

Development and Implementation of The Soil and Groundwater pollution Remediation Act in Taiwan

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ABSTRACT

The Soil and Groundwater pollution Remediation Act was enacted by the Taiwan Legislative Yuan in January, 2000. The law authorized the government to promulgate regulations for the remediation of soil and groundwater pollution in order to ensure sustainable use of land and groundwater resources and to protect public health and the environment. It imposes legal liability on polluters for the release of hazardous substances to soil and groundwater and compels polluters to implement investigation and remediation of subsurface contamination.

During the rapid economic development of Taiwan Miracle, noticeable air and surface water pollution problems were gradually derived from industrial activities in the 1970s. Contamination of soils by cadmium and other heavy metals was found in several "poisoned rice" events during the 1980s. These heavy metals were transported by irrigation water polluted by wastewater discharged from chemical factories. As the poisoned rice caused widespread concerns from the public, the government had pushed for passage of the soil pollution prevention act, but failed to get approval.

Serious groundwater pollution at industrial sites was not discovered until the 1990s. Unlike air and surface water pollution, the invisible groundwater pollution had occurred for years and spread over a large area before the problem was exposed. Lacking of a legal framework for prevention and remediation, soil and groundwater pollution became the most difficult environmental problem to the government. Of those contamination sites, the most well-known case is the RCA Taoyuan plant because former workers of the plant were reported to have a high incidence of cancers.

RCA established the Taoyuan plant to manufacture electronic products in 1970. It was acquired by General Electric and then sold to the French electronics firm TCE. After its closure in 1992, the site was purchased by a land development firm. In 1994, a legislator and former EPA administrator exposed the site contamination. Not long after EPA-sponsored studies confirmed contamination of residential wells in the vicinity of the plant by chlorinated solvents, GE and TCE agreed to clean up the site based on the Superfund approach, establishing "the polluter pays principle". From 1994 to 1998, extensive site investigations and remedial activities were conducted at the site. Although

contaminated soils have been cleaned up, the situation of groundwater contamination remained unresolved when the remediation work was suspended.

This case exposed only a tip of the iceberg of subsurface pollution in Taiwan. The public realized the potential impact of soil and groundwater pollution to their health. The government faced difficulties in compelling the polluters to clean up subsurface pollution. As more subsurface pollution cases came to light, public demand for environmental responsibility and sustainable development led to a joint effort by EPA, universities, environmental groups and professionals during the legislation process of the Soil and Groundwater pollution Remediation Act in 1999.

The law has the following features:

- The authority declares a contamination site as a “Control Site” or “Remediation Site” according to its potential impact on public health and the environment.
- The liability of pollution remediation applies to abandoned sites (Superfund) as well as active facilities (RCRA corrective action), including those polluted before the effective date of the Act.
- Disposition of the responsible parties’ land at the Remediation Site is prohibited before the completion of remediation. The land use within the pollution control region is also restricted.
- Prior to the establishment, termination or land transfer of the specified categories of industries, a report of soil inspection shall be provided.
- The local governments are responsible for regulatory enforcement, while the central government is in charge of grants management, regulatory policy development, and oversight of remediation activities.
- Failure to adopt the necessary measures or failure to follow the authority’s order is subject to not less than seven years and up to life imprisonment if death results.

A commission chaired by the EPA administrator was established to manage the Soil Pollution and Groundwater Pollution Remediation Fund. The commission set up four work groups to carry out its duties. The projected funding for remediation program, primarily taxed from the chemical industry, is approximately 1 billion USD over 20 years.

In the past four years, the government has established a regulatory framework for managing remediation of contamination sites, a well network for monitoring groundwater quality, an emergency response system for eliminating immediate threats to public health, and a remediation information website for effective public communication. The remediation of contamination at

hundreds of farmland, gas stations, and industrial sites are underway. It is noticed that TCE restarted its groundwater remediation activity at the RCA Taoyuan plant after it was declared as a Contamination Site in 2004.

Implementation of the new law during the initial stage has inevitably encountered many problems. One critical issue is the lack of sufficient well-trained personnel. Most officers of government agencies, environmental professionals of consulting firms and staff of responsible parties have limited knowledge and experience in soil and groundwater pollution remediation. This problem has led to disputes on regulations, discrepancies in regulatory enforcement among government agencies, as well as inefficient or ineffective investigation methods and remediation techniques. In addition, complex lawsuits and insurance problems associated with site remediation are yet to come.

The direct and indirect cost for the remediation of subsurface pollution has gradually been realized. The declaration of a contamination site may result in restricted land use and depreciation of real estate values in the nearby area, causing opposition from landlords and local residents. The site remediation could be costly and time-consuming, imposing a heavy financial load on the responsible parties, particularly small business enterprises. Therefore, the law does have a great impact on the risk of business, including the risk of foreign investment in Taiwan.

On the positive side, public concerns on the sustainable development of land and groundwater resources provide a great support to the law enforcement. In addition to legal and moral considerations, the high value of real estate in Taiwan provides polluters another incentive to remediate contaminated sites. It is also noticed that the law enforcement has indirectly encouraged industries to take actions for preventing hazardous substances from contaminating soil and groundwater.

How to efficiently and effectively implement the complex soil and groundwater pollution remediation program with limited resources is a challenge to Taiwan. Currently our remediation program tends to build on operational experience and technology development in the U.S.A. It is envisioned that international cooperation with Asian and European countries with similar background in economic and industrial development would also be beneficial to the success of our program.