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In this issue . . .

Feature Article

Five-River Cleanup Plan Opens New Chapter in River Protection

A Look Inside the EPA

The Bureau of Water Quality Protection

EPA Appreciates AmCham Environmental Concerns

The EPA expresses its appreciation for the comments and suggestions made by AmCham in its 1998-99 Taiwan White Paper. Issues such as recycling systems, industrial waste, soil contamination and policy transparency are touched on in the White Paper.

EPA Steps Up Groundwater Remediation Efforts

In response to increasing concerns over groundwater contamination, the EPA has accelerated development of the remediation and cleanup procedures and continues to push contamination and monitoring area delineation plans.

Drinking Water Protection Zone Delineation Hastened

Water quality protection zone delineation work is behind schedule. The EPA plans to speed up the process through a variety of measures such as setting requirements for local government agencies and dispensing subsidies.

Dry Cleaners Targeted for Solvent Recovery Requirements

The EPA is preparing controls that shall require dry cleaning businesses to recover their organic solvents. Newly established firms shall be required to recover 95% of their tetrachloroethylene while existing firms will have to recover 90% of their petroleum-based solvents.

Government Policy EIA Targets Formally Announced

The EPA recently completed regulatory articles regarding EIA performance for government policies. Large development-related policies now require EIAs to be performed prior to final approval of the policies.

LY Inquiries to the EPA Focus on Narrower Range of Issues

In the most recent Legislative Yuan session, Legislators presented formal inquiries to the EPA that focused on a range of issues narrower than in the past. Issues included EIA policy, garbage treatment, resource recycling, greenhouse gas emission reductions and river treatment.

EPA Announces First Round of Firms to Declare Industrial Waste Online

The EPA recently announced the firms that will be required to declare information regarding industrial waste via an Internet-based electronic reporting system.

Electric Motorcycles Listed for Priority Purchase by Government

New guidelines require government agencies that purchase motorcycles to choose electric-powered models.

New Emission Standards to Phase-Out Two-Stroke Motorcycles

New standards that go into effect on December 31, 2003 will spell the end of the road for

two-stroke motorcycles in Taiwan.

News Briefs

Feature Article

Five-River Cleanup Plan Opens New Chapter in Water Quality Improvement

Cleanup of river pollution has been a core policy of the Bureau of Water Quality Protection Treatment since the Bureau's establishment. Large-scale cleanup work has continued without interruption, and has included early plans to treat a specified river in each major city/county and plans to control the pollution in major rivers throughout Taiwan. Despite considerable effort over the years, river water quality has not appreciably improved; nor has it deteriorated in recent years despite rapid and widespread development. There are several reasons for this apparent stalemate:

- River cleanup work has, until now, focused on point source pollution control in spite of the fact that river pollution types are usually diverse and complex. They include wastewater from industry, animal raising, urban areas, agriculture and garbage dumps where water permeates into waterways. Investment in only one area of pollution source improvement, no matter how well executed, is an exercise in futility.
- The aforesaid types of pollution are usually spread broadly over river basins, cover large tracts of land and involve the responsibilities of numerous authorities. These include the Taiwan Provincial Government's Bureau of Water Resources, public water utilities, the Ministry of the Interior (MOI) Construction & Planning Administration, the Ministry of Education, the Council of Agriculture, the Aboriginal Affairs Committee and local government agencies. Communication and cooperation between these authorities has been problematic.
- With pollutants flowing continuously into up-, mid- and down-stream river sections, it is essential that control work be carried out comprehensively (by region and section). All levels of government must therefore provide support, and environmental authorities must cooperate regionally. Incomplete coordination mechanisms, however, have for a long time delayed integration of river pollution control activities.

Faced with these challenges, the EPA has considered a number of policy approaches to help cleanup efforts yield better results. Following a year of investigation, planning and discussions with central and local government, a plan to establish water quality protection zones (hereafter referred to as "protection zones") in five river basins gradually took shape early this year and was recently submitted to the Executive Yuan for approval.

The EPA selected the Tamshui, Touchien, Tachia, Kaoping and Tsengwen Rivers as the first round of targets to implement the all-new river pollution control plan. These rivers and tributaries are the primary sources of drinking water for about 75% of Taiwan's population. In addition, the even geographical distribution of these river basins throughout the island is inline with a national policy that encourages balanced development.

This plan is unique in that protection zones are designed according to the overall characteristics of a river basin, with site location the core consideration. The plan aims to raise drinking water quality, follow drinking water source protection zone plans, and carry out implementation according to drinking water and tap water source protection zones. The EPA is responsible for setting improvement targets and for coordinating the measures to achieve them. The plan calls for NT\$35.7 billion (not including water resource allocations, waterway area garbage dump relocation and tap water treatment site improvement) to be allocated over eight years from 1998 to 2006. In Phase I of the plan, protection zone water quality is to reach drinking water quality standards by 2003. In Phase II, by 2006, 60% of river sections in each river basin is to attain river water quality standards for BOD (biological oxygen demand), and 40% of each river section is to reach the ammonia nitrogen standard.

The following is a list of five strategies and associated projects to be carried out simultaneously:

1. Reallocate water resources: The EPA plans to relocate drinking water collection points along the Kaoping river basin to the Kaoping River weir. This step should remove an estimated 57% of ammonia nitrogen pollution from tap water. The Keelung River Liudu water collection points are to be substituted with those in the Malungkang River during the rainy season and with those in the Hsinshan Reservoir during the dry season. This should eliminate over 35% of ammonia nitrogen from the Liudu water collection points. A consensus on the plan was reached with the Ministry of Interior (MOI), and under the impetus of public water utilities, water collection point work was begun with funds earmarked by the MOI.
2. Accelerate sewer installation and hookup rate: The central government is to completely subsidize the installation of sewers in protection zones. Initial targets call for 12 sewer systems to be built in the protection zones found in Chimei, Tashu, Kaoshu, Chubei, the Liudu-Nuannuan areas, Panhsin (includes the Tahsi water interceptor), Ruifang Town, Chutung Town, Shikang Dam, Lishan area and Pingtung City and Hsinchu City. Due to a shortage of funds and personnel at the local level, the central government is to take responsibility for all expenses and the Taiwan Provincial Government's Bureau of Housing and Urban Development is to form special taskforces to lend support.

This project costs are estimated at NT\$31.7 billion. NT\$8.1 billion has been approved by the Executive Yuan and the EPA has reached a consensus with the MOI's Construction & Planning Administration (CPA) on the remaining funds whereby the MOI is to consider land, design and construction costs for inclusion in the national economic stimulus plan. In addition, after the Provincial Government is downsized, application is to be made for Taiwan provincial government land value-added taxes to contribute to the sewer construction funds.

3. Reduce hog raising operations: Plans call for the priority removal of 584,000 hogs from watershed areas upstream of water collection points. The Kaoping and Tsengwen Rivers were selected as primary targets for hog reductions as wastewater from animal raising operations accounts for 77% and 56% of ammonia nitrite pollutants in these river basins respectively. Watershed areas above the Kaoping River weir and Type B water body sections of the Tsengwen River were delineated as total volume control zones (hereafter referred to as control zones) with 470,000 and 83,000 hog reductions planned respectively. The draft stipulates that as farmers' livelihoods are at

stake, the most favorable fund allotment scheme should be used. In the future, compensation funds will be increased to encourage the relocation of hog raising operations in drinking water protection zones and tap water source water quality and volume protection zones. The central government is to earmark NT\$3.5 billion in compensation funds agreed to by the CPA.

4. Improve garbage dumps near watercourses: Currently 13 watercourses with garbage dumps nearby have been targeted for priority treatment. These include those in Liukui, Shanlin, Meinong and Tashu Villages, Sanhsia, Ingge and Shikang Towns, Hsinshe, Tongshi and Heping Villages, Pingtung City, Yenpu and Hsinyuan Villages. In the future, 50 garbage dumps located in river and watercourses throughout Taiwan will be targeted for improvement. The plan was discussed at the local level recently and then submitted to the Executive Yuan for approval. It is estimated that NT\$2.5 billion in improvements are to be completed over four years.

5. Improve tap water treatment plants: Water utility companies are to be responsible for conducting twenty drinking water quality improvement plans and auditing nine drinking water source water quality improvement plans. The MOI is to develop and establish a water treatment plant monitoring and management system.

In terms of regulatory support for the projects, the EPA will implement nitrogen and phosphate controls on wastewater from animal raising operations. A pollution source inspection and auditing system and a total volume control system will also be established. The Kaoping River is to be targeted for priority implementation. Delineation of total volume control areas and implementation is set for completion by 2003.

To ensure smooth implementation, the plan calls for an implementation committee and five taskforces to be set up, each being responsible for implementation of one of the five strategies. Local community groups, academics, environmental, agricultural, and aboriginal groups are to be invited to participate in the process. This will be the first time members of the general public will have participated in the monitoring of large-scale public works projects.

Although non-point source pollution controls for these five river basins are still inadequate, their importance has become increasingly apparent since point-source pollution was brought under control. For this reason, the EPA has moved to simultaneously investigate 670,000 hectares of excessively used land within Type A drinking water source water bodies and reservoir watershed areas and implement a special ban and reforestation plan under the *Forestry Act*, *Water and Soil Protection Act* and *Mountain Slopes Conservation Use Statutes*.

A Look Inside the EPA

The Bureau of Water Quality Protection

According to the *Environmental Protection Administration Organization Statutes*, the EPA's Bureau of Water Quality Protection is responsible for the following primary duties: drafting water quality protection policies and regulations; plotting, guiding and overseeing effluent controls; plotting, guiding and overseeing surface-water and groundwater contamination controls; planning and guiding marine pollution prevention

and control; guiding and overseeing discharge of polluted water into open-water; and other areas of water quality protection.

In terms of organizational structure, the Bureau has a General Director, Deputy General Director and one higher-level staff member. Reporting to them are five Divisions, each with a Director and supporting staff. The Divisions have the following responsibilities:

Division I:

1. Draft and implement river, lake and reservoir water quality protection policies and projects.
2. Draft, revise, elucidate and disseminate water quality protection regulations.
3. Investigate and monitor river, lake and reservoir impact. Draft water quality standards.
4. Delineate water zone and water pollution control areas. Approve total volume control methods.
5. Plan and oversee point source pollution controls.
6. Control and oversee water pollution control zone pollution activities.
7. Develop water body water quality protection technology. Develop and apply water quality models.
8. All responsibilities not included under other Divisions.

Division II:

1. Draft, implement and oversee wastewater pollution control strategies.
2. Plan, implement and oversee wastewater discharge permitting, specialized personnel installation and reporting systems.
3. Investigate wastewater pollution sources. Study and apply related information.
4. Draft, revise, elucidate and disseminate factory and mine wastewater discharge controls.
5. Plan and oversee water pollution control fee rate levying and application.

Division III:

1. Develop, implement and oversee water pollution control policies and plans.
2. Manage construction water pollution treatment facilities.
3. Plan, implement and oversee water pollution discharge permits, specialized personnel installation and reporting systems.
4. Draft, amend, elucidate and disseminate water pollution discharge control regulations.
5. Investigate water pollution sources and study and apply related information.

Division IV:

1. Develop and implement marine water and groundwater protection policies and plans.
2. Investigate and monitor marine water and groundwater pollution sources and study and apply related information.

3. Plan, approve, implement, assist and oversee marine water and groundwater pollution control plans.
4. Draft, amend, elucidate and disseminate marine water and groundwater pollution control regulations.
5. Approve and oversee permitting of wastewater discharged into the sea.
6. Control pollution of marine water and groundwater in conjunction with the EPA's Bureau of Solid Waste Control.
7. Plot, guide and monitor controls on large areas of land that have subsided (due to excessive extraction of groundwater from the water table).

Division V:

1. Draft, plan, approve, disseminate, implement, coordinate and oversee river basin pollution treatment special projects.
2. Investigate river pollution treatment projects, and study and apply related information.
3. Oversee permitting, reporting and control of wastewater discharged into rivers.

Executive Yuan Approves National Environmental Plan

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

Given the inextricable relationship between sustain-

able commercial operations and the environment, it is only natural that the American Chamber of Commerce (AmCham) in Taipei places much importance on environmental protection in Taiwan. In its 1998-99 Taiwan White Paper, AmCham makes several suggestions on such issues as recycling systems, industrial waste, soil contamination and policy transparency. The EPA greatly appreciates these suggestions and has instructed relevant departments to follow up on each of the points raised. A comprehensive response will be provided to AmCham at the earliest possible time.

The white paper recommends that open and transparent regulations be set to manage the use of environmental protection related fees through the announcement of regular updates on related fund use and an efficiency evaluation system be formulated to effectively monitor fund use. According to the EPA, the budget funding system is to undergo major changes this fiscal year. The Resource Recycling Management Fund has already earmarked sums for trust funds and not-for-profit funds. The former are to serve as reimbursements for auditing certification, recycling and disposal fees while the latter are to go toward government use and will be monitored by the Legislative Yuan and other parties. It is hoped that through the supervision of public interest organizations, use of the Resource Recycling Management Fund will become more open and transparent. Apart from announcing regular updates on related fund use, the

EPA will establish an Advisory Committee composed of business professionals, experts, academics and other respected figures to provide insights on fund utilization.

In terms of a recycling system, the White Paper indicates that Taiwan should formulate efficient fee collection and auditing regulations to ensure that competition between firms is fair and legal. To this end, the EPA has set up a special auditing taskforce to track and collect outstanding fees. Violators are to be fined one to three times the fee amount and face criminal liability. To ensure that the recycling system is fair, the Fund Management Committee's current procedures stipulate that declared sales quantities are to be checked against import or tax declaration data. Computer records are then used to conduct an on-site inspection.

In terms of communication with the foreign business community, AmCham praised efforts made by the EPA that include publication of the *Environmental Policy Monthly* and early notification of public hearings. AmCham also expressed the hope that translation of environmental regulations could be made the responsibility of a single office. The EPA noted that translation of regulations into English is currently managed by the Regulatory Affairs Committee and communication with foreign firms is handled by the Office of Science and Technology Advisors (OSTA). OSTA will serve as the single window for requesting English-language regulatory information.

In terms of current regulations on soil contamination control, the White Paper noted that the opinions of businesses and experiences of similar regulations abroad should be consulted more often when regulations are drafted. In fact, Taiwan's Soil Pollution Control Act was developed with the spirit and structure of the US's Superfund system in mind. The Superfund was used mainly as a reference for solving pollution cases in Taiwan that include protecting the quality of agricultural soil. The EPA has invited academic experts to engage in mutual discussion when regulations are being drafted. Furthermore, discussions between environmental departments and agencies and the participation of government officials, academics, consultants, public opinion representatives and environmental groups in public hearings should yield policies and laws that are more open and just.

It is worth noting that Taiwan's *Soil Pollution Control Act* focuses primarily on treatment and secondarily on monitoring with regulatory controls relying on prevention. In terms of standards, the EPA will consider international trends in a local context when setting standards in the future.

The EPA appreciates AmCham's enthusiastic participation in environmental affairs in Taiwan over the years. Having carefully reviewed the portion of the White Paper concerned with the environment, the EPA hopes the policymaking process can be made more transparent. The EPA will endeavor to maintain communication with the foreign community to ensure full public participation in environmental affairs.

EPA Appreciates AmCham Environmental Concerns

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

Controversy surrounding the reasonableness of water usage-based waste disposal (including collection and processing) fee rates prompted the EPA to draft an amendment to the *General Waste Items Collection and Processing Levying Fee Rate Regulations* on July 14. The draft gives local authorities the discretion to set fee rates

according to local needs. This lets sticky regulatory matters get solved at the local level and thus eases regulatory burden at the central level.

The draft revises Article 3 and adds Article 10-1 to the *Regulations*. Article 3 gives local authorities the discretion to set their own waste disposal fee rates. The street sweeping and cleaning, culvert cleaning and flushing, produce scrap and box disposal and waste accumulation point disinfecting work costs will be removed from the scope of national unified cost calculations. Local authorities will instead set their own fee rates according to local attributes, economic conditions and profit and loss factors. Article 10-1 gives Taipei and Kaohsiung Cities under the Central Government and cities and counties under the Taiwan Provincial Government the discretion to set other fee rates that can be registered with the EPA following Central or Provincial Government-level approval.

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

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

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

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

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

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

EPA Steps Up Groundwater Remediation Efforts

In response to the public's increasing concern over groundwater contamination, the EPA has accelerated development of the *Groundwater Contamination Remediation Procedures* and a contamination and monitoring area delineation plan. In response to local authority concerns that personnel and funds for technical skills are inadequate, the central government, in the future, is to provide subsidies, establish specialized technical support taskforces, produce a *Groundwater Contaminant Hazards Manual* and enhance resource mobilization in an effort to strengthen support at the local level.

With the increasing frequency of groundwater contamination incidents in recent years, remediation has become a matter of great urgency. The EPA is currently taking steps to amend the *Water Pollution Control Act* (hereafter referred to as the "Act") to establish a legal basis for groundwater pollution control. The EPA is also developing *Groundwater Contamination Remediation Procedures* (hereafter referred to as the "Procedures") as an implementation reference for local government. The EPA shall consider difficulties encountered in actual remediation cases as a basis for future amendments to the *Act*.

To facilitate implementation, the EPA on July 21 held a meeting with local environmental authorities at all levels on groundwater contamination control to discuss establishment of the Procedures and how to delineate the scope of groundwater contamination and areas to be monitored. It was the first of several meetings on a series of future activities. In line with the spirit of "public right to know," the EPA shall require that where possible central and local governments provide information on contamination cases currently under their control.

Major groundwater contamination cases island-wide currently under the control of the EPA, apart from the former-RCA Taoyuan and Chubei plants and Philips Chubei plant, include chloroethylene contamination at Taiwan VCM's Toufen plant, pentachlorophenol and mercury (Hg) contamination at China Petrochemical Development Corp.'s (CPDC) Anshun plant, phenol contamination at Tungpeiya's Taoyuan plant, diesel and fuel oil contamination at Chinese Petroleum Corporation's (CPC) Kaohsiung oil refinery and Lingya storage facility.

In terms of future controls, the EPA aims to foster an exchange of implementation experience between local government personnel during the process of establishing the *Procedures* and to setup a model to guide local government in their remediation work. The question of whether groundwater contamination areas are delineated for the purpose of defining the scope of contamination remediation work or for prohibiting land development must be resolved. The EPA shall carefully study the approaches and rationale behind contamination area delineation.

In view of the EPA's resolve to accelerate groundwater remediation, most representatives from local government at the meeting said they lacked the necessary experience, funds and personnel. They also said that contamination source monitoring and polluter-submitted remediation oversight plans lack adequate technical skills and regulations and noted that remediation standards have yet to be set.

To address these difficulties, the EPA said it would consider establishing professional technical support taskforces and producing a *Groundwater Contamination Hazards Manual* to provide concrete technical support skills at the local level. In addition, the Procedures are to put more emphasis on workload allocation between different levels of government. The Procedures are also to indicate the sources of funds available for

different stages of remediation and technical skill assistance that can be provided by the central government.

As historical data on groundwater are incomplete, the EPA is developing a blueprint on island-wide groundwater historical data that take into consideration administrative areas, industrial parks (on- and off-site), major contamination sources (businesses and gas stations) and burial sites of hogs that died from hoof-and-mouth disease. In addition, the EPA is already requiring that local government agencies assemble data on potentially toxic substances and establish contamination risk models based on research and analysis of production processes in industrial parks for which they are responsible.

In the short-term, the EPA shall continue to require that polluted municipalities and counties report the remediation process and status of contamination cases under their jurisdiction and hopes to set the initial framework of the Procedures.

The groundwater remediation process is a difficult and long-term undertaking. Apart from using current resources to carry out remediation work, the EPA shall also initiate efforts to terminate contamination at the source. Therefore, strengthening controls on underground oil storage tanks and monitoring industrial parks and industries with high contamination risk are to be major focuses of groundwater remediation work in the future.

Drinking Water Protection Zone Delineation Hastened

With drinking water source water quality protection zone delineation work behind schedule, the EPA plans to speed up the process by requiring local government to first delineate 400,000 acres of national forest land . The EPA also recently earmarked NT\$26 million in subsidies for conducting delineation investigation work. The protection zone delineation draft is to be completed and submitted to the Executive Yuan for review by March 31, 1999. In addition, the EPA plans to provide subsidy funds to the provincial government s Department of Environmental Protection in FY 1999 to develop a protection zone feedback system

To advance the delineation of drinking water source protection zones (hereafter referred to as "protection zones") work, the Taiwan Provincial Government's Department of Environmental Protection (DEP) recently submitted to the EPA two drafts. These drafts delineate 57 Type A water bodies and reservoir watershed areas and 36 areas within a specified distance of drinking water collection points (hereafter referred to as "collection points") with a total surface area of 72,000 hectares.

As the EPA has already initially delineated about 96 protection zones and 51 areas within a specified distance of drinking water collection points totaling some 525,000 hectares, 450,000 hectares remain to be delineated. Apart from requiring that local government agencies, according to review committee conclusions, investigate and assess protection zones, and quickly complete modifications to the submitted drafts, the EPA has instructed the DEP to delineate national forest land and Chingtan water source area of the Hsintian River (a specially designated water source area in Taipei County) totaling 400,000 hectares as protection zones within a short period of time.

As development shall be prohibited in protection zones, the interests of many will be affected and local governments have adopted a cautious attitude toward delineation work. In addition, delineation of protection zones will limit the right of local governments to manage watershed areas. As Type A water bodies, reservoir watershed

areas and outlet areas cover a vast area with a complex distribution of pollution sources and given the limited personnel and material resources of local governments, investigation and assessment work has been very difficult. As a result, local governments adopted a conservative approach to doing the delineation work.

During the course of discussions and investigations conducted by local governments, local citizen, aboriginal and farming related groups demanded that protection zones be delineated only if the landowners are compensated or if the land is bought outright by the government. Yet, according to the *Drinking Water Management Statutes*, there are no regulations requiring that compensation be made. Only in the *Tap Water Act* are specially designated water source areas permitted to have compensation measures. The lack of progress in coordinating compensation measures has frustrated the delineation work of local governments.

To lighten the financial and personnel burden on local governments, the EPA on July 16 earmarked NT\$26 million to subsidize investigation and assessment work. Each county will receive NT\$2 to 3 million. Apart from requiring that local governments move quickly to delineate a total of 400,000 hectares of national forest land into protection zones, the entire protection zone delineation draft must be completed and sent to the central government for review by March 31, 1999.

In terms of property compensation in protection zones, the EPA shall ask the Executive Yuan to provide as much compensation as possible. In the meantime, regulations stipulate that public water utilities are responsible. In addition, the EPA is to provide subsidy funds to the DEP in 1999 to develop a protection zone land-owner compensation system.

Dry Cleaners Targeted for Solvent Recovery Requirements

The EPA is preparing controls that shall require dry cleaning businesses to recover their organic solvents. Newly established firms shall be required to recover 95% of their tetrachloroethylene while existing firms will have to recover 90% of their petroleum-based solvents. Recovery controls on petroleum based solvents shall be gradually applied according to the type of machines or quantity of solvents used. The controls are to come into effect next year.

Dry cleaners often use organic solvents to clean clothing. Tetrachloroethylene is suspected of being carcinogenic and harmful to the ozone layer. Faulty or poorly maintained dry cleaning equipment can easily create organic solvent pollution (especially air pollution) that harms the atmosphere and endangers the health of company staff and nearby residents.

Since fiscal year 1997, the EPA has promoted pollution emission controls and reduction quantity related technology assessments for the dry cleaning business. Originally, the draft *Dry Cleaning Business Air Pollution Control Standards* prescribed controls based on emissions concentration. However, as these firms are large in number, small in scale and located in densely populated residential or commercial areas, and due to the typically close relationship between their emissions concentration and their operational process, overseeing their emissions concentration and auditing them is extremely difficult. For these reasons, the EPA decided to target the source by requiring that dry cleaning equipment makers install solvent recovery dryers and stipulated recovery rates for them.

After completing a draft of dry cleaning organic solvent control standards, the EPA, on July 30, discussed the draft with dryer manufacturers and importers to find out about current recovery technology capabilities, equipment costs and future supply capabilities.

The draft primarily targets petroleum-based chemicals and tetrachloroethylene for control. As firms use far less of the latter than of the former, and because most firms have already installed solvent freezing recycling systems, controls are simpler for tetrachloroethylene. Its recovery rate is to be set at the more stringent level of 95%.

In terms of petroleum-based chemicals, according to an EPA-sponsored National Taiwan University research report, the current market cost of freezer recovery dryer equipment with a capacity of around 18 kg is between NT\$300,000 and 400,000. This figure, combined with the various dry cleaning equipment needed by firms that use separate washing and spinning equipment, is a minimum capital investment of NT\$830,000. Firms that use combined washing and spinning equipment and that have not yet installed drying equipment would have a minimum investment of NT\$550,000. To reduce the impact on existing firms, the recovery rates for petroleum-based solvents have been set according to the size of the firm.

In addition, according to dry cleaning firms that participated in the July 30 meeting, equipment currently on the market has a 98% recovery rate. They also indicated that 80kg drying equipment priced at about NT\$100,000 may generate demand in the future. Current technology and plans to implement future control standards have set the stage for an injection of economic incentives.

In terms of implementation methods, the draft has based its plans on equipment capacity and annual use quantity with controls implemented in stages every half year. The following is a list of three implementation stages:

1. Users of dry cleaning equipment with a design capacity of over 18kg or that uses a quantity of over 1,000 liters of petroleum-based solvent annually.
2. Users of dry cleaning equipment with a design capacity of between 13kg and 18kg or that uses a quantity of between 800 and 1,000 liters of petroleum-based solvent annually.
3. Users of dry cleaning equipment with a design capacity of less than 13kg or that uses a quantity of less than 800 liters of petroleum-based solvent annually.

The EPA is currently testing various dry cleaning solvent recovery drying equipment to confirm recovery rates and standard testing methods. The EPA expects to achieve the *Dry Cleaning Business Air Pollution Control Standards* by the middle of next year.

Government Policy EIA Targets Formally Announced

On August 3, the EPA formally announced the *Items for Assessing the Environmental Impact of Government Policies* completing all related articles for EIA performance on policies. The announcement stipulates that large development policies such as those for industrial parks, gravel development and supply networks, and water source development plans in Taiwan all require policy EIAs to be performed.

During discussions of the *Environmental Impact Assessment Act (EIA)* in the Legislative Yuan in 1994, a policy implementation EIA article was added to the Act. The article required that the government perform an EIA on government policies

(hereafter referred to as policy EIA) that could have a major impact on the environment. As there are many implications to this issue, an extremely cautious approach was taken to setting related regulations. After the draft was completed by the EPA and approved by the Executive Yuan, its status as governing regulations had been changed to working guidelines and it was formally announced and implemented in September, 1997.

After the Guidelines were announced, inquiries from some legislators continued to call for the Executive Yuan to perform a policy EIA on policies that are highly controversial. However, according to the Guidelines, performance of a policy EIA must follow stipulations in the work scope and must specify policy areas covered. The EPA in March of 1998 completed formal announcement of the *Government Policy Assessment Description Work Scope* that specifies EIA policy areas, scope and methods. On August 3, the EPA formally announced the *Government Policy Environmental Impact Assessment Items* completing all related articles for policy EIA performance on government policies.

According to the announcement, policy EIA performance is required in the following policy areas: Industrial park development; gravel development and supply; water resource development plans in Taiwan; farm and conservation land that is significantly altered for other than agricultural purposes; energy allocation; hog farming policies; major rail lines; and garbage treatment and nuclear/electric power plants that treat spent nuclear fuel.

LY Inquiries to the EPA Focus on Narrower Range of Issues

It was found that during the 5th session of the Legislative Yuan (LY), inquiries addressed to the EPA on environmental issues focused on a narrower range of issues. The nature of most inquiries was controversial, universal, highly influential and closely tied to personal interests. Issues most concerned by Legislators included environmental impact assessments (EIA), garbage treatment, resource recycling, greenhouse gas emission reductions and river treatment.

To understand how Legislators (as representatives of public opinion) view environmental policy, the EPA recently conducted a detailed analysis of inquiries addressed to the EPA by Legislators at the 5th session of the Legislative Yuan (LY). There were a total of 350 inquiries on environmental issues, down 15 from the previous session.

Results indicated that inquiries addressed at the session focused on a more narrow range of issues. The top 23 issues had a total of 207 cases or about 60% of all environmental issues. The nature of most inquiries was controversial, universal, had potentially broad implications and was closely tied to public interest-charged environmental issues. The report also indicated that the majority of information on environmental issues came from media stories, research reports, environmental group protests, public complaints (to the LY) and reports from the general public.

There were 88 cases involving comprehensive environmental planning, 36 involving water quality protection pollution control, 27 involving general waste management, 22

involving air quality protection planning and 19 involving environmental sanitation and pest control in public places.

Analysis by case showed Legislators were most concerned with the following issues: How to responding to Kyoto Protocol; greenhouse gas emission reductions; garbage treatment policies and problems; strengthening and advancement of resource recycling work; environmental impact assessment (EIA); and river treatment projects. The report notes that this ranking should closely reflect the background of current policies promoted by the government such as the National Energy Conference and duties currently being implemented by environmental authorities.

In terms of inquiries in the cases, Legislators focused on the implementation side of environmental policy. For example, the majority of written inquiries regarding EIAa addressed EIA examination work procedures, evaluation item contents, raising of examination effectiveness or implementation issues such as the requirement that new development projects cannot dodge EIA performance. The 17 cases of garbage treatment policy and issue inquiries also generally belong to inquiry garbage treatment system preparation planning, with construction garbage treatment measures, strengthening resource recycling systems, properly treating garbage and implementation issues. Regarding the former-RCA groundwater contamination incident, the focus of inquiries also focused on groundwater regulation inadequacies or factory site groundwater contamination, cancer caused to personnel and other implementation issues related to health hazards. In terms of the Kyoto Protocol, it was suggested that enforcement adopt total volume controls.

Only the minority of cases involved policy inquiries. A total of 40 inquiries addressed government policy issues including the opening up of Eastern Taiwan to golf course development and the total load bearing capacity of Taiwan. Many of the inquiries called for performance of a policy EIA. In addition, as the meeting of greenhouse gas reductions as part of the Kyoto Protocol also called policy areas into question, it requires a re-evaluation of Taiwan's energy and industry policies and should include an announcement that nuclear power is not the only option in solving greenhouse gas emissions.

According to a report in the *Environmental Prospect Weekly* regarding the EPA's responses to Legislator's inquiries, a portion of Legislators' assistants indicated that response time was a little slow but they were otherwise generally positive. They also said information provided on current status and follow-up handling and treatment was generally clear. In addition, some assistants said that compared with other agencies, the EPA's information was more transparent and its communications more forthcoming.

EPA Announces Online Industrial Waste Declaration

On August 1, the EPA announced 10 state-run enterprises and major firms to declare information regarding industrial waste via an *Online Reporting System*. The next round of targets to be announced on October 1 is to include disposal agents, medical institutions with more than 50 beds and 1,000 large-scale enterprises. To ensure that these compulsory regulations have a legal basis, the EPA has taken steps to add related articles to the *Industrial Waste Implementation Standards* and has drafted amendments to the *Waste Disposal Act*. The latter should be submitted to the Legislative Yuan in October for approval.

To strengthen industrial waste controls, the EPA is to require, through a series of announcements, that organizations declare information regarding industrial waste via a new *Online Reporting System* (hereafter referred to as the “online system”). Information to be declared is to include industrial waste type, quantity, method of storage and treatment and name of firm handling the waste.

On August 1, the EPA announced the first round of organizations that must declare industrial waste via the online system. A total of ten state-run and private firms were targeted including Chinese Petroleum Corp. (CPC), China Shipbuilding Corp., Taiwan Fertilizer Co. Ltd., Taiwan Power Co., Taiwan Sugar Corp., Taiwan Machinery Manufacturing Corp., Taiwan Salt Industrial Corp., Aerospace Industrial Development Corp., Taiwan Tobacco and Wine Monopoly Bureau and China Steel. The online system went into effect on August 1.

Under the online system, industrial waste is tracked from the source and information on its movement can be checked at any time. In the future, organizations that collect, treat, and dispose of industrial waste (hereafter referred to as waste disposal organizations), must first declare related information including the quantity of industrial waste disposed of by a disposal agent via the online system. After receiving a manifest from the control center, and checking to see that the declaration information contains no errors, the organization passes the form to the waste disposal organization who, with the form in hand, is authorized to remove the waste material from the site. Local environmental authorities can go online to check the declared information of an organization and, when necessary, local environmental authority auditing personnel can do the same before waste enters a treatment plant.

Once the online system is set up, electronic data will be automatically filed and stored. Once the system has operated for a certain period of time, initial waste generation quantity forecasting models for each industry can be generated from the stored data and each piece of declared data can be more rapidly examined. As a result, waste kept in a production, treatment or storage site (plant) can be better controlled and collusion between firms and waste disposal organizations to make false declarations is made more difficult.

To promote the online system, the EPA’s Bureau of Solid Waste Control held a briefing on August 5 with first round targeted organizations. In response to concerns over online security, the EPA said that as the content of industrial waste largely involves production process secrets, to safeguard the interests of firms, the exchange of declared information between control centers and firms would be made secure. However, based on the principle of open information, control center databases would also maintain an appropriate level of openness.

Currently, the EPA is planning to make public the total quantity of industrial waste generated by each organization that makes an online declaration of industrial waste. Firms, however, asked whether each production site or plant must submit its declaration directly to the control center, or if the company headquarters collects and submits them together. The EPA responded that in the interest of efficiency, each production site (plant) would submit a separate declaration directly to the control center. The control center would compile all declarations belonging to the same organization and make them available to the relevant organization for online perusal via a password issued by the control center.

In response to private-sector organization concerns over the legality of requiring that declarations be submitted electronically, the EPA said that it took the opportunity when waste disposal regulations were being reviewed to strengthen the legal basis of electronic declaration in related articles. Apart from stipulating in the *Waste Disposal Act* that organizations or waste disposal organizations, according to the designated method and time, submit information related to waste treatment declarations, additional articles in the *Industrial Waste Collection, Treatment and Storage, and Disposal Methods and Equipment Standards* are to add regulations on electronic declaration. The draft amendment to the Act is to be submitted to the Executive Yuan at the end of August and passed to the Legislative Yuan shortly thereafter.

Once the first round of organizations has submitted industrial waste declarations via the online system, the EPA shall focus on promoting the second round. To be announced on October 1, this round will include 1,000 large-scale enterprises and medical treatment institutions. Once the online system is setup, including an assistance and auditing part of the plan, it is estimated that 85% of industrial waste in Taiwan is to come under the control of the plan by 1999.

Electric Motorcycles Listed for Priority Purchase by Government

The EPA recently completed a draft of the *Comprehensive Government Agency Purchasing Electric Motorcycle Work Guidelines*. In the future, motorcycles purchased by the government at all levels must be electric motorcycles where feasible.

To encourage government to take the lead in purchasing electric motorcycles, the EPA held discussions with representatives at all levels of government on the draft *Comprehensive Government Agency Purchasing Electric Motorcycle Work Guidelines*. The EPA confirmed that motorcycles purchased by the government at all levels must be electric motorcycles where feasible. It was also decided that electric motorcycle recharging equipment and fee funds would be provided to organizations via local government. In line with the principle of administrative streamlining, the funds can be approved directly by local government without having to be applied for at the EPA.

In terms of the amount of subsidies, the working guidelines recommend that recharging equipment for each motorcycle cannot exceed NT\$10,000 and recharging fees cannot exceed NT\$1,500. However, actual amounts are to be set by local government as needed.

After the discussions, the draft working guidelines were for the most part set and are to be formally announced at the end of August. This essentially concluded the first stage of establishing an electric motorcycle promotion and incentive system. The next stage will focus on further promotion of electric motorcycle purchases and putting the finishing touches on establishing a comprehensive user environment for electric motorcycles.

The difficulties that currently face commercialization of electric motorcycles include technology obstacles such as limitations in the capacity, life and recharge speed of batteries. In addition, electric motorcycles are still far more expensive than gas motorcycles and recharging stations and equipment are still not widely available.

In response to these challenges, the EPA issued subsidy purchase guidelines in 1995. These guidelines have brought the price of electric motorcycles down to a level where demand has been stimulated. Two companies are trying to launch new electric motorcycles ahead of schedule in November of this year while two other firms already have electric motorcycles on the market.

To support large scale manufacturing, the EPA will provide different subsidies for different peripheral electric motorcycle equipment. Beginning in January 1, 1999, subsidies will focus separately on the battery and the rest of the vehicle. The maximum subsidy for the vehicle less the battery is NT\$5,000 while that for the battery depends on its functions. The maximum subsidy amount for each electric motorcycle is to be between NT\$20,000 and 25,000. An annual budget of NT\$500 million in air pollution fees that currently subsidize natural gas powered cars is to be reallocated to subsidize electric motorcycles after June, 1999. The additional funds are to come from the air pollution fee revolving fund. The EPA expects to invest a total of NT\$5 billion in electric motorcycle related subsidies over the 1999 to ~2002 period.

Numerous measures have been undertaken over the years to promote electric motorcycle use and commercialization. Announcement of the *Comprehensive Government Agency Purchasing Electric Motorcycle Work Guidelines* require that motorcycles purchased by the government at all levels must be electric motorcycles where feasible. On January 1, the *Third Stage Motorcycle Emission Standards* were formally announced and implemented. They require that Taiwan motorcycle manufacturers and importers sell two electric motorcycles for every 100 gas motorcycles beginning in 2000.

With regard to the point when the electric motorcycle market takes off, steps have already been taken to avoid the problem that occurred when not enough filling stations were available to support widespread adoption of the natural gas powered car. The EPA selected Hsinchu as the pilot city to conduct a comprehensive evaluation of electric motorcycle recharging methods, service centers and promotion and guidance that will serve as the direction for planning nationwide implementation.

In terms of actual progress, 56 general recharging stations (including 756 recharging bays) were installed and five motorcycle retail outlets were assisted with installation of battery exchange stations (where spent batteries can be immediately exchanged for recharged ones). In addition, the EPA commissioned MOEA's Industrial Technology Research Institute (ITRI) to commence planning and installation of electric motorcycle infrastructure in municipalities around the Taipei area. A total of 1,000 charging stations and 200 service stations are planned for Taipei, Chungli, Hsinchu, Taichung, Chiayi, Tainan and Kaohsiung by 1999.

The Fourth Stage Motorcycle Emission Standards are to use cold-engine testing, tighten emission standards on in-use motorcycles and adopt different emission standards for two- and four-stroke motorcycles. Once the fourth stage standards go into effect on December 31, 2003, air pollution in Taiwan's urban areas is expected to improve appreciably.

In Taipei, motorcycle carbon monoxide (CO) and hydrocarbon (HC) emissions account for 31% and 33% of air pollution respectively. To stop the steady growth of pollution, the EPA has actively implemented controls on petroleum products and tightened motorcycle emission standards year after year.

The EPA announced on August 5 that the *Fourth Stage Motorcycle Emission Standards* are to go into effect on December 31, 2003. Firms closely watching the development of the fourth stage standards dubbed them the “terminating” articles for two-stroke motorcycles. The following is a list of the main features of the fourth stage standards:

1. Sets different emission standards for two- and four-stroke motorcycles. First, second and third stage standards used the same standards for both two- and four-stroke motorcycles. According to investigation results, however, the average emissions value of a cold engine tested two-stroke motorcycle was about triple that of a four-stroke motorcycle and the results were even worse when the motorcycle was in poor condition. For this reason, the standards for two-stroke motorcycles in the fourth stage standards are twice as strict as that for four-stroke motorcycles.
2. Changes tests from warm to cold engine. First, second and third stage standards testing procedures all used the warm engine method whereby tests were conducted after the motorcycle was driven for 10 kilometers until the engine was warm. According to the EPA, investigations indicated that about 70% of trips averaged less than 10 kilometers roundtrip with a one-way journey of no more than five kilometers. Moreover, the actual quantity of emissions detected in a cold engine test was 2.5 times that for a warm engine test.
3. Tightens emission standards for in-use motorcycles. For the sake of convenience, standards for CO and HC used to audit in-use motorcycles remained for many years at an average of 4.5% and 9,000 ppm respectively. Given the increased performance of motorcycles and to ensure that catalytic converters continue to be used, the standards for CO and HC are to be increased to 3.5% and 2,000 ppm respectively. In the future, in-use motorcycles that are not properly maintained may have trouble passing inspection.

Two-stroke models currently account for about half of all motorcycles. Under current conditions, two-stroke models will likely have trouble adjusting to the fourth stage standards when they go into effect and thus two-stroke motorcycles are likely to be eliminated.

In terms of emissions from moving motorcycles, rough estimates indicate that two- and four-stroke emissions improvement rates for CO are to average 20% and HC + NO_x are to be 80% and 60% respectively. Assuming each motorcycle ride averages 10 km roundtrip and 300 rides per year, annual emission reductions of CO and HC + NO_x would be 6,000 and 10,000 metric tons respectively.

For idling motorcycles, improvement rates for CO and HC + NO_x are to be 25% and 67% respectively which should reduce the concentration of waste gasses appreciably during traffic hours and at major intersections in urban areas.

News Briefs

EIA Air Quality Modeling Requirements Announced

According to Article 49 of the *Development Activity EIA Work Procedures*, the EPA set the scope of models for air quality estimation technology and completed formal announcement on July 28. The technical scope lists approved air quality forecasting

models and appropriate conditions for use, related information, source data and processing method, and modeling result processing method regulations. If firms choose to use the models listed in the technical scope, they must submit the results of all programs used, local and foreign case models and modeling results as well as a comparison of results between all models approved in the technical scope to the competent authority for approval.

Health Risk Assessment to be Conducted at Former-RCA Site

On July 28, the EPA approved the *Former-RCA Site Groundwater Contamination Epidemiology Research and Risk Assessment Plan*. The EPA's Former-RCA Site Incident Workgroup reached the following resolutions: 1) Immediately setup a Former-RCA Site Incident Epidemiology Research and Risk Assessment Taskforce and employ two toxicologists; 2) ensure that the items in the local resident health risk assessment conducted by the EPA are the same as those conducted by the Council of Labor Affairs for former-RCA factory workers; and 3) identify the contamination source by checking hydrology information. After registering and surveying all residents in the region, carry out physical examinations and take samples.

Controls on General Waste Recyclers to be Relaxed

On August 5, the EPA formally announced an amendment to a portion of articles in the *Public and Private Waste Disposal Organization Management and Assistance Regulations*. To encourage private sector participation in general waste recycling, simple general waste is to be removed from the regulatory scope of public and private waste disposal organizations' recycling and disposal work. The following is a list of simple general waste: 1) Plastic, aluminum, iron and glass containers; 2) aluminum foil, paper and environmental agent containers; and 3) motorcycles, tires and lubricants.

Installation Standards for Environmental Agent Factories Announced

On August 12, after consulting with the Ministry of Economic Affairs (MOEA) and the Council of Labor Affairs (CLA), the EPA announced environmental agent factory installation standards. According to the new standards, new factories must comply with the standards to apply for an environmental agent production permit. Furthermore, existing plants must complete improvements within three years of the announcement date. Violators may be fined between NT\$15,000 and 30,000.

Amendment to Toxics Detection and Warning Guidelines Announced

August 5, the EPA formally announced an amendment to Articles 4 and 5 of the *Toxic Chemical Substances Detection and Warning Equipment, Installation and Operation Guidelines*. The new guidelines loosen the operator permit application procedures. When firms apply for a permit, they can submit related material to the local competent authority for registration and then use the registration contents to complete installation of detection and warning equipment.

EPA Relaxes Air Pollution Permit Requirements for Specified Industries

On August 5, the EPA announced a revision of rounds 1 through 7 of stationary pollution sources that require application for installation, modification and operation permits whereby pollution approval declaration regulations are loosened. Some industries specified by the EPA with air pollution levels below the standards set by the

EPA (typically household or small-scale factories) are to be exempt from mandatory permit application requirements.

Seven Industrial Waste Items Listed for Recycling

Pursuant to Article 31, Item 1 of the *Commercial Waste Storage, Collection and Processing Methods and Implementation Standards*, the EPA formally announced on July 31, the addition of waste wood (planks and chips), glass (bottles), ceramics (bricks, tiles and cast sand), distiller grains, dregs, clay, single alloy metal (copper, zinc, aluminum and tin) and plastic to the list of items for recycling and control.