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By July 2000, all current semiconductor production operations must meet new emission standards. Targeted firms are expected to pay out nearly NT\$1.2 billion over the next year to meet these standards.

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1998 factory pollution control evaluation efforts focused on 402 factories. Thirty-two factories were recognized for their outstanding performance.

### ***News Briefs***

Feature Article

*An Overview of the National Council for Sustainable Development*

Taiwan's National Council for Sustainable Development (NCSA) was established under the ROC Executive Yuan in 1997. A critical task before the NCSA in 1999 is to script an agenda for the new century – an "Agenda 21." Also, with a charge to take its message to the local level, Council Chairman Ta-Chou Huang has underscored his commitment to localize NCSA activities through the year. In addition to focusing on major environmental protection topics, he would like to see regional sustainable development symposiums held on a rotational basis in each of Taiwan's counties and municipalities.

The 1992 Earth Summit in Brazil, attended by over 100 world leaders, resulted in clear support for implementing sustainable development concepts to address environmental, resource, and economic development issues. One of the Summit decisions was to declare that sustainable development promotion in each country should be done according to an Agenda 21. In 1993, the United Nations established its own Sustainable Development Committee to support and monitor sustainable development initiatives around the world.

Sustainable development is of particular importance to Taiwan due to Taiwan's population density and the island's natural resources. To encourage domestic sustainable development programs and keep up with global initiatives, the Executive Yuan (EY) expanded the mandate of the existing Working Committee on Global Environmental Change Policy and re-inaugurated the group as the National Council for Sustainable Development in 1997.

Council responsibilities are defined within both external and internal categories. External responsibilities encompass tracking and promoting Taiwan participation in international environmental protection (EP) treaties and agreements and in international organizations. Externally, the NCSA also develops and executes strategies for ROC participation in international (or regional) sustainable development and environmental protection activities. Internal responsibilities focus on translating international environmental protection trends into domestic action. The NCSA is responsible for defining and promoting comprehensive domestic strategies for sustainable development and environmental protection and to facilitate, coordinate, and guide Taiwan's sustainable development efforts in relation to environmental protection efforts and research overseas.

The NCSD's eight working groups focus on the following eight issue areas: atmospheric protection and energy; waste management and resource recycling; marine and land/water resource management; ecological protection and sustainable agriculture; environmental policy and development issues; trade and the environment; sustainable industry; and, social development. (For additional information on the working groups, please see accompanying table.)

The NCSD held a series of conferences last year which included seminars and meetings on issues such as: Taiwan's response to the UN Framework Convention on Climate Change, development of sustainable energy resources, the relationship between investment and sustainable development, sustainable development of groundwater resources, and the relationship between environmental protection and sustainable development.

In addition to key task areas assigned to each of the NCSD's working groups, the most critical task for the Council this year is to draft an Agenda 21 that will provide the framework for future progress in sustainable development. All working groups are cooperating on this project and, pending final editing and compilation work, an initial draft will be completed in the near future.

Chairman Huang believes it imperative that NCSD come to understand the practical problems arising from the implementation of sustainable development concepts and initiatives around the island. The Council is presently involved in two high profile projects -- the illegal burial of solid waste on agricultural land in Ping-Tung, Taoyuan and Changhua Counties and the restoration of Hualien and Taitung County coastline affected by development. It is the NCSD's intent to strengthen this trend toward involvement in local issues. In addition to meetings and seminars held to discuss and research macro environmental issues, the NCSD may begin holding regional symposiums on sustainable development issues in Taiwan's various counties and municipalities on a rotational basis.

Working Group	Chairing Agency	Issue Areas	Principal Tasks / Responsibilities
Atmospheric Protection and Energy	EPA, Air Bureau	Montreal Protocol; Treaty on Global Climate Change; Energy Issues	Review and set national energy policies; increase industry energy use efficiency; monitor greenhouse gas emissions; appropriate CFCs; control production and import of HCFCs.
Waste Management and Resource Recycling	EPA, Waste Bureau	Basel Accord; Waste Recycling; Industrial Waste Minimization; Radioactive Waste Management	Establish bilateral waste import/export control agreements with relevant countries; revise relevant domestic laws; guide domestic industry waste minimization efforts; promote plans to export low-level radioactive waste; plan and build medium-term storage facilities for spent nuclear fuel material; and conduct inspections of long-term grade 3 storage facilities.
Marine and Land/Water Resources Management	MOEA, Water Resources Bureau	Marine Resources; Water Resources; Land Resources	Conduct planning and development work for all Taiwan-area water resources; promote water conservation and reuse technologies to industry; promote resource conservation to fishing industry; revise the structure of Taiwan's fish farm industry; establish policy and laws governing national lands.
Ecological Preservation and Sustainable Agriculture	Council of Agriculture, Forestry Bureau	CITES Convention; Convention on Bio-diversity	Promote sustainable agriculture and ecological preservation; ensure participation in and cooperation with international wildlife conservation and bio-diversity initiatives; assess and maintain databases on Taiwan's biological resources.
Environmental Policy and Development	EPA, Comprehensive Planning Bureau	Macro-level environment and development issues, such as green consumerism and "green GDP."	Promote EIA review of government policies; compile and draft the ROC's agenda for the 21 <sup>st</sup> century; promote Taiwan's 4-in-1 recycling plan.
Trade and the Environment	MOEA, Board of Foreign Trade	Environmental protection and trade issues addressed by international economic and trade organizations.	Promote ROC participation in international and bilateral environmental agreements.
Sustainable Industries	MOEA, Industrial Development Bureau	ISO-14000; Development of EP industries; ISO-9000; Cleaner Production	Promote Cleaner Production, EP-related technologies; develop ISO-1400 related techniques and tools; establish certification systems; assist firms to establish environmental management systems meeting ISO-1400 standards requirements.
Social Development	Council of Economic Planning and Development	Population; Integration of Cultures; Sustainable Communities; Underprivileged Groups; Combatting Poverty; Ensuring Availability of Medical Care.	Organize task forces to address each of the task areas indicated at left.

# Environmental Policy Monthly

## *Waste Act Amendment to Emphasize Industry Responsibility for "Waste Life Cycle"*

The EPA recently launched a full scale review of the *Waste Disposal Act*, leading to key recommendations including: (1) handling resource recovery through separate chapters; (2) strengthening the control of solid waste streams and intensifying efforts to ensure that industry assumes full "waste life cycle" responsibility for wastes generated; and (3) significantly raising fine levels and making repeat offenders subject to criminal prosecution. The EPA further plans to retain a team of lawyers to fully prosecute companies that continue to illegally dispose of wastes.

Following the recent illegal shipment of mercury-contaminated sludge to Cambodia by the Formosa Plastics Corp., the problem of inadequate solid waste treatment capacity in Taiwan has become ever more apparent. Recognizing that new action must be taken, the Executive Yuan requested the EPA to redraft amendments to the *Waste Disposal Act*.

The EPA had been racing to get an earlier set of amendments approved by the EY so that they could be passed by the previous session of the Legislative Yuan (LY). These proposed amendments primarily targeted changes to the administrative underpinnings of the Act and concentrated many waste management regulations into only a few articles. Now, with an extended timetable to develop the legislation, the EPA has the time to conduct a comprehensive review of the Act's contents and structure.

Revision of resource recycling regulations is one area in urgent need of attention. In the current Act, all regulations relevant to recycling are compressed into Article 10.1 of the Act -- making this section exceptionally large and unwieldy. The EPA is currently examining ways to break Article 10.1 into its logical component parts and requiring issues related to resource recovery be handled by special regulations. Also, regulations governing solid waste management are undergoing extensive rework to give them more punch and to ensure more comprehensive coverage.

The principal foci of EPA deliberations regarding industrial solid waste management are how best to strengthen regulations to ensure that industry assumes "final treatment responsibility" for wastes generated and how to make offenders liable to criminal prosecution. The EPA is also preparing to significantly raise penalties. The

maximum fine for certain violations of the Act may go as high as NT\$10 million.

Current EPA Administrator Hsun-Hsiung Tsai has from early on wanted to promote a concept of "waste life cycle responsibility." During last year's revision of the *Waste Disposal Act*, Administrator Tsai seriously considered making firms that generate solid waste legally and financially responsible for the final disposal of their wastes, and for all associated environmental contamination. This responsibility would be effective regardless of whether the pollution generator handled the wastes on their own (through proper disposal or recycling) or hired a certified clearance and treatment firm to do so. Following reports of Formosa Plastics Corp.'s illegal shipment of mercury-contaminated sludge to Cambodia, the EPA began serious discussions on entering "waste life cycle responsibility" into the law books.

Finally, in light of the large sums of taxpayer money spent each year to clean up illegally dumped industrial waste and to restore contaminated sites, the EPA has decided to retain a team of professional lawyers to help claim damage compensation from companies that have illegally disposed of their wastes.

### ***Noise Act Amendment Submitted to EY***

**The EPA has completed a draft amendment to the *Noise Pollution Control Act*. Key elements include tighter noise pollution controls; setting noise standards for public areas, motor vehicles, and aircraft; and time/area controls on objectionable noises such as those caused by election campaigning. Also, the draft requires that any new structure built adjacent to a road more than 8 meters in width, or adjacent to a highway, rail line, mass transit system, or airport must incorporate noise-dampening construction materials as a condition for receiving a building permit.**

Seven years have past since the last amendment to the *Noise Pollution Control Act* was made in 1992. During the intervening years, the number of noise pollution cases has risen dramatically -- around 15% annually. With a current annual volume of 20,000 cases, noise pollution now ranks as Taiwan's second most common public nuisance charge.

Data shows that in 70% of noise pollution cases, either the noise cannot be properly monitored or the source cannot be determined. Therefore, a majority of noise pollution cases, characterized by noise that is intermittent and difficult to monitor, cannot be adequately addressed under current control standards. To address this inadequacy, the EPA began draft an amendment to the *Noise Pollution Control Act* last July. Following several public reviews, the final draft was finished on March 2 of this year. The 26 paragraphs in the previous revision were increased to 70, and the approach to noise

control was completely redefined and the control regime overhauled. The Director General of the EPA's Bureau of Air Quality Protection and Noise Control, Hsiung-wen Chen, said that the overhauling of the *Noise Act* is more like the breaking of new legal ground rather than a revision of current laws.

The draft amendment incorporates seven chapters: General Principles, Maintenance of Environmental Noise Levels, Noise Control in Public and Private Areas, Motor Vehicle and Railroad Noise Control, Aircraft Noise Control, Penalization Guidelines, and Appendices. Key accomplishments in this draft include (1) strengthened noise control measures, (2) the establishment of noise control standards for public/private areas, motor vehicles, and aircraft, and (3) permitting inspectors to fine violators immediately for a first offense to save on time and energy and to increase effectiveness (the current Act requires that violators be permitted a certain period within which to effect improvements prior to being liable for fines).

The draft sets different control standards according to land zoning categories and according to each of the four 6-hour segments in a day (morning, daytime, evening, and night). Controls focus on the noise generated by public/private sites, transportation and delivery networks, aircraft, and noise-generating equipment.

To control irregular, non-continuous noise, such as that generated by construction sites, cultural and neighborhood activities, commercial activity, election campaigning, and aircraft engine testing, the draft sets limitations based on time of day and geographic location.

Noise suppression measures for equipment generating low frequency or intermittent noise, such as air conditioners, cooling towers, printing machinery, and motors, will be addressed noise pollution prevention guidelines.

Another point new to this draft is the requirement that any building built adjacent to a road 8 meters or more in width, or facing a highway, rail line, high-speed rail line, mass transit system, or located in any other area officially designated a high-noise zone, must incorporate noise-dampening construction materials as a condition for receiving a building permit

General noise pollution improvement measures include addressing source noise, insulating the noise source, and otherwise blocking the noise from reaching the listener. In addressing the problem of traffic noise, Taiwan already has strict motor vehicle noise emission standards. However, without restrictions on the number of vehicles on the road, improvements resulting from such measures are limited. Alternatively, construction of noise barriers is limited by cost and the efficiency of available technology and could not be implemented on a sufficiently large scale.

If construction firms incorporated noise suppression materials in new buildings, the

relative additional costs would not only be minimal, they would pale in comparison to the government funds needed to build a comparatively effective system of barrier walls around noise sources. Currently in Taiwan, many residential buildings already claim to use noise suppression materials. It would protect further the public's interest to enact laws requiring such materials in buildings .

Draft revision work on the *Noise Pollution Control Act* has been finalized and was submitted to the Executive Yuan on March 11.

### ***EPA Announces Requirements for Toxic Substance Liability Insurance***

**Rules requiring third party liability insurance for the handling of toxic substances were completed and announced at the end of March. The effective date for the new rules must await a decision on new insurance forms by the Ministry of Finance and a determination by the various insurance associations regarding implementation procedures. Insurance coverage is specified to be “no fault” and will be limited to compensation for injury, disability, death, and financial loss caused by toxic chemical related accidents.**

Accidents involving toxic substances nearly always result in harm and damage. Therefore, provisions regarding insurance responsibilities were added during 1997 amendments to the *Toxic Chemical Control Act*. Companies are now legally required to hold third party insurance for all EPA-designated toxic substances. The EPA expects that the involvement of insurance firms will further reduce the danger posed by such chemicals.

Because there are no domestic precedents regarding toxic substances insurance, the EPA conducted extensive study of the issue and announced the *Rules for Implementing Mandatory Third Party Liability Insurance for the Use of Toxic Chemical Substances* on March 31, 1999.

According to these regulations, all persons or companies involved in the manufacture, use, storage, or transport of toxic chemical substances must hold third party liability insurance to cover associated operational risks. Even though the activity of transportation is already included within the scope of mandatory vehicle liability insurance, these policies only cover damages that resulted directly from a traffic accident. Because of the high risks involved in transporting toxic substances, it is necessary to include within the scope of liability insurance the damages that result from the release of toxic substances during an accident.

The newly enacted rules stipulate that individuals or firms using Category 3 substances at quantities of more than a specified baseline amount must purchase



liability insurance. The baseline equals a multiple of the controlled usage amounts as stipulated in the *Working Guidelines for Hazard Prevention and Response Planning*.

For liquid and solid toxic substances, the baseline amount equals the controlled usage amount multiplied by 10. For liquid substances, this means that firms that use a given toxic substance in excess of 3,000 tons per year, or use a volume that exceeds 100 tons at any single time at any single site must be insured. For solid substances, the baseline is 12,000 tons per year or 400 tons at single site and time.

The baseline for gaseous substances equals 100 times the controlled usage amount defined in the aforementioned working guidelines. Those using less than 20 tons (total) of either chlorine or formaldehyde at any single site at any single time are excepted from this requirement.

The newly enacted rules define the scope of mandatory third party insurance to cover physical damage, disability, death, or financial loss resulting from toxic substance accidents and related emergency response measures. Insurance coverage must be “no fault”. During development, compensation for the chronic effects (such as cancer) of long-term exposure to toxic substances were considered. However, consensus was not reached prior to submitting the draft and these points were not included.

Under the principle of fairness, the rules require that insurance pay for losses suffered by all true victims of such accidents. However, those harmed as a result of purposeful or criminal intent should not be entitled to compensation. In addition, the rules stipulate four situations which may not be covered by insurance policies.

1. When an incident did not occur in a sudden manner.
2. When the user of a toxic substance intentional causes an incident.
3. When an incident occurs prior to the insurance policy going into effect.
4. Incidents caused directly by acts of war, armed conflict, or civil unrest; however, accidents resulting from said factors will be covered.

This draft sets minimum compensation standards as follows: Casualty insurance (per person) – NT\$2 million; Casualty insurance (per incident) – NT\$70 million; Capital loss insurance (per incident) NT\$10 million; accumulated insurance amount over the term of policy – NT\$160 million. The draft further requires that the policyholder (i.e., the user of toxic substances) must accept a deductible of between NT\$100,000 and 500,000 per incident to share out some of the associated responsibility and risk. The actual amount of deductible should be worked out between the policyholder and their insurance provider.

The actual format of new insurance forms must wait until discussions have completed between the Ministry of Finance and insurance industry association on

details regarding rights and responsibilities as well as rules regarding group policies and/or re-insurance. Once these questions have been resolved, the EPA will announce the formal date of implementation of the rules.

Once the rules undergo implementation, relevant parties will be required to take out insurance policies within three months.

### ***The Need for Third Generation Air Quality Monitoring Stations Under Review***

**To facilitate total pollutant quantity controls, the EPA recently launched a full review of plans for the existing network of air quality monitoring stations. Academics made a recommendation to relax current station placement rules to one station per 350,000 inhabitants. To help monitor and control ozone levels, the EPA is considering adding VOC monitoring functions to stations. Officials indicate that a clearer position regarding plans to increase or reposition monitoring stations must wait until April.**

The government has installed and maintained air quality monitoring stations since 1980. Initially, a total of 19 such stations were installed in large metropolitan areas. This situation remained until 1993 when the EPA hired an international consulting firm to analyze such factors as population, distribution of emission sources, land usage, and weather patterns and then to re-design the monitoring network. The program resulted in a total of 66 monitoring stations, which were increased again to 72 by 1998.

In line with plans for implementing total pollutant quantity controls (TPQC), the EPA recently invited a team of academics and experts to review the current air quality monitoring network and to discuss the necessity and potential of increasing the number of stations or relocating existing stations.

TPQC systems will monitor and control the total emissions generated over a particular area of land. Decisions whether to increase or loosen controls on emission densities and whether to add or change permitted pollutant levels must, in the end, be based upon baseline estimates tied to the air quality model used. Answers are particularly needed to questions such as whether monitoring stations in their current configuration deliver data relevant to macro emission control formulas and whether each monitoring station provides data representative of a certain area's air quality situation as well as indicative of the needs of future control measures.

A minimum of two to three years is required to open a new monitoring station; from planning, siting, budgeting and purchasing, and testing, through to installation and final acceptance checking. Currently, most existing stations operate with equipment in excess of five years old – outside the government-mandated replacement cycle.

Therefore, this is an opportune time to conduct a full review of the current monitoring network and to begin drafting blueprints for third generation air quality monitoring stations.

The team noted that, according to a 1993 directive on implementing air pollution control, siting standards for monitoring stations were set as follows: in areas with a population density of 15,000 people per square kilometer or higher, one station would be established for every 250,000 people; in areas of population density less than this number, one station would be established for every 300,000 people. Now, with even higher urban population densities, the current number of stations does not meet original requirements and cannot meet originally formulated expectations. The team recommended a relaxation of current regulations to dismiss considerations of population density and instead establish one station for every 350,000 people to bring monitoring capabilities closer to expectations. According to this principle, there will be an increase in the number of stations allocated to Taipei and Taichung Cities and to the counties of Taipei, Taoyuan, Miaoli, Taichung, Changhua, and Tainan, and Pingtung.

Another finding of the team was that the number of stations could actually be reduced without significantly degrading the accuracy of PSI calculations. Eight stations were recommended for closure, with their personnel and equipment relocated to offshore island stations, such as those on Orchid and Turtle Islands, to extend the range of data input into the air quality model.

After EPA review of these recommendations, the decision was made not to implement the closure/relocation recommendations. While certain stations may not significantly add to the accuracy of PSI estimates, their data are frequently used for EIA purposes and therefore have a value. Also, the need to establish stations on outlying islands must be weighed against the additional maintenance, utility, and staffing costs such an arrangement would require.

Ozone has become an important indicator for air pollution levels in Taiwan. In order to promote early detection and control of ozone-causing substances, the EPA is taking active steps to see how to incorporate monitoring of volatile organic compounds (precursors of ozone formation) in the next generation of monitoring stations.

Some on the team made suggestions regarding the repositioning of current traffic and general air quality monitoring stations. However, problems regarding land procurement for relocation and the applicability of new data streams from these stations need first to be considered. All problems are intertwined and none can be addressed in an isolated manner. The question of station relocation must wait until after April.

## ***Semiconductor Industry Expenditures on Air Pollution Control Expected to Hit NT\$1.2 Billion***

**By July 2000, all current semiconductor production operations must meet emission standards as stipulated in the *Air Pollution Emission Standards for the Semiconductor Manufacturing Industry*. Compliance with these standards will result in an estimated reduction of 2,700 tons per year in volatile organic compound (VOC) and acid gas emissions. As new operations in Taiwan's southern science park come on line, reduction volumes should hit 6,000 tons per year. To achieve the standards, firms are expected to pay out an estimated total of NT\$1.2 billion over the next year.**

To address air quality problems specific to this industry, the EPA issued the *Air Pollution Emission Standards for the Semiconductor Manufacturing Industry* in January 1999. All current operators are required to submit air pollution prevention plans to both central and local competent authorities. All must be in full compliance with mandated emission standards by July 1, 2000. To facilitate industry compliance, the EPA held seminars in Taipei and Kaoshiung cities on the legal and technical aspects of the new regulations on January 21 and February 10.

Data indicates that the domestic semiconductor manufacturing industry consumes 11,500 tons of volatile organic compounds (VOCs) annually, including benzene, methylbenzene, isopropyl alcohol, dichloroethylene, and trichloroethylene. Most current pollution control systems in place do not effectively control VOC emissions, leading to annual emission volumes of around 3,000 tons – nearly 30% of total consumption volume. Also, the industry uses 12,500 tons of inorganic acids each year, although wet scrubbers keep much of their waste emissions from entering the environment. Total release of inorganic acids by the semiconductor manufacturing industry is approximately 600 tons per year.

According to the new standards, all semiconductor firms engaged in the manufacture or packaging of IC wafers and/or chips, epitaxy, mask production, or circuitry etching whose annual consumption of VOCs and inorganic acids (such as nitric, hydrochloric, sulfuric, phosphoric, and hydrofluoric acids) exceed control limits will be subject to regulatory control. The standards also require firms consuming 50 or more tons of VOCs annually, or releasing more than 0.6 kg per hour, to install monitoring instruments to check VOC concentration. Firms are responsible to record monthly input and emissions totals for VOCs and inorganic acids as well as any reduction in usage. Operators must record daily key operational variables and maintenance information for pollution control equipment. Those who have installed VOC concentration monitor(s) must record on a daily basis the ratio removed or

emissions volume. Those who have not installed such monitors are required to test once a year their waste gas emissions both prior to and following treatment. All records on usage, operations, and tests must be submitted each quarter to local authorities and retained in company files for a period of at least two years.

Following release of these new standards, the EPA estimates that approximately 70 firms in the semiconductor industry will need to upgrade pollution control facilities to come up to compliance requirements. Of these, approximately 20 will need to invest an estimated total of more than NT\$1 billion to install appropriate VOC control equipment. Another 50 firms must spend an approximate total of NT\$200 million to improve current inorganic acid treatment facilities.

Experts believe that after full implementation of new standards in July 2000, total VOC and acid gas emissions will be reduced by 2,700 tons per year. With completion of work on Taiwan's southern science park, this annual emissions reduction is expected to hit 6,000 tons per year.

### *Tap Water Receives Best Rating in 14 Years*

**Tests this year returned the most positive prognosis on Taiwan's tap water supply of the past 14 years. Most of the problems identified this year centered on high bacteria levels and taste and odor factors. This year's test also revealed that no samples contained excessive levels of heavy metal contamination. Key reasons include reduction in contamination of water reservoirs and the enhanced enforcement of relevant laws - including higher fines for violations.**

In 1998, 0.41% of total tap water samples taken were found to be below minimum quality requirements. This represents a vast improvement over previous years: 0.9% in 1997 and 2.97% in 1996. This year's figure is higher only than the 0.27% recorded in 1985. This makes the 1998 figure the lowest in 14 years.

Water sample data showed a decrease in water quality problems throughout the island in 1998. Most counties and municipalities recorded substandard tap water readings of 1.0% or less, with the counties of Hsinchu, Taichung, Nantou, Yunlin, Chia-Yi, and Hualien, and the cities of Hsinchu, Chia-Yi, and Tainan, all recording 100% compliance on inspections.

During the 12 months of 1998, a total of 15,009 samples of tap water were analyzed in Taiwan. A total of 61 of these (0.41%) were reported to fall below quality requirements. Of this number a total of 14,976 samples were taken directly from the water supply system with 55 (0.37%) reported substandard. I-Lan and Taoyuan County Environmental Protection Bureaus provided indirect samples (those not taken directly

from the water supply system). Of their 33 recorded samples, 6 (18.18%) were found substandard.

Of the samples taken, the most failed due to clarity (18 cases). Other significant problems included were excessive bacteria (16 cases), presence of colon bacillus (9 cases), free active chlorides (8 cases), and excessive dissolved solids (7 cases). All identified problems fell into the bacteriological and potable categories. Every sample passed tests for various heavy metals including lead, arsenic, chromium, cadmium, silver, and mercury. Most of the problems identified with this year's samples resulted from contamination by water pipes or by improper water treatment procedures.

Indirect samples were found to have higher rates of non-compliance due to secondary contamination from improper maintenance and cleaning of private water towers, reservoirs, and equipment (including the improper siting or configuration of such).

After initial analysis, reduction in water source contamination was identified as the principal reason for the drop in the number of 1998 substandard water samples. For example, following the outbreak of foot-and-mouth disease at many of Taiwan's pig raising operations, volumes of pig excrement entering the Kaoping River dropped, leading to a significant reduction in ammonium nitrogen levels at the four water treatment facilities in the Kaohsiung area. A secondary reason for improvement was improved legal and penalty structures put into place after the announcement of revisions in May 1997 to the *Drinking Water Management Statutes*.

Currently, environmental protection agencies conduct regular or irregular inspection of tap water quality around the island. All municipal and county EPBs collect at least 15 tap water samples per month. The monthly sample volume in Taiwan is over 1,000 every month. Samples found not to meet minimum requirements are dealt with according to stipulations in Article 11 of the aforementioned statutes. Violators are subject to fines between NT\$60,000 and NT\$600,000 and are required to effect improvement within a specified period of time. If follow up inspections reveal continued problems, the violator will be fined on a per day basis and, for serious violations, can be ordered to cease supply operations.

Today's tap water inspection results are built upon a foundation of increased inspections and heavier fines for violators. Government policies have already effectively guided water supply companies to tighten monitoring of their own water quality and to upgrade treatment techniques.

## ***Investigation of Groundwater Beneath Waste Dumps Begun***

**The EPA recently launched an investigation of groundwater contamination around Taiwan's 140 identified illegal waste dumps. Testing has already been completed on 60 wells. Of 22 used to draw drinking water, 8 were found to fall below minimum safety and health standards. Apart from wells in Fang-Yuan Township, Changhua County, which contained unacceptable levels of benzene and methane dioxide, none of the substandard wells were rejected for reasons tied to seepage from waste dumps. The EPA is also moving ahead with plans for soil and groundwater inspections at 28 key industrial districts. Results from the first stage of investigations will be issued in April.**

The contamination of subterranean water flows threatened by the illegal dumping of wastes on agricultural land, the illicit dumping of wastes in vacant areas, and seepage from Taiwan's industrial parks is an issue now firmly in the public spotlight. The EPA is actively addressing this issue by investigating the use and quality of groundwater in areas close to such dangers.

Firstly, with the assistance of local authorities, the EPA conducts a survey of water wells within a 2 km radius of an identified site; testing for clarity, pH, chloride salts, sulfates, free-ion ammonium nitrogen, hardness, iron, manganese, chromium, lead, colon bacillus, and COD. Wells will be tested for other contaminants depending on the characteristics of the buried waste. If a sample returns a result in excess of maximum testing standards or if the sample is determined to contain contamination from the site, residents are immediately notified to stop using the said water source. The water supply company is then brought in to resolve as quickly as possible the resulting shortage in water supply.

According to a report received recently by the EPA, Taiwan currently has a total of 140 illegal waste dumps (including that at Linyuan in Luo Tuo Mountain). Local EPB authorities have already pinpointed 186 groundwater wells near 110 of the dumpsites and have begun inspections.

Recently EPB agencies around the island conducted tests at 60 groundwater wells, of which 22 are used to draw drinking water. These tests indicated that 8 of the drinking water wells fell below drinking water standards. The problems included excessive manganese in one well in Taoyuan county, colon bacillus in two wells in Hsinchu county, intestine bacillus in three Pingtung County wells, and excessive iron and manganese in one well in Tainan. In addition to these, two wells in Fang-Yuan Township, Changhua County were tested to contain benzene and methane dioxide. One of these was used for drinking water. The local EPB has already advised nearby

residents not to drink from these wells.

A point of particular note is that the Kaohsiung-Pingtung Plain, home to the densest concentration of mercury-contaminated sludge wastes in Taiwan, did not submit a single report worthy of particular concern. In total, 10 waste dumps in that area were inspected (including Luo Tuo Mountain) along with 41 wells, of which 12 were used for drinking water. Currently, 10 of the wells, including 2 used for drinking water, were tested for VOCs and mercury. All were found to meet minimum drinking standards. Testing at the remaining 10 drinking water wells is slated to finish by the end of February.

In Pingtung county, testing is being conducted at 20 dumpsites and a total of 46 groundwater wells – of which 11 are used for drinking water. Of the 18 wells already tested (including 9 drinking water wells), 5 (3 for drinking water) were found with excessive levels of intestine bacillus. The remaining 2 drinking water wells are expected to be tested by the end of February. Several of the groundwater wells returned higher than average levels of iron and manganese. This is most likely attributable to natural conditions in the area. The high intestine bacillus reading appears to be the result of nearby settling ponds and other livestock-related factors rather than contamination of groundwater by illegally disposed of wastes.

Outside of its work in areas adjacent to illegal waste dumps, the EPA is also focusing inspection efforts on potential contamination from Taiwan's many industrial districts. The EPA has already allocated NT\$15 million to local authorities to conduct soil and groundwater contamination inspections around 28 industrial districts. These districts include: the petroleum refining districts of Ta She, Jen Wu, Lin Yuan, Lin Hai, and Tou Fen; the Hsinchu Science Based Park; Chinese Petroleum's Kaohsiung Plant; the Taoyuan Oil Refinery; and the industrial processing zones of Yung An, You Shih, Ta Yuan, Kwan Yin, Chung Li, Lung Teh, Fang Fan, Chuan Hsing, Nan Kang, and Ping Nan. The first report of findings should be ready around the close of April.

### *Incinerator Construction Moves Forward*

**The EPA is vigorously pursuing the construction of new waste incineration facilities as the best method of waste disposal currently available. To increase understanding between the EPA and the general public, the EPA is stepping up communication and setting up a compensation system for those living within the vicinity of an incinerator.**

To address pressing needs, the EPA intends to continue pushing new solid waste incinerator facility construction as a priority for government policy. Waste incineration is currently the best method of waste disposal given the island's needs and



circumstances. With limited available land and a highly concentrated population, incinerators provide a safe, sanitary, resourceful method of waste disposal, which uses less land than other methods.

The EPA's Bureau of Incinerator Engineering, set up in March 1992, oversees the *Taiwan Waste Resource Recycling (Incineration) Facility Construction Engineering Plan*, which scheduled the construction of 21 incinerators capable of handling a combined total of 21,900 tons of waste per day. Currently, nine incinerators have been completed and 12 are under construction. At this stage, the EPA is actively overseeing the project's progress and quality control, and is further ensuring that a smooth transition is made from project completion to operation. Following completion of construction and commencement of operation, the rate of waste treatment through incineration should be 70% or higher.

Opposition to the construction of incinerators from residents of chosen sites, reflecting the "Not in my backyard" mentality of the general public, has prompted the EPA to undertake measures to promote cooperation and understanding. The EPA is striving to increase communication with the general public by distributing information pamphlets and holding informational meetings to share views. The EPA is further setting up a compensation system to allay public misgivings over the construction projects. Since implementing these measures to reach out to the public, most residents have consented to the construction of the incinerators.

The compensatory program will allow for districts near the incinerators to receive subsidized public facilities, which would include exercise and recreation centers, libraries, swimming pools and tennis courts. Financial compensation would also be available.

### ***Toxic Substance Shipping Procedures Streamlined***

**The EPA completed the draft revision of *Regulations Governing the Transportation of Toxic Chemicals*. Key points of this revision include relaxation of several control requirements and clarification of transporter and chemical owner responsibilities with regard to accident prevention and reporting, emergency response, and post-accident clean-up and rehabilitation. The EPA will work quickly to gain MOTC concurrence for relevant draft requirements in order to get the draft approved and issue a formal public announcement.**

The EPA once again submitted a draft revision of the *Regulations Governing the Transportation of Toxic Chemicals* to clean up a number of troublesome and ambiguous points that exist in the current version. A public hearing was held on March

12. Key revisions incorporated in this draft are as follows:

1. To make the reporting process more convenient for businesses, the number of permitted exempt manifests shall be extended to be “*up to and inclusive of*” the total number noted. Concurrently, the permitted volume of stabilized toxic substances shall be increased to 200 kilograms.
2. Current regulations require the submission of manifests for each instance of the import or export of a toxic chemical, regardless of the total number of instances. Text revisions now clarify this point and specify that import/export of toxic chemical substances are not included in the manifests exemptions mentioned in Item 1, above.
3. For the convenience of business, this revision adds a line permitting firms to submit copies of manifests to relevant recipients by fax. Regulations have also been changed from the current requirement that the sixth copy (recipient copy) be delivered within five days of application to the designated recipient of said shipment to permitting the faxing or delivering of the sixth copy to the recipient any time prior to their receipt of said shipment.
4. In recognition of actual industry practice, shipping documents are recognized in three different formats: single shipment; multiple shipment; and supplemental. However, as manifests required for toxic substance import and export must include shipping documentation, clarification is given that only single shipment documents are acceptable for such shipments.
5. The actual volume of toxic chemical substances in liquid or gaseous form shipped via tanker truck or ship frequently varies from that reported on the manifest. Circumstances make it difficult to correct errors prior to the date of shipment. Therefore, the EPA proposes to revise current rules to permit an error margin of 5% on principal manifests. However, within three days of actual shipment, the actual volume shipped must be reported in a supplemental documentation and submitted to EP authorities in the shipment’s point of origin.
6. A revision has been made that central authorities shall specify safety equipment that all toxic substance shippers must prepare to strengthen safety preparedness. In cases where no specifications have been made, the shipper shall prepare personal protection and emergency preparedness gear appropriate to the dangers noted on the relevant chemical safety sheet(s).
7. A third category of toxic chemical shipment method, rail, has been added to distinguish this method from shipment by highway, to note the different roles expected of personnel, and to meet requirements incorporated into recently revised railway transportation regulations. When shipping via rail, the shipper must assign

an individual to accompany the shipment who has taken and passed relevant MOTC training. Relevant transportation training shall be conducted according to the rules and regulations established by ROC transportation authorities.

8. Under current regulations, highway management agencies have no authority to inspect toxic chemical substances shipments. This revision bridges this gap to define the inspection authorities of each organization and to request that highway police conduct irregular inspections and spot checks.
9. To define more clearly the prevention and emergency response responsibilities, the revision distinguishes responsibilities held by the shipper and owner for accident prevention and reporting, emergency response, and rehabilitation work.

Public hearings related to the above-proposed revisions have met with general approval. These changes will be promulgated upon completion of the appropriate wording and after consultation with the MOTC.

### ***EPA to Integrate Factory Pollution Prevention Evaluation and Assistance***

**1998 factory pollution control evaluation efforts by the EPA focused on round 2 and 3 factories, i.e., those who were in the process of applying for stationary source air pollution permits. Of 402 such factories, 32 were recognized for outstanding performance. The EPA then sponsored "open houses" at these factories, inviting other factory operators in the area to visit and learn from their experience. EPA evaluation work will continue to be a focus into the future.**

On March 10, the EPA honored 32 factories that returned outstanding pollution control results during EPA evaluations. The EPA held "open houses" at some of these factories on the on the 11<sup>th</sup>, 12<sup>th</sup>, and 16<sup>th</sup> of March in Northern, Central, and Southern Taiwan respectively to demonstrate proper pollution control practice to other factories.

The target of factory pollution control evaluation efforts during 1998 focused on those factories targeted in the second and third public announcement rounds; i.e., those who needed to make changes to their stationary pollution source apparatus and would also need to apply to renew their operator's permit. In all, a total of 402 factories were selected for evaluation. Evaluations were conducted in 8 designated zones by academics authorized by the EPA. Evaluation reports specified a total of 7,261 problems and improvement recommendations. Of this total, 55% were "environmental protection" issues and 31% were "production process and safety" issues. The remaining 14% of evaluation comments were classified as "other" issues. Currently, all firms targeted by the evaluations are in the process of submitting relevant improvement

plans to their local EP agency.

The EPA has authorized factory pollution control evaluations for the past 6 years, beginning in 1993. The Evaluation Task Force is comprised of members from the environmental protection, chemical, manufacturing, and worker safety fields. Members hail from academia, industry oversight agencies, occupational safety inspection agencies, as well as environmental protection agencies. The Council is responsible to give improvement recommendations on a wide spectrum of manufacturing site issues, including air pollution, water pollution, solid waste management, and toxic chemical substances. They further carry out a full "check-up" on factory production processes and site safety infrastructure and make recommendations on how to avoid potential future environmental issues based on findings.

To date, evaluations have been completed at the Ta She, Lin Yuan, and Tou Fen Petrochemical Industrial Parks. Also evaluations have been completed amongst the first, second, and third group of public and private entities that should have already requested permission to operate a fixed pollution source. In all, a total of 954 site evaluations have taken place.

Records show that, since inception, such evaluations have resulted in the identification of nearly 20,000 problems and recommendations on improvement measures. The work of the Task Force has pushed firms to strengthen their pollution prevention efforts and to improve production processes to lower emissions. The results have been clearly demonstrated in improved air quality levels and a reduction in legal action due to pollution issues.

Concurrent with evaluation efforts, the EPA is committed to enhance pollution reduction assistance provided to industry. Leveraging the expertise of local consulting organizations, the EPA can target on-site advisory and technical assistance to those factories identified with poor pollution records and to those with more complex pollution issues.

### *News Briefs*

#### *EPA Completes First Phase Investigation of Organic Compounds in Tamshui River Bed*

The EPA announced the results of its first year investigation and analysis of heavy metals and organic chemicals in the Tamshui River. Results indicate that heavy metal levels are higher than upstream concentrations, with copper contamination registering the most severe, however, they do not pose a serious threat to river life. While organic chemical levels in the riverbed tested high (higher than background levels) they did not reach levels defined as "toxic". The EPA's National Institute of Environmental Analysis conducted the analysis project between

October 1997 and September 1998. It included analysis of water quality; riverbed silt; heavy metals, benzene polychlorides, dioxins, aromatic hydrocarbons, and other organic compounds contained in river fish; and the variety of fish now living in the river. The EPA will continue to monitor the situation to track any change trends as well as target efforts to curb pollution at its source and to limit total volumes of emissions entering the river.

*EIA Requirements for Petroleum Storage Tanks Revised*

On 4 February, the EPA issued a public announcement regarding revision and relaxation of EIA requirements for petroleum product storage tanks. As of that date, such storage facilities of 300 tons or less in total (or accumulated) volume sited on national park land and in similarly controlled zones, within freshwater reservoir preserves, or in port districts were exempted from EIA requirements.

*CD-ROM of Environmental GIS Data Published*

The EPA issued the first in the set of "Public Databases on Environment Geographic Information Systems" CD-ROMs on February 8. Stored databases include chart data showing results of EPA plan implementations over the span of many years as well as geographical data publicly available from other ROC government agencies. The first CD-ROM includes information related to air quality, water quality, and charts covering environmental assessment work. The EPA indicated that the second in the set should be available in April and will include graphical data on noise pollution, solid wastes, environment & sanitation, toxic chemical substances, pollution control, and ultraviolet radiation as well as records of historical EPA legal battles.

*Leaded Gas to be Phased Out Next Year*

In a public announcement issued on 2 March, high-grade gasoline containing 0.026g/l or more of lead is now defined as a serious air pollution source. The same designation will be given high-grade gasoline with lead levels of 0.013g/l or more after January 1, 2000. Use and sale of gasoline under such a designation are strictly controlled. From the respective dates of announcement, cars and motorbikes will no longer be permitted to fill up with either category of gasoline. Those who wish to continue selling the controlled gasoline must apply for a special waiver from relevant agencies. Regardless, sales will only be permitted for non-controlled end uses or where special permission has been given.

*Sale of Diesel Fuel Containing More Than 0.05% Sulfur Controlled*

In an EPA announcement made on 2 March, effective immediately, the sale and use of diesel fuel containing sulfur content in excess 0.05% is now controlled. No diesel fuel in this category may be used in any air quality control district. These controls will not apply to the following vehicles and machinery: military & warfare vehicles, agricultural machinery (with appropriate

certification as such), trains, and boat engines.

*EPA Promotes Training of International Negotiators*

To address increasingly complex international environmental protection issues, the EPA plans to enhance training of EPA staff in all Bureaus on international negotiation skills. Chea-Yuan Young, Director General of the EPA's Office of Science and Technology Advisors, noted that staffs responsible for international activities from various bureaus will be invited in April to participate in a "Training Camp for International EP Conference Participation and Treaty Negotiation Skills". The camp will incorporate analysis of international treaty developments and get staffs involved in exercises to hone their international relations and diplomatic negotiation skills.

*Incinerator EIA Requirements Set According to Treatment Volume*

Environmental impact assessment (EIA) requirements for existing municipal and general industrial waste incinerators specify requirements related only to siting and floor space. The EPA announced on March 17 the addition of another factor -- handling volume. From now on, waste incinerators located in municipal areas must undergo an EIA if treatment capacity exceeds 50 tons of waste per day. Those constructed outside municipal areas must undergo an EIA if daily volume is over 200 tons. Finally, incinerators in industrial districts that treat over 100 tons per day will be required to undergo an EIA.