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## ***Regulations for the Transboundary Shipment of Industrial Waste to be Expanded***

**After examination of current regulations managing the import and export of hazardous wastes, the EPA decided to make extensive revisions to the *Regulations Governing the Import, Export, Transit and Transshipment of Hazardous Industrial Waste*. Among the changes to be made, the definitions used for listed substances will revert to the style used in the original law, the *Waste Disposal Act*. Furthermore, regulated substances will no longer be listed by item and general industrial wastes and general wastes will be included in the expanded scope of the revised regulations. Due to the lack of domestic treatment capacity, imports of foreign hazardous wastes will be totally prohibited.**

At the end of 1998, Formosa Plastics Corp. illegally shipped a batch of mercury waste to Cambodia, creating an international incident once the truth was brought to light. In July of this year the revised *Waste Disposal Act* was passed, introducing stiffer penalties and potential criminal prosecution for illegal waste dumping in Taiwan. The Act also clearly stipulates that the treatment abroad of industrial waste must be permitted by or registered with the proper authority. Thus, after examination of current management regulations for the transboundary shipment of industrial wastes, the EPA decided it was necessary to overhaul the *Regulations Governing the Import, Export, Transit and Transshipment of Hazardous Industrial Waste*.


In the future, the definitions used for listed substances will be reverted to the style used in the original law, the *Waste Disposal Act*. Listed substances will include all types of industrial wastes, such as general industrial waste and ash residues from trash incineration, and will no longer be listed progressively by item. Furthermore, in the past only hazardous industrial wastes were within the regulations' jurisdiction, however the revised scope will be expanded to include all wastes. For this reason, in conjunction with the content revisions, the title will be changed to the *Regulations Governing the Import, Export, Transit and Transshipment of Waste*.

Because it has been expanded to include general industrial wastes, new chapters will be added to the regulations to explain the scope of controls. In the portion dedicated to the import of waste material, the draft stipulates this is restricted to factories with reuse capabilities and contracted treatment firms. In addition, permission from local environmental protection bureaus (EPBs) must be obtained before the waste can be imported. However, if the waste in question is listed in the Basel Convention, permission must be obtained from the EPA. Aside from this, if at the waste material required by industry and has been listed as importable by the EPA, application for permission to import or export is not necessary.

Correspondingly, in the section pertaining to the

export of waste materials, exporters are limited to waste producers or contracted waste clearance or treatment firms. Permission must also be obtained from the local EPB before export, and if the waste in question is listed in the Basel Convention, permission must also be obtained from the EPA.

In the case of illegal shipments abroad which are sent back to Taiwan, the revised regulations will include new management rules. According to the draft, when shipments of industrial waste from Taiwan are returned by the receiving country, within seven days of receiving notification by the government of the receiving country, application should be made for reshipment to Taiwan or for transshipment to a third country with treatment capacity. Furthermore, all related procedures must be completed within 90 days, or if the waste in question is hazardous, the time limit shall not exceed 30 days.

The EPA has already begun communicating with county and city EPBs on their responsibilities, and has not encountered local opposition to the contents of the draft. Departmental discussions and public hearings have also been called by EPA, but because of the increased jurisdiction over imports and exports, the opinions of customs agencies must still be deliberated before the revisions can be completed. 

## ***Government Spending on the Environment for FY99 Hits 87.1 Billion NTD***

**According to results from EPA statistics for FY99, pollution control made up close to 89% of the government's environmental spending, of which solid waste clearance and treatment made up the greatest portion, followed by air pollution control. Other areas, such as R&D, monitoring and testing, EIAs, and administration made up around 10% of total expenditures.**

To better understand environmental spending by various government agencies, the EPA recently finished a statistical study of the government's environmental expenditures for FY99 (July 1998 to June 1999). The analysis revealed that for the entire fiscal year the government's environmental expenditures totaled 87.1 billion NTD, still less than 1% of GDP, but an increase of 16% compared with the past fiscal year. At the central level, spending increases by the EPA were greatest, with a 91% margin of increase over last years. According to the EPA, this was due mainly to proceeds from the Resource Recycling Fund and funds for incinerator construction projects. Several other government agencies scaled back spending, with the biggest cuts occurring at the Ministry of the Interior (MOI), at around 900 million NTD, and the

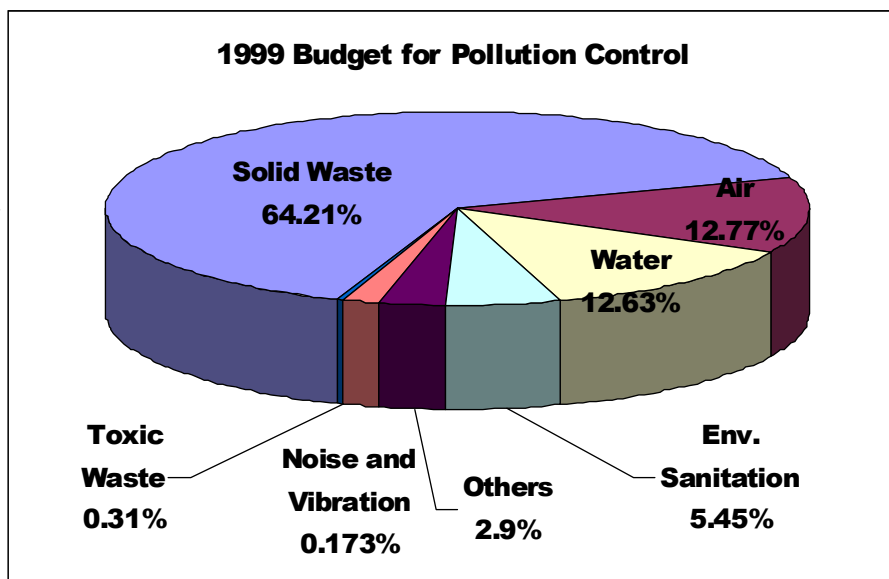
Ministry of Economic Affairs (MOEA), at around 200 million NTD.

This year's environmental expenditures study included the central, provincial, and county and city governments. A broad range of environmental activities, dealing with environmental protection, sewage systems, radiation, conservation, greenification and beautification were included in calculations of expenditures. The investigation was conducted by sending surveys to a total of 1,922 government agencies. Of these 1,803 agencies returned valid surveys forms, or around 93.8%. The results also showed that 586 agencies had established environmental departments, or 33% of the total.

Broken down by categories, 89% of the FY99 spending on the environment was dedicated to pollution control, with 64.21% of this going to solid waste clearance and treatment, 12.77% to air pollution control, 12.63% to water pollution control. The remaining nearly 11% of total spending was dedicated to R&D, monitoring and testing, EIAs, and administration. Of these, expenditures for administration were the largest, at 62.07%, followed by monitoring and testing at 21.98%.

Compared with environmental spending from the past fiscal year, overall expenditures for pollution con-

trol in 1999 grew by 18%. Broken down by category, the 12.29 billion NTD spending increase for solid waste management was the greatest, constituting growth of around 33% from last year, and which was used mainly on incinerator construction, landfills, recycling plants, and the purchase of trash and recycling trucks. Other growth areas include 750 million NTD for control of nuclear radiation and natural conservation, and 740 million NTD for noise and vibration control. Spending for air pollution control was cut by 1.37 billion NTD, a decrease of 12% compared with last year, while environmental sanitation was cut by 570 million NTD, and water pollution control by 180



million NTD, resulting mainly from a large decrease in spending from central government and provincial level agencies.

Looking at the breakdown between different levels of government, central government agencies accounted for around 40% of total spending, consisting mainly of remediation for industrial pollution from the MOEA's state owned enterprises, EPA expenditures, and MOI sewer projects. Another 30% of overall spending on the environment was dedicated to county and city government organizations, 22% to two special municipalities, Taipei and Kaohsiung, and only 7% to provincial level agencies.

### Central TQC District to Focus on Pollution Reduction

The Central Air Quality District total quantity control pilot project is formally underway. In the first stage, contracted organizations proposed 12 pollution reduction plans. One of these has initially selected 20 key stationary pollution sources for implementing pollution reduction measures. According to EPA plans, reduction targets have been set for suspended particulate matter, SO<sub>x</sub>, and NO<sub>x</sub> by 2001 and 2006.

Amendments made in January this year to the *Air Pollution Control Act* provided a legal basis for total pollutant quantity control concepts. Subsequently, the EPA chose Taiwan's Central Air Quality District as the location for a pilot project. Due to its high potential for further industrial development, this district provides many examples of how related measures can be implemented. On July 1 of this year, the pilot project was officially kicked-off, and the EPA chose through open bidding a private

consulting firm to implement related activities.

According to EPA plans, the Central Air Quality District pilot project will proceed until December of 2002 and will be divided into three implementation phases. However, due to the heavy damages suffered in this region during the September 21 earthquake, the schedule for total quality control implementation will be adjusted to complement earthquake reconstruction efforts. Regardless, elements of the first implementation phase include best available control technology (BACT) measures and pollution reduction measures for existing sources. Plans submitted by the contracted organization have outlined the following elements of pollution reduction in the Central Air Quality District:

1. Coordinate EPA mobile pollution source controls and

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(continued from page 3)

- educational activities.
2. Promote pollution reduction measures and improvement tracking for 20 key stationary pollution sources with poor air emissions.
  3. Review the efficiency of large-scale boilers and nitrogen oxide (NO<sub>x</sub>) and sulfur oxide (SO<sub>x</sub>) control equipment.
  4. Promote Nantou and Chang-Hwa Counties implementation of the ban on 0.5% sulfur-content fuel and petrol products, and conduct random sampling.
  5. Investigate and initiate discussion on volatile organic compound (VOC) emissions reductions for the building and surface-coating industries.
  6. Promote classification and control of dirty streets and privatization of street cleaning operations.
  7. Implement assessment of pollution control at 20 construction sites and provide relevant improvement assistance.
  8. Promote reductions of commuting and transportation on the part of large-scale enterprises.
  9. Coordinate remote sensing and monitoring of vehicle emissions and the tracking of improvements.
  10. Promote and coordinate sampling analyses of vehicle fuels and industrial fuels.
  11. Promote beautification/greenification of exposed areas surrounding monitoring stations, schoolyards, and factories.
  12. Implement traffic flow and vehicle types analyses on major roadways in the Central Air Quality District.
- As part of the reduction measures focused on 20 key stationary pollution sources, primary targets will be large annual emitters of particulate pollutants, NO<sub>x</sub> and SO<sub>x</sub>.

## ***2nd Round List of Industries Required for Continuous Emissions Monitoring to be Announced***

**The EPA plans to announce the second round of stationary pollution sources required to install continuous emissions monitoring equipment. Targets of these requirements will include such industry groups as coal-fired boilers, refuse incinerators, petrochemical manufacturing firms, steel and smelting operations, basic chemical producers, paper and pulp factories, and glass producers. If pollutants source emissions are above the scale dictated in the regulations, they will be required to install continuous emissions monitoring equipment. Statistics show that this round will increase the scope of emissions quantities under control by 5% for sulfur oxides and 1% for nitrogen oxides.**

In 1993, the EPA announced the first round of stationary pollution sources required to install continuous emissions monitoring (CEM) equipment. However, as part of the amendments made to the Air Pollution Control Act in January of this year, clauses were added increasing the number of EPA listed stationary pollution sources to install CEM equipment. The stipulations require firms to provide on-line CEM data to local government agencies.

At present, the EPA has set about preparing the scale for the second round of announcements of pollution

Industry groups targeted will include power plants, paper manufacturers, steel producers, glass producers, gas-fired brick kilns, and asphalt mixing plants. Priority for selecting listed pollution sources will be based on proximity to monitoring stations. Follow ups will also continue to monitor progress on improvements made by key stationary pollution sources involved in the pollution reduction negotiations which took place last year. By considering the points mentioned above, the contracted organization has already initially identified 20 key factories to act as special implementation cases. Of these, the Taichung Thermal Power Plant has the highest portion of emissions – approximately 68%.

Another important factor is the use of best available control technology (BACT). Because pollution sources within a given industry can differ based on scale and production processes, it is necessary to consider related production, engineering and transportation costs. This plan, therefore, takes a five-step approach to deciding BACT criteria, including control technology confirmation, feasibility analyses of control technology, and ranking of control technology. By the end of 1999, these criteria should be completed, and measures are slated to take effect next year.

In addition to pollution reduction, a major goal of this project is to build operational experience of total quantity control mechanisms. The next step will be to establish a national system of total quantity controls. By 2001, it is hoped that the following reduction targets can be met: particulate emissions by 28,062 tons, SO<sub>x</sub> emissions by 50,100 tons, and NO<sub>x</sub> emissions by 21,300 tons. Reduction targets in 2006 for these pollutants will be 37,718 tons, 72,580 tons, and 67,178 tons, respectively. ●

sources required to install CEM equipment. The EPA will also announce that stationary pollution sources targeted by the first round of announcements establish on-line CEM links with relevant agencies.

EPA officials indicated that the second phase of air pollution fees will be collected according to actual emissions quantities. Air pollution fees levied from sites that have installed CEM equipment will be calculated according to monitoring results. Sites that are not required to install CEM equipment, on the other hand, will be assessed fees based on inspection data that is mathematically converted to obtain emissions levels. Because this process is less reflective of actual emissions quantities, the EPA plans to expand the scope of CEM controls to increase the fairness of air pollution fee collection and to get a better handle on air pollution emissions.

The EPA-announced first round targets include the following: (1) boilers and non-vehicular gas-fired turbines and generators; (2) rotary cement kiln pre-heaters, raw material grinders; and processed material coolers; and (3) steel production facilities and electric arc furnaces.

Of the facilities mentioned in Item 1, only those that have input heat values greater than 100 million kilocalories, or those with steam evaporation quantities greater than 130 tons per hour will be required to comply with CEM regulations. Moreover, according to the aforementioned stipulations first round targets include 62 sites, of which

60 can be confirmed as completed—a 96% success rate. The two sites still in the confirmation process include the Formosa Plastic Corp.'s cogeneration facility and its Mai-Liao power generation plant.

As part of the EPA's expansion of the scope of CEM controls, planned targets of the second round of announcements include:

1. Boilers using solid, liquid or gas fuels and non-vehicular gas fired turbines and generators.
2. Petroleum heaters and cracking furnaces.
3. General or industrial (including medical) waste incinerators.
4. Paper and pulp recycling boilers.
5. Steel production ore-sintering plants and coke charring furnaces.
6. Glass kilns.
7. Sulfuric or nitric acid manufacturing processes used in the basic chemicals industry.

According to EPA projections, sulfur oxide (SO<sub>x</sub>) emissions quantities monitored by the second round of announcements will increase from 80% (following the first round) to 87%. Nitrogen oxide (NO<sub>x</sub>) emissions quantities monitored will increase from 65% to 76%. In line with installation stipulations, the EPA will also issue a list of initial demonstration factories. For SO<sub>x</sub> controls, 60 factories will be added, and for NO<sub>x</sub> controls, 68 sites will be included. However, only the list of factories in Taipei County, Taoyuan County, Hsin-Chu City, Yun-Lin County and Nan-Tou County have been confirmed as error free. The final list must include confirmations from each of Taiwan's counties and cities.

Target items planned by the EPA for the second round of CEM equipment announcements include sulfur dioxide (SO<sub>2</sub>), NO<sub>x</sub>, oxygen and their respective flow

rates. Because some manufacturing processes do not result in SO<sub>2</sub> or NO<sub>x</sub> emissions, in the future second round announcement some targets will be excluded from installation requirements. Following analyses of current status and benefits, the EPA has also removed degree of opacity (as targeted under the first round of announcements)

from the installation requirements set forth in the draft second round.

Because this round of announcements greatly increases the scope of installation requirements, the EPA has endeavored to understand the costs associated with CEM equipment installation and on-line reporting requirements. According to an EPA survey, costs and fees resulting from the second round

Stationary Pollution Sources to be Targeted by Second Round Announcements of CEM Equipment Requirements		
Industry Type	Control Targets	Determinants of Whether Installation is Required
All Industries	Fuel-fired boilers and non-vehicular gas-fired turbines and generators	<ul style="list-style-type: none"> <li>■ Input heat values from a single emissions window greater than 61.5 million Kcal per hour, but under 100 million Kcal per hour.</li> <li>■ Steam evaporation rates greater than 80 tons per hour, but under 130 tons.</li> </ul>
	General refuse incinerators	Design or actual treatment rates exceeding 10 tons per hour.
	Industrial waste incinerators	Design or actual treatment rates exceeding 2 tons per hour, continuous operation of more than 8 hours a day, or treatment of over 10 tons a day.
Petrochemical industry	Heating furnaces and cracking furnaces	Input heat values from a single emissions window greater than 61.5 million KCal per hour
Steel smelting industry	Ore-sintering furnaces and coke charring furnaces	All equipment in this category.
Basic chemicals industry	Sulfuric acid production processes	Production quantities greater than 60,000 tons per year
	Nitric acid production processes.	Production quantities greater than 35,000 tons per year.
Paper and Pulp Industry	Recycling furnaces	All equipment in this category.
Glass Industry	Kilns	Design or actual production capacities that exceed 250 tons per day from a single emissions window.

of CEM announcements may be as high as 2.5 to 4.5 million NTD. Because overall installation costs are high the impact on small-scale pollution sources is relatively bigger.

Nonetheless, the EPA has indicated that amendments to the *Enforcement Rules of the Air Pollution Control Act* provide a two year buffer period for CEM equipment to be installed on stationary pollution sources. This will allow firms to spread installation costs across a two year period. In consideration of this cost problem, the EPA had delayed announcement of the second round of requirements. The new *Air Act* amendments, however, now requires that these installations be made.

When the EPA originally announced first round requirements, it did not strictly require firms to establish on-line links with county and city environmental protection agencies. However, such requirements will soon be announced. According to EPA statistics, the current connection rate under first round controls has already hit 80%. Regions that have not yet established on-line connections with stationary pollution sources include the counties of Miao-Li, Chang-Hwa, Yun-Lin, Tainan, and Hua-Lien. Once the EPA completes related announcements, county and city EPBs and factories that have not established on-line reporting connections will have one year to do so.

**Feature Article**

**Three Years of Assistance to Stationary Air Pollution Sources Pay Off**

**In 1997 the EPA began to provide technical assistance for stationary sources of air pollution, and since has assisted an average of 1,500 factories per year. Over three years the EPA has assisted 34 different industries including about 4,535 factories. Of these factories, 2,880 have completed improvements and another 1,665 are in the implementation process. Statistics compiled estimate a total of 2.7 billion NTD were invested for improvements over the past three years.**

In 1997 the EPA began implementing a plan to improve controls and technical assistance for stationary sources of air pollution. The China Technical Consultant Inc.'s (CTCI) Industrial Pollution Control Center and the Industrial Technology Research Institute's (ITRI) Union Chemical Labs and Energy and Resources Labs, were commissioned for the plan to act as assistance units to industries suspected of pollution, factories with public complaints filed against them, or factories that received unsatisfactory evaluations. The three units provide assistance for pollution control technology upgrades, suggestions for improvements, and provision of technical information, geared to motivate industry to adopt a more active role in pollution prevention.

The plan provides assistance to about 1,500 factories per year, and over three years has provided assistance to industry groups such as PU synthetics, petrochemicals, semiconductors, tape, dyeing, metal casting, and brick and tile producers. In all, a total of 34 industry types and approximately 4,535 factories were targeted for assistance. Over this period 72 meetings were also held to introduce technologies and explain and evaluate pilot projects. The EPA has finished improvements for 2,880 factories, and another 1,665 are in the process of implementation. Over three years industry has invested a total of roughly 2.7 billion NTD in improvements.

An official from the EPA's Bureau of Air Quality Protection and Noise Control noted that reductions in volatile organic compound (VOC) emissions have been the most remarkable, with nearly 74,000 tons of VOCs reducible per year as a result of improvements. In addition, the concentration of non-methane hydrocarbons in the Kao-Ping Air Quality Region fell from 0.46ppm in 1996 to 0.39ppm in June of 1999, an improvement rate of 15.2%. According to EPA analyses, the VOC

emissions controls and PU industry emission standards enacted in 1997 have had noticeable results on petroleum and PU industry emissions.

Emission reductions for particulates, sulfur oxides (SO<sub>x</sub>), and nitrogen oxides (NO<sub>x</sub>) for these three years reached 12,000 tons, 4,000 tons and 570 tons respectively. NO<sub>x</sub> reductions were greatest for the dyeing industry, at about 180 tons per year.

In order to better understand the results of assistance provided, the EPA conducted a study of over 3,000 factories that received assistance in FY 1997 and 1998. The results of the study showed that 63% of the factories were satisfied by the EPA's service attitude, and 65% of factories felt that the assistance units had ample professional knowledge. As far as the productiveness of assistance, 77% of those surveyed felt the service to be helpful and thought it should be

Year	No. of Factories Assisted	Record of Inspection	Gave Written Improvement Suggestions	No. in the Implementation Process	No. Finished with Improvements
1997	1,497	69	1,428	508	989
1998	1,496	760	736	492	1,004
1999	1,546	871	671	653	887
<b>Total</b>	<b>4,535</b>	<b>1,700</b>	<b>2,835</b>	<b>1,655</b>	<b>2,880</b>

continued. Furthermore, around 60% of factories that received assistance felt that the suggestions provided were feasible and they would implement the improvements over time. Overall, the willingness and satisfaction of industry to receive assistance was very high. There were also hopes that the EPA could expand the scope of service, and focus on in-depth assistance for individual factories.

In addition, the assistance units also undertook specific R&D on low pollution control technologies in conjunction with common problems faced by industries in the improvement process. Currently, a total of six technologies have been successfully developed, of which two are already in the patent application review process. These technological developments should save firms an estimated 1 to 1.5 million NTD each on equipment expenditures.

In the year 2000, EPA work efforts will center on continued follow-ups on factories that have not finished improvements, and expanding the scope of assistance to factories in different industries. An estimated 1,750 factories will receive assistance in the year 2000. Furthermore, the EPA will set up a demonstration factory, initiate a study on emissions characteristics for specified industries in coordination with assistance efforts, and build factory models of pollution sources to help determine best possible operating conditions for various industries.

## ***EPA to Go All Out Against Underground Electroplaters***

**To solve pollution problems caused by electroplating in Taiwan, the EPA has drafted a preliminary plan for integrated assistance and controls for the electroplating industry. Recently the Industrial Development Bureau (IDB) and relevant EPA offices were invited to discuss the plan and determine an appropriate division of labor. The EPA plans to use supply side management of raw material to exercise strict control over the import, sale and production of electroplating chemicals. The EPA will also assist illegal operations to relocate to special electroplating parks and move towards legal compliance.**

Large quantities of highly polluted industrial waste sludge are created from electroplating production processes. A large portion of this waste contains heavy metal ions and toxic chemical substances (mainly cyanide and chromium-6). However, to cut costs, a significant number of Taiwanese factories continue to refuse to invest in pollution control equipment, set up factories in unsuitable locations, or engage in illegal effluent release and "midnight dumping", all at a heavy cost to the environment.

Although at present the EPA has listed over 1,400 electroplating enterprises (including some illegal enterprises), according to statistics from the Electroplating Association there are over 3,000 electroplating enterprises, of which over 2,000 are so called "underground" enterprises. To deal with the pollution created by this industry, the EPA has drafted a plan for integrated assistance and controls, and recently invited the IDB and relevant EPA offices to deliberate the plan and determine an appropriate division of labor.

The assistance and controls mentioned by the plan are intended mainly to push illegal enterprises to "legalize", but will allow them to continue production during an adjustment period if they can provide evidence of an improving trend towards compliance with pollution standards. Also, a concrete time table agreed upon for factory relocation will be overseen by local environmental protection bureaus (EPBs). Factories violating the agreement or exceeding time limits will be punished in accordance with the circumstances.


In terms of assistance, the EPA will request enterprises to make internal factory improvements. These can be initiated first through process improvements or a switch to non-cyanide electroplating to lower effluent volume and concentration. The EPA will request that the IDB provide, in accordance with the *Industrial Assistance Code*, new equipment, technical guidance for improving treatment equipment, and low-interest loans for small and medium-sized enterprises. Environmental protection units will assist the IDB in processing tax exemption documentation for pollution control equipment and

provide a deadline for enterprises to complete all legal permitting.

Based on the structure and character of electroplating in Taiwan, plans have been proposed to overcome the industry's water pollution problems by creating special electroplating parks with dedicated central wastewater treatment facilities. In the past, related agencies had recommended establishing special electroplating parks in the Wu Ku (Taipei County), Taichung (Phase III), Ho Shun (Tainan), and Bin Hai (Chang Hua) Industrial Parks. However, at present, only the Bin Hai Industrial Park has finished development of a special zone for metal surface treatment. Difficulties in the other three parks have arisen due to the unwillingness of electroplating industries to relocate. However, the EPA plans to make a strong effort to assist illegal enterprises to move to special electroplating zones and legalize operations.

In terms of controls, the EPA will adopt strict supply side management of raw materials. The new regulations will strictly control the import, sale, and manufacture of chemicals used for electroplating. To eventually eliminate all factories in violation of regulations, purchases of these chemicals will be restricted to electroplating factories that are properly registered or that carry approved improvement agreements. Restricted or reduced sales of these chemicals will also be used to enforce deadlines for the installation of wastewater treatment facilities. Those engaged in illegal sale or resale of these chemicals will be strictly punished and their permits revoked.

At present, there is a clear deficiency for the clearance and treatment of hazardous waste produced by the electroplating industry, with only 55 approved waste treatment companies. The industry is also confounded by a number of other problems, including the rejection of wastes by local governments at planned final disposal sites and the entry of waste from outside sources, as well as a lack of standards for reasonable fee collection. In response, the EPA has charged the Bureau of Solid Waste Management with coordinating this issue.

The draft also includes plans for the IDB to determine standards for the commissioning of electroplating factories, which would stipulate that all new factories include facilities for recycling chemical fluids and wastewater control before they can register to begin operations or purchase sodium cyanide and other electroplating chemicals. To provide further incentive to reduce wastewater volume and lower pollution levels, rewards will be given to factories that install automated electroplating equipment and move to eliminate the out-of-date manual processing of each batch. 

## New Delineation of Air Pollution Control Districts Comes Into Effect

In line with recent amendments to the Air Pollution Control Act, on September 18 the EPA promulgated the re-delineated air pollution control districts, which are now based on county and city boundaries. The changes came into effect beginning in October. According to the announcement, with the exception of national parks and natural preserves which are listed as Class I, of Taiwan's 25 counties and cities, 12 have been listed as Class II for suspended particulate pollution and 13 have been listed as Class III. In terms of ozone levels, 15 districts have been listed as Class II, and 10 have been listed as Class III. For SO<sub>2</sub>, CO, and CO<sub>2</sub>, all districts have been delineated as Class II.

The amendments to the *Air Pollution Control Act* were promulgated in January of this year. One amendment transferred authority to delineate air pollution control districts from county/city governments to the EPA. Working with data collected by general air quality monitoring stations, the EPA recently completed redrawing of district boundaries and on September 18 promulgated the re-delineated air pollution control districts.

EPA officials noted that the previous control districts were based on village and townships as the units of delineation. The new approach uses counties and/or cities as the basic units for delineating districts. Moreover, the *Air Pollution Control Act* stipulates that air pollution control districts be divided into three classes:

- Class I – areas legally designated as national parks, nature conservation areas, etc.
- Class II – areas other than Class I districts that comply with air quality standards.
- Class III – areas other than Class I districts that do not comply with air quality standards.

Control districts were classified according to data collected by 57 monitoring stations throughout Taiwan. Data includes measured quantities of suspended particulate pollutants, ozone (O<sub>3</sub>), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), and carbon monoxide (CO). Three-year averages of pollutant level readings are used to evaluate whether a given area complies with air quality standards. Districts in compliance are listed as Class

II, while those that do not comply are given Class III status.

For the delineation of some of the Taiwan region's more remote off-island counties, modeling results collected from various air quality monitoring plans and the results from Tai Power's automated monitoring stand on Penghu were used. According to the various sources, concentrations of pollutant items on Penghu and Quemoy Counties are all below prescribed national standards. Because they are in compliance with standards, both have been delineated as Class II Air Pollution Control Districts. Based on pollutant source emissions in Lianchiang County, pollution levels fall below those of both Penghu and Quemoy, so it has also been listed for Class II status.

According to these principles, Taiwan's 25 county and city administrative districts (including Quemoy and Lianchiang) have been classified as follows: for suspended particulates, 12 have Class II status and 13 have Class III status; for O<sub>3</sub>, 15 are Class II and 10 Class III; and for SO<sub>2</sub>, NO<sub>2</sub>, and CO, all districts have Class II status.

According to the Act, stipulations and restrictions for each of the classifications are as follows: Within Class I control districts, stationary pollution sources shall not be added or modified. Facilities necessary for the livelihood of residents within protected areas and facilities needed for the operational management of national parks and for purposes of national defense shall be exempt from this restriction.

For additional or modified stationary pollution sources that emit pollutant quantities of a specified scale within Class II control districts, it must be proven that emitted quantities will not exceed allowable increase limits within the district where the pollution source at issue is located or within neighboring districts whose air quality may be affected.

Within Class III control districts, existing stationary pollution sources shall reduce pollutant emission quantities; and for additional or modified stationary pollution sources that emit pollutant quantities of a specified scale, best available control technologies shall be adopted. It also must be proven that emitted pollutant


Class I Control Districts									
Yangming Mountain National Park									
Hsueh-Pa National Park									
Taroko National Park									
Jade Mountain National Park									
Ken-Ting National Park									
Taipei Water Quality Protection Zone									
Lan-Yang Seashore, and 12 other conservation areas									
Nan-Ao Wild Animal Preserve									
Tai-Tung Seashore, and 7 other nature conservation areas									
Ta-Wu Mountain Nature Conservation Area									
County/City	Class II Control Districts					Class III Control Districts			
	SP	O <sub>3</sub>	SO <sub>2</sub>	NO <sub>2</sub>	CO	SP	O <sub>3</sub>	SO <sub>2</sub>	NO <sub>2</sub> , CO
Taipei City	✓	✓	✓	✓	✓	✓	✓	✓	✓
Keelung City	✓	✓	✓	✓	✓	✓	✓	✓	✓
Taipei County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Keelung County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Taoyuan County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hsin-chu County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Miao-li County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Taichung County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chang-hwa County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Yun-lin County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chia-yi County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nantou County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tainan County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ping-tung County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Han County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hwa-lien County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Taitung County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Keelung City	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hsin-chu City	✓	✓	✓	✓	✓	✓	✓	✓	✓
Taichung City	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tainan City	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chia-yi City	✓	✓	✓	✓	✓	✓	✓	✓	✓
Peng-hu County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quemoy County	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lianchiang County	✓	✓	✓	✓	✓	✓	✓	✓	✓



quantities will not exceed allowable increase limits within the control district where the pollution source at issue is located or within neighboring districts whose air quality may be affected.

Moreover, it is important to note that air pollution fee rates vary in different types of districts. Current SO<sub>x</sub> fee rates for pollution sources that have not installed control equipment are 10 NT per kilogram in Class II districts and 12 NTD per kilogram in Class III districts. Per kilogram fees for NOX emissions are 8 NTD in Class II districts and 10 NTD in Class III districts. Because of these varying rates, firms will

pay more or less depending on the changes in the delineation to their respective control districts. However, because the control zones were previously administered at the county/city level, the EPA as of yet has no means to estimate how much air pollution fees will change with the new districting.

The EPA has indicated that these new districts and classification procedures formally came in place beginning October 1, 1999. As the next step, all county and city governments are required to come up with air pollution control plans according to the new regulations. 

## Heavy Metal Classifications for Agricultural Soils to be Applied to Industrial Lands

**Due to the frequency of incidents of industrial-use land pollution and illegal dumping in Taiwan, the EPA has decided to expand the use of a table for classifying soil concentrations of heavy metals in agricultural land, to monitoring for industrial and other lands. The classifications will be used as the basis for future monitoring and remediation plans. Also, priority remediation values for agricultural land will be added to the original Class V standards.**

In the past, when working with agricultural lands, the EPA set a table for concentrations of heavy metals in soil to divide monitoring results into five classifications. But, because of the recent number of incidents of industrial land pollution and illegal dumping, the EPA has decided to expand use of these classifications for the monitoring results of industrial and other land uses. The classification

will also be the basis for drawing up future soil monitoring and remediation plans.

According to the table, heavy metal-contaminated land is divided into five classes. Class I indicates that monitoring of the soil has revealed it to be deficient of copper, zinc, and other elements essential for agricultural lands. Class II land contains soil with a heavy metal content lower than environmental background values, while Class III land has soil with contaminant levels equivalent to environmental background values. The heavy metal concentrations in Class IV land are defined as being at observation levels, and a ranking of Class V means that land has been polluted by an exterior source of heavy metals, and should be listed as a key area for pollution

controls. In addition, the EPA has decided to add to Class V a column for priority remediation values for agricultural land. Agricultural lands falling within this scope are assigned priority and will undergo remediation, depending on the environmental necessity and the willingness of local farmers.

The EPA explains that parcels of land categorized as Class I, II, or III do not have heavy metal soil pollution problems. County and city governments should put their main efforts into Class IV and V parcels. Although Class IV lands have exceeded environmental background values, this may be precipitated by geo-

graphical or environmental factors. According to plans, government efforts should center on identifying sources of external

pollution, and if they exist strengthening pollution checks and controls. For land listed as Class V, county and city governments should perform regular monitoring of heavy metal concentrations in the soil, and determine priority for remediation accordingly. Monitoring results should also be sent to agricultural and health agencies for reference.

However, to avoid pollution to rice stocks, if cadmium or mercury values exceed 1mg/kg in land used to plant rice, the land must be listed as Class V and assigned priority for monitoring and remediation. If rice plantings tested do not conform with food product health standards (for cadmium and mercury), local EPBs must meet with relevant agencies to discuss which lands

Table: Taiwan Land Classifications for Heavy Metal Concentrations in Soil


Pollutant	Class I	Class II	Class III (Env. Background Levels)	Class IV (Observation Levels)	Class V	
					Monitoring Levels	Priority Remediation Levels For Agricultural Lands
Arsenic		topsoil <4	4-9	10-60	>60	>60
		bottom soil <4	4-15	16-60	>60	>60
Cadmium		<0.05	0.05-0.39	0.40-10	>10	>10
Chromium		<0.10	0.10-10	11-16	>16	>40
Copper	<1	1-11	12-20	21-100	>100	>200
Mercury		<0.10	0.10-0.39	0.40-20	>20	>20
Nickel		<2	2-10	11-100	>100	>200
Lead		<1	1-15	16-120	>120	>200
Zinc	<1.5	1.6-10	11-25	26-80	>80	>500

\* Measurements in mg/kg

should be left fallow, and provide support for follow-up work efforts.

In June of this year the Executive Yuan approved a draft of the *Soil Pollution Remediation Act* which was then sent to the Legislative Yuan for review. Before passage of the act there are as yet no procedures to follow for soil pollution control in Taiwan. For example, in the case of the pollution of industrial land, unless the identity of the polluter is clear, responsibility for remediation is extremely difficult to ascertain. Because the *Soil Pollution Remediation Act* has not yet passed, the classification table above is offered only as a reference for county and city governments. To cope with soil pollution problems for the time being, the EPA suggests county and city governments use the table to determine the polluted in-

dustrial lands and then determine the presence or absence of a pollution source. Governments should then request the removal of existing pollution sources according to the relevant laws for water, air and solid waste pollution, and should wait for further clarification of responsibility to begin soil remediation.

Addition of the priority remediation values for agricultural land is primarily intended to make county and city governments determine priority and begin remediation for those more seriously polluted sites. An EPA official stressed though that even if monitoring results do not fall within priority remediation values, remediation can still be undertaken. If the county or city government judges the site to be dangerous a remediation plan can be proposed and begun. 

### ***Taiwan Plans Participation in Green House Gas Reduction Measures***

**At a recent seminar on the atmosphere, the EPA reiterated that Taiwan should be considered a newly industrialized country and emphasized that Taiwan's special governmental situation should allow it to participate in international reductions according to the clean development mechanisms spelled out in the Kyoto Protocol. Also, in response to international controls, the ROC Industrial Development Bureau plans to lower taxes as a means to encourage industrial upgrading.**

The EPA and the Ministry of Economic Affairs' Industrial Development Bureau (IDB) sponsored the *1999 Taipei International Seminar on Atmospheric Protection* on the 13<sup>th</sup> and 14<sup>th</sup> of August at the Taipei International Convention Center. The seminar's major topics included: policies in response to atmospheric change and protection of the ozone layer, raising energy efficiency, measures to reduce global greenhouse gas emissions, substitute technology development, and industrial green house gas reduction measures. Participants at the seminar include academics and experts from countries such as the R.O.C., the United States, Japan, New Zealand, and Vietnam.

Director General of the EPA's Air Quality Control Bureau, Chen Hsiung-Wen, stated that the Framework Convention on Climate Change (FCCC) and the Kyoto Protocol do not yet target developing countries, and thus have not yet defined Taiwan's reduction responsibility. However, in consideration of current development conditions, Taiwan cannot afford to treat the subject lightly. In response, Taiwan has not only established the Atmospheric Protection and Energy Work Group under the central government's National Council for Sustainable Development, but has also begun evaluating what a reasonable position for the country would be and has sought relevant international cooperation. As for internal policies, various measures are being implemented that strive to achieve a win-win outcome in terms of both economic and environmental protection goals.


Director General Chen further noted that, in order to achieve CO<sub>2</sub> reduction targets, the government is

planning to raise LNG supply levels, raise the efficiency of energy use, and modify industrial structure. By 2020, it is estimated that Taiwan's annual CO<sub>2</sub> emissions can be reduced to 297 million tons. However, there will still be a gap between this amount and the reduction target of 223 million tons.

With this in mind, Director General Chen emphasized that Taiwan's level of development should be classified as "newly industrialized," and that reduction targets different from those of industrialized nations should therefore apply. In terms of the Kyoto Protocol's Clean Development Mechanism, Chen also stressed that the international community should recognize Taiwan's willingness to accept reduction responsibility, even though the island cannot participate in related negotiations, and integrate Taiwan's status into reduction planning.

Chen further pointed out the Clean Development Mechanisms currently being considered by the international community are intended not only for governments, but also for manufacturers. If, in the future, Taiwan's manufacturing sector can participate, this could quickly allow Taiwan's reduction measures to be accepted by the global system.

At the same conference, the Director General of the Industrial Development Bureau (IDB), Yea-Kang Wang, indicated that his agency is also planning to take some action. In response to the Montreal Protocol (requiring controls on CFC emissions) and the FCCC, the IDB will publish a "Manufacturing Sector White Paper" and offset industrial income taxes by up to 20% in order to encourage facility and process upgrades.

In addition to the formal conference on August 13, the 1999 ROC Atmospheric Protection Awards were also issued. Winners included the Taiwan Power Company's Taichung Power Plant and nine other organizations. Special recognition awards were also granted to Director General Chen Hsiung-Wen, IDB Section Chief Lai Ping-Ho, and the Industrial Technology Research Institute's Union Chemical Labs Director Lee Chung-Hsi. 

## ***Local Governments Urged to Strengthen Air Pollution Permit System***


**Near the end of last year, the work of handling air pollution permits was transferred from the previous Provincial DEP to local EPBs. Now, the EPA has laid out future permit work focus and proposed a set of unified permit extension regulations.**

In conjunction with the revised Air Pollution Control Act promulgated on January 20, 1999, the work of handling permits for stationary air pollution sources was transferred from the previous Department of Environmental Protection (DEP) to be handled by county and city environmental protection bureaus (EPBs). To ensure a smooth transition, on September 26 the EPA called together a meeting with the various EPBs to discuss key points for work on the permit system in the coming year and a half.

Since the beginning of the stationary air pollution sources permit system in 1993, a total of seven rounds of pollution sources that should apply for permits have been announced and over 8,000 public and private sites brought into the permit system, over 40% of the number of factories listed for controls. The permit system now manages over 95% of all

emissions quantities.

Article 28 of the Air Pollution Control Act states that air pollution permits are valid for five years, and that those wishing to extend permits after five years must apply for extension six months before permit expiration. Many of the first round of permits that were mandated in 1993 will soon be up for renewal. For this reason the EPA has reminded county and city EPBs in the next year and a half to get a firm handle on permit applications, raise the quality of permit reviews, and faithfully carry out permit inspections and carry out other related tasks.

Furthermore, all EPBs must verify that corrections are made to the original list of firms that must apply for permits, stemming from a partial revision of clauses pertaining to production process announced for the sixth round of permits. Additionally, to avoid a pile up of extension applications when the seventh round of permits expire on February 10 of next year, the EPA has asked all EPBs to urge firms to apply as early as possible and assist them with applications. 

### ***News Briefs***

#### ***Environmental Database for Disputes Prone Areas Under Construction***

The EPA will continue to push the construction of an environmental database for dispute prone areas. This work will continue to be carried out by the EPA's Bureau of Performance Evaluation and Dispute Settlement in the new fiscal year. According to contracting plans from the EPA, in this fiscal year detailed database construction will be done on dispute prone areas including the Tafa and Linyuan industrial parks, the CPC oil refinery complex in Kaohsiung, and the Hsingta thermal power plant.

#### ***Lead Content for Motor Vehicle Fuels Lowered Again***

Beginning August 26, motor vehicles in all air pollution control zones are prohibited from using fuel with lead content over 0.026 grams per liter, and beginning January 1, 2000 the use of leaded fuels will be prohibited.

#### ***EPA Develops New Technology for Pollution Assessment in Environmental Disputes***

The EPA has successfully developed new technology to be used in risk assessment for public pollution disputes that are large, sudden or occur in dispute prone areas. The so called "3S" technology for advanced environmental monitoring is composed of remote sensing (RS), a geographic information system (GIS) and a global positioning system (GPS). This series of technology uses satellite and remote aerial photography for monitoring purposes. GPS is used to improve differential positioning, and configured to a transmission system, then integrated with the remote aerial sensing system, and linked to the ground based environmental database, creating a high precision aerial monitoring system. If GPS is installed in a land based vehicle or carried by environmental personnel, collection of information and monitoring of pollution is even more effective. The EPA has already engaged in sample testing and

risk assessment for a number of important public pollution incidents from over the past few years, and have been successful on all fronts.

#### ***Value of Industrial Waste Reuse Nears 800 Million NTD in 1999***

In 1999 the EPA approved a total of 50 applications for reuse of industrial waste, a total permitted volume of 474 thousand tons. Of this, general industrial waste accounted for 459 thousand tons and hazardous waste 15 thousand tons. According to EPA calculations, if one ton of general industrial waste is valued at 1,500 NTD, each year 690 million NTD can be saved in treatment costs. For hazardous wastes, at a value of 6,000 NTD per ton, total yearly savings equal 90 million NTD. In order to meet waste reduction and recycling goals, the EPA established an industrial waste information exchange center in cooperation with the Industrial Development Bureau. According to statistics, in 1999 the center acted as intermediary for a total of 143 information exchanges, of which 12 led to successful exchanges totaling 16,033 tons of waste.

#### ***Reporting of "Inkfish" Vehicles Increases Five Fold After Reward Offered***

In mid-August the *Regulations for Reward and Reporting of Pollutant Emissions From In-use Vehicles* came into force. At that time, the EPA also announced that as of September 1, 1999, it would begin to process reports turned in by the public. According to statistics from September 1 to 9, the EPA and local governments received a total of 3,520 cases, a five fold increase compared with similar time periods in June and July. According to initial EPA analyses, motorcycles made up the greatest proportion of reports, at 55%, diesel vehicles were second at 40%, with other vehicles making up the other 5%. In April, while still in the process of formulating the regulations, the EPA received around 2,000 public telephone reports a month.

## Medium and Long Term Plans for Waste Disposal Facilities in the Works

The EPA is drafting the *Medium and Long Term Plans for the Construction of Public Waste Disposal Facilities* for the next ten years. The plan aims by 2010 to raise proper treatment rates for trash to 90%, industrial waste to 90% and trash recycling rates to over 45%. Goals for the next four years (until 2004) include raising proper trash treatment rates to 88%. To implement these policies the EPA has requested all counties and cities to propose plan names and budgets necessary to meet the goals laid out for the next four years.

To come up with comprehensive plans for the use of limited public construction resources, the various departments of the

Executive Yuan are in the process of putting together the *Medium and Long Term*

*Public Construction Plans*. The plans contain separate construction goals set for the next four and ten years. For this, the EPA called a meeting of all units on September 7 to draft future construction plans for trash disposal from 2001 to 2004.


The EPA noted that current incineration rates are at 24.6%, proper trash disposal rates at 75%, and that several township trash landfills hit capacity each year. To solve these problems, the EPA will rely mainly on the trash disposal program drafted by the Bureau of Solid Waste Management. In the future most trash disposal will be based on incineration, and according to plans,

within the next couple of years 21 large incinerators, 15 BOT and BOO incinerators and 10 small incinerators will be completed. For this reason, current trash disposal has concentrated on incinerator construction projects and ash residue treatment facilities.

According to a draft of the *Medium and Long Term Plans for the Construction of Public Waste Disposal Facilities* formulated by the EPA, the ten year goals (until 2010) include raising proper disposal rates for trash to 90%, industrial waste to 90%, and raising trash recycling to above 45%. Four year goals include raising proper trash disposal rates to 88% by 2004, and the completion

of 16 public incinerators before the year 2000, (including those already in operation), and another

five before 2004. The four year plan also aims to complete 15 BOT and BOO incinerators before the year 2004.

To implement the above policy goals, after internal discussions the EPA decided to again request that county and city governments propose the names of necessary plans and budgets based on the four year goals. An EPA official pointed out that in the past public construction plans were limited to hard construction or machinery purchases. But because the Executive Yuan has already passed this resolution, at present as long as a measure is clearly effective it can be incorporated into the *Medium and Long Term Public Construction Plans*. 

Target Year	1999	2000	2001	2002	2003	2004	2010
Trash Disposal Rates (%)	85	85	85	86	87	88	90
Incineration Rates (%)	44.6	57.9	70	80	90		
Recycling (thousand tons)	600	700	750	800	800	800	

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