposits to reach NT\$14 per kilogram. PP and PE containers will be raised to NT\$10 per kilogram.

Tire recycling in Taiwan has also faced difficulties. The use of tires in retaining walls and as bumpers on docks has not been successful, and as the NT dollar has lost value over the past few years, the original recycling fee of NT\$1.8 per kilogram makes it no longer beneficial to ship discarded tires overseas for treatment. As a result, only a small number of treatment applications have been submitted since the end of 1995, and the volume of discarded tires has climbed to a level of over 100,000 tons.

In response, the EPA has identified domestic treatment as the primary response measure, and overseas treatment as a supplementary approach. Domestic treatment will utilize methods such as chopping and flattening the tires. Priority treatment will be aimed at eliminating the breeding environment for disease vectors like mosquitoes.

Even though discarded tires do not fall within the scope of the Basel Convention (the international agreement that limits transboundary shipments of waste), the EPA feels that tires in their original shape are containers that act as breeding environments for mosquitoes. Shipping tires overseas may, therefore, lead to ecological damage and the spread of disease. Therefore, the EPA's current attitude is to avoid exporting large quantities of discarded tires unless necessary.

Discarded tires that were collected following January 1, 1998, are the responsibility of the waste recycling industry. As such, treatment methods must be in accordance with the baseline date of December 31, 1997 and be in accordance with the following principles:

1. For tires collected before the baseline date and where the responsibility for treatment has been transferred to the Recycling Fund, the EPA will contract a treatment company to compact 100,000 tons of the tires and seek uses for the tires in construction activities. This treatment process will remove the threat of disease vectors breeding in the discarded tires. Treatment must occur before June 30, 1999.
2. For tires collected before the baseline date and where the responsibility for treatment has been transferred to the Recycling Fund, approximately three thousand tons will be exported for overseas treatment. Tires primarily located in Hualien, Ping-tung, Tainan and other areas where dengue fever cases are rare will be handled in this manner. The EPA will complete this activity within a limited time.
3. Tires that were collected after the baseline date will be partly the

responsibility of recycling firms to treat. The EPA will assist previously operating firms to obtain the tires. Recycling firms with current treatment responsibilities will receive subsidies at the rate of NT\$3.2 per kilogram, following auditing and certification.

Toxic substance Control Limits to be Solely Based on Quantity

Toxic substance management has been simplified through the removal of concentration criteria for lowest level control limits and has returned to managing toxic substances by classifying single chemicals as single controlled substances. The EPA has also loosened several toxic substance management measures. For some toxic substances, these changes were made in the area of reporting procedures, fugitive emission reduction, and toxics use management scheduling. Articles regulating the reporting of incident prevention and response planning have also been relaxed.

New regulations for classifying toxic substances based on lowest control amount concentration standards and amount limitations were announced in July, 1998. Since implementation, however, firms have frequently complained that the controls were too complex and that compliance was too difficult. As a result, the EPA decided to "re-simplify" toxic substance management controls. On December 2, 1998, the EPA announced the cancellation of concentration criteria for lowest control limits and reinstated toxic substance classification to a single chemical per single listed classification basis. The announcement also stated that for Taiwan's 64 categories and 114 listed chemicals, many regulations regarding use and operation have also been loosened.

Those regulatory items loosened primarily include the following: reporting procedures, fugitive emission reductions, and operational management scheduling. The EPA has extended the reporting deadline to March 31, 1999, for firms that manufactured, used, and stored ethylene dibromide, oxirane, 1,3-butadiene, perchloroethylene, trichloroethylene, ethylene chloride, and formaldehyde. Firms should, by this date, submit plans to reduce fugitive emissions through process improvements, fugitive emission reductions, and operational management improvement. After these plans have been approved by the EPA, firms must complete improvements to equipment according to the plan contents and within the approved time period. However, in the interest of simplifying administrative procedures, the EPA has agreed that those firms or operators that had their plans reviewed prior to the newly announced changes will not have to reapply for approval.

In support of the *Operational Guidelines Regarding Toxic Substance Incident Prevention and Response*, this recent announcement also loosened the requirements

for which firms must submit incident prevention and emergency response plans. For cadmium and listed cadmium-containing compounds, diarsenic trioxide, listed cyanide compounds, and acrylamide incident prevention and response plans are now only required if 12 million tons or more are used at a single site, or if more than 40 tons are in use at a given time (previous regulations required plans for single site usage in excess of 3 million tons, or ten tons or more in use at a given time). Originally, plans were required if total use amounts exceeded 50 kilograms at any given time. The new announcements relaxed this requirement to more than two tons.

It is also worth noting that controls on substances such as oxirane, 1,3-butadiene, and ethylene chloride have been tightened. Previously, incident prevention and response plans were required when total amounts use exceeded 10 tons at any given time, or annual amounts exceeded 300 tons. Plans are now required if single-schedule use amounts exceed two tons.

Moreover, criteria for operating electroplating tanks have also been loosened in a reasonable manner. The announcement stipulates that electroplating liquid in tanks and metal surface treatment tanks will no longer be figured in when calculating a site's use amounts.

If, prior to the recent announcement, firms were using approved permits or had registered for future inspection regarding the use of general toxic substances, they must apply to the local-level competent authority for change of future inspection registration or relevant permits. As for controls on PCBs, the EPA will press ahead with a ban in the near future. However, in recognition of the fact that many firms still use PCB-containing equipment, the deadline for changing permits will be extended to October 31, 1999.

Regulations concerning the reporting of operation records and release amount requirements for PCBs have also been loosened. Unless specifically required by the competent authority, users of PCBs are no longer required to regularly submit toxic substance use records.

Refuse Incinerator Construction to Move Forward as Scheduled

To satisfy Taiwan's expanding infrastructural needs, the EPA is picking up the pace of its refuse incinerator plan. The EPA forecasts that 36 incinerator facilities will be completed by 2003, thereby achieving a national refuse incineration rate of 90%. The environmental protection requirements of the new facilities are high. Dioxin limits are set at 0.1 nanograms per cubic meter, and facilities must install fly-ash solidification equipment. Older incinerators will also be given a limited timeframe to make improvements. By October 6, 2001, older facilities must meet dioxin limits of 1

nanogram per cubic meter.

As part of the first stage of the EPA's plan to promote refuse-treatment-through-incineration, a German company was contracted to build Tainan County's Yongkang refuse incinerator on November 25, 1998, which means that construction has been started on 21 publicly owned/publicly operated and publicly owned/private operated refuse resource recycling incinerators. In support of the Executive Yuan's policy to meet expanding infrastructural needs, the EPA has also stepped up the promotion of the second-stage plan to build 15 BOO and BOT incinerator facilities. The EPA anticipated all public bid invitations to be issued by the end of 1998 and all construction to be complete by 2003. At that time, designed incinerator capacity will be 30,400 metric tons per day, achieving a national refuse incineration rate of 90%.

Currently, of the 21 stage-one incinerators nine have been completed and twelve are currently under construction. As for the BOO and BOT facilities, the bidding for the Taoyuan southern incinerator was recently completed, and the bid invitations for five other incinerator projects have already been issued. The EPA anticipates bid selection to occur early this year. The bids for these facilities are under preparation.

To allay public concerns over dioxin emissions, the EPA announced the *Waste Incinerator Dioxin Control and Emissions Standards* in August, 1998. These standards are based on the strictest international standards and set the dioxin emissions limit at 0.1 nanograms per cubic meter (one nanogram is one one-billionth of a gram). Incinerators that will comply with this standard include 15 BOO and BOT facilities as well as 11 publicly owned/private operated incinerators, including the Tainan Yongkang incinerator. Taiwan's existing incinerators must comply with a dioxin emissions standard of 1 nanogram per cubic meter by August, 2001. Estimates put the cost of upgrading current facilities at more than NT\$ 2 to 3 billion. The EPA is urging local-level governments to provide the budget for these improvement efforts.

The measures described above will dramatically reduce incinerator dioxin emissions island-wide. By 2001, older incinerators will have been upgraded, and although the total number of incinerators will grow to 29, dioxin emissions will be at 12% of emissions prior to the implementation of the new controls. The actual amount of dioxin emitted island-wide per year will be reduced to less than 13 grams.

To address the other public concern of high heavy metal content fly ash, the EPA since 1994 has required winning bidders to install fly ash solidification equipment. After solidified fly ash has undergone a TCLP test and proven to be non-hazardous, it will be buried in a sanitary landfill.

Some environmental groups have questioned whether local-level governments

might over-report garbage treatment requirements in order to secure larger treatment budgets. Should this happen, capacity will exceed need and some incinerators may land in the embarrassing situation of having no garbage to incinerate.

Practically speaking, after the EPA received the applications and determined each incinerator's treatment capacity, it reduced applied capacity. Moreover, according to the *National Environmental Protection Plan*, the national incineration treatment rate for refuse should be at 80% by 2001. By 2006, the rate should be at 90%. In the short-term, the problem of over-capacity will not occur.

In the future, if treatment capacity exceeds actual amount, either due to garbage reduction policies or increase incinerator capacity, the EPA will consider using excess capacity to treat general industrial waste.

Evaluation Process for EIA Consulting Firms Systematized

In amending the *EIA Act Enforcement Rules*, the EPA added stipulations regarding EIA consultant evaluation. Ordinarily, consulting companies which have qualified for two consecutive years can skip the initial EIA review procedures. The EIA Committees decided to recognize evaluation criteria made over the past two years. Therefore, 21 companies have favorable qualifications.

Amendments to the *EIA Act Enforcement Rules* stipulated that EIA consulting companies that had qualified two consecutive years can directly submit EIS and EIA report documentation for content review, skipping initial review procedures. As a result, since 1998 EIA consultant evaluation is no longer just a voluntary education activity. It now involves the legal rights of the concerned consulting firms. The EPA recently invited the EIA Committee to determine whether evaluation criteria should be adjusted and how to integrate evaluations criteria used over the past two years.

It was decided that 1998's evaluation classification would continue to use last year's method. The background information of EIA consultants would constitute 30% and the rating of the briefing would constitute 60%. Those with a score of 60 or less would not qualify, qualifiers would consider the size of the consultant to prevent unfairness in the evaluation process. Consultants will be ranked according to large, medium, and small business volume scales.

Moreover, committee members in attendance reached the consensus that the original policy of encouraging outstanding consulting companies should be accelerated. It was decided, therefore, that evaluation qualifications made over the past two years will be recognized. A "C" ranking given in 1997 will now be considered as qualifying. EPA officials indicated that as a result of this approach, there are 21 firms which have met qualifications for the past two years. From now,

these firms can directly submit EIA documentation for content review, skipping initial review procedures. At the same time, Article 10-1, Item 2 of the Enforcement Rules stipulate that if a qualified firm's documentation is not in compliance with EIA operational guidelines, the competent authority can, according to circumstances, cancel the firm's favored status and enact strict review procedures.

Because this is the first year that evaluation stipulations have been added, the committee decided that consulting firms requested to participate in the evaluation process must attend or will be considered as forfeiting their rights. Also, in order to set up a well-rounded database, committee members will perform site visits of firms that are participating in the evaluation process for the first time. Visits will be made following the firm's presentation of its report. Firms that have previously participated in the evaluation process will be chosen at random for an on site visit.

As for evaluation content, background research on a firm will consider years in operation, capital, and reference material related to participation in previous EIAs. Scoring of the consulting firm's report will be based on considerations of the report's comprehensiveness, the professional background of team leader and report writers, technical ability, the background of EIA personnel, and the comprehensiveness of answers to questions posed.

Committee members emphasized that consulting firms' recent performance should be specially emphasized. They advocated giving greater weight to the previous year's performance. The last point of agreement was on the item of technical capability analysis. Special consideration should be given to cases performed over the last year.

The entire range of EIA evaluation work is currently the responsibility of Environmental Engineering Industry Association. This group has organized a taskforce that will mail a background questionnaire to relevant firms. After compiling this data, the association will perform an initial analysis of the basic information submitted and then submit it to the EIA Review Committee for evaluation. An association representative indicated that this year's background questionnaire has already been mailed and that responses will be received before December 30, 1998.

News Briefs

5-River Remediation Plan Passes

The Executive Yuan recently passed the EPA's plan to remediate the catchment basins of 5 rivers, including the Tamshui, Kao-ping, Tseng-wen, Ta-jia, and Tou-chien rivers. Under this plan, the government will invest NT\$36.2 billion over eight years. Within the water source protection zones of the above-mentioned basins, 12 wastewater sewer systems will be built, and NT\$6.4 billion will be used to compensate the relocation of 640,000 hogs from the water

source protection zones.

The Executive Yuan Approves Amendments to Waste Disposal Fee Regulations

To solve the previous dispute between the central government and Taipei City regarding garbage fees, and to give garbage bag-based fee collection a legal footing, the EPA amended the *Regulations Governing the Collection of General Waste Disposal Fees*. The amendment takes environmental clearance costs, in addition to removing waste clearance and treatment costs, it gives the rights and responsibilities to voluntarily set fee collection methods. Previously passed by the Executive Yuan, the amendment was announced on December 12, 1998.

Subsidies for LPG Filling Stations to be Raised

The Ministry of Economic Affairs Energy Commission forecasts that from July, 1999, the government will begin providing subsidies for the installation of filling stations for LPG-powered vehicles. The highest amount provided will be NT\$7 million. To overcome firms' current wait-and-see attitude, the EPA on December 3, 1998, announced the standards for raising the level of current subsidies: facilities with an LPG storage tank capacity of under 20 cubic meters will be subsidized by NT\$3 million; those with between 20 and 40 cubic meters capacity will be subsidized by NT\$5 million; and, those with a capacity of more than 40 cubic meters will receive NT\$7 million.

Electrical Appliance Firms Now Bear Recycling Responsibility

On November 27, 1998, the EPA announced that electrical appliance vendors now have the responsibility of recycling old products. When vendors collect old products, they are prohibited from taking any additional fees from consumers.