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Chemical Control Measures: Comparison of the Approaches in the EU & U.S. at the Federal & State Level

By Robert Donkers

Chemical substances have a variety of applications in our daily life. Growing awareness of the environmental and health risks posed by chemicals has led to the development of legal provisions regulating chemicals production, processing and use. However, legislation can be based on different approaches and principles. This article does not intend to make an exhaustive comparative analysis of the EU and U.S. chemical policies, but aims at giving an overview of and the differences between these policies. It also indicates which lessons can be drawn from experience at both sides of the Atlantic for the further development of REACH and a future overhaul of the U.S. system.

Chemicals Legislation in the EU

Current Legislation: An Overview

In 1967, the EU harmonized the classification, labelling and packaging of hazardous substances. But it took until the sixth amendment of the 67/548 directive in 1979 before a legal framework for new chemicals was established. Substances on the market before September 1981, the so-called "existing" chemicals, were reg-

istered in the European inventory of existing commercial chemical substances (EINECS) without any further testing obligations. EINECS is a closed list and contains 100.106 substances.

All chemicals introduced on the market after September 1981 (to date about 3700, not including individual polymers which are notified in groups and not separately) are called "new" chemicals and are listed in the European list of notified chemical substances (ELINCS). The law requires the producer or importer to submit a notification of a new substance with the competent authority in one of the member states 60 days before it is placed on the market (not before manufacturing as in the U.S.) in volumes above 10 kg per year.

Information and testing requirements vary in function of the volume to be put on the market. The relevant member state registration agency carries out a risk assessment on the basis of the notification. These assessments are harmonized on the basis of Directive 93/67/EEC which defines the principles for risk assessment.

Directive 76/769 EEC of 1976, sets the rules for bans and restrictions on the

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Country Profile: Singapore

Editor's Note: This is the fifth in a series of articles summarizing various country's government and SH&E legislative processes. It is intended to serve as a planning tool for SH&E professionals preparing to conduct business in profiled country. Previous profiles have covered Japan, Great Britain, Chile and Ireland. The material has been provided courtesy of ENSR International. Requests for additional country information should be directed to Halley Moriyama at hmoriyama@ensr.ae.com.com; (978) 589-3233.

Singapore is located in Southeast Asia, off the tip of the Malay Peninsula and connected to

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Country Profile: Singapore

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Malaysia by a 1.2-kilometer long causeway and a new land link, to the west at Tuas. Singapore comprises one major island and more than 50 small adjacent islets. The narrow Johor Strait separates Singapore Island, the major island, from Malaysia on the north; the city of Singapore is located along the southeastern end of the island. On the south, the country is separated from the Riau Archipelago of Indonesia by Singapore Strait, an important shipping channel that links the Indian Ocean and the South China Sea.

The total area of the country is approximately 697-sq. km. (269 square miles). The main island measures about 25 miles long by 14 miles wide. Singapore is a low-lying country, with no prominent relief features other than a central area of hills, which rise to a maximum elevation of nearly 166 meters (545 feet).

Singapore, which almost lies on the equator, has a wet tropical climate, with an average annual temperature of 81 °F and an average annual rainfall of 95 inches (Microsoft, 1994). The map of Singapore (pg. 5) identifies the principal cities and towns.

Population

Singapore is the smallest of the southeast Asian countries in population after Brunei Darussalam. However, it is one of the most densely populated countries in the world (6,004 persons per square km). As of Dec. 31, 2003, Singapore's population stood at just over 4.185 million. The majority of the population is concentrated along the southern part of the island.

More than three-quarters of the population are of Chinese descent; Malays (14%) and Indians (7%) are the other principal ethnic groups. The country has four official languages, English, Mandarin Chinese, Malay, and Tamil (Microsoft, 1994). Malay is the national language while English is the principal language of business and government. Most Singaporeans are bilingual, speaking both the mother tongue and English.

Government

Formerly a British crown colony (1824-1963), falling briefly to the Japanese (1942-45) and later a part of Malaysia (1963-65), Singapore became a sovereign

state in 1965. Singapore is a republic with a parliamentary form of government modeled after the Westminster system of government. A president, who is elected by the people to a 6-year term, serves as the head of state while a prime minister is head of government. Executive powers are vested in a cabinet appointed by the prime minister, all of whom are elected members of parliament. The cabinet is a council of ministers that has the responsibility of administering the country and providing Parliament with policy guidance. The cabinet consists of the prime minister and 14 ministers, including the minister of the environment.

Environmental Authorities

The Ministry of the Environment (ENV) was formed in 1972 and up to 2002, it was the main agency in Singapore, taking charge of pollution control and public health. In July 2002, ENV launched its own statutory board, the National Environment Agency (NEA) (see National Environment Agency Act, Act 4 of 2002). NEA focuses on the implementation and operation of environmental policies. NEA took over the operations of the Environmental Public Health Division and the Environmental Policy and Management Division of ENV. The Meteorological Service Department of the Ministry of Transport was also integrated into NEA, and called the Meteorological Service Division.

NEA's main divisions/departments are the divisions of Environmental Protection, Environmental Public Health, Meteorological Services, Corporate Services and the Singapore Environment Institute (formerly the Center for Environmental Training). ENV has also taken charge of Singapore's water authority, the Public Utilities Board (PUB).

The Environmental Public Health Division is responsible for administering safety standards and preventing the spread of infectious diseases. The division is headed by a director-general of public health (formerly called the commissioner of public health). It comprises the Environmental Health Department, the Environmental Health Institute and the Hawkers Department. The Quarantine and Epidemiology Department is now brought under the Ministry of Health; the former Vector Control and Research Department has been dissolved and merged with the Environmental Health Department of

NEA; and the former Public Education Department is now with NEA and called Education and Partnership Department under its Corporate Services Division.

Health & Safety Authorities

The Ministry of Manpower ("MOM"), established on April 1, 1998 (formerly the Ministry of Labor), is responsible for workplace health and safety (www.mom.gov.sg). MOM's Occupational Safety and Health Division (OSHD) was newly formed on May 1, 2000. It has the following departments:

- Occupational Safety
- Occupational Health
- Occupational Safety and Health Training and Promotion Center;
- Work Injury Compensation.

OSHD provides the following services:

- registration and inspection of factories;
- investigation of accidents;
- inspection of pressure vessels and lifting equipment;
- conducts occupational safety and health training courses;
- surveillance of occupational health and diseases.

CDA was established on Jan. 1, 2004, as a consolidation of the Center for Pharmaceutical Administration and the Center for Drug Evaluation. The latter is now renamed the Innovative Therapeutic Group (ITG).

The Environmental Health Institute (under the Ministry of the Environment) was launched on April 25, 2002, to develop new capabilities to understand and deal with disease-transmitting vectors, particularly mosquitoes and rodents.

SH&E Legislation

Environmental

Over the past decade, Singapore has built a reputation as one of the "greenest" countries in southeast Asia. It markets itself as a Garden City that is "clean and green." The country claims to have achieved its industrialization goals without sacrificing environmental protection, through a three-pronged strategy of prevention, monitoring and enforcement. Prevention is achieved by clear controls at the planning stage. Careful land use planning ensures that every inch of land is

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zoned for a particular use. The various authorities ensure that developments are sited in designated areas and pollution control measures are incorporated in the design of the developments.

The construction of new facilities, including manufacturing plants and commercial offices, requires plan approval by several agencies including the Pollution Control Department (NEA), Building and Construction Authority (Ministry of National Development), and Fire Safety and Shelter Bureau (see Code of Practice on Pollution Control). NEA's Pollution Control Department will only approve building plans if they comply with sewerage, drainage, environmental health and pollution control requirements.

Recent Developments

After this steady evolution of environmental control laws, the Ministry of Environment has focused in recent years on streamlining and strengthening the environmental regime. The result of this effort was a major overhaul of Singapore's environmental laws in 1999. The new Environmental Pollution Control Act (EPCA) came into effect on 1 April 1999, "to consolidate the laws relating to environmental pollution control" (preamble to act). It is intended to tighten environmental controls, and to specifically address topics previously given little attention, such as land contamination and clean up liability.

The preamble to the EPCA states that the act's purpose is to "consolidate the laws relating to environmental pollution control and to repeal the former Clean Air Act 1971 and the Water Pollution Control and Drainage Act 1975." The act also replaces provisions of the Poisons Act and its implementing hazardous substance regulations, and includes noise control provisions formerly contained in the Environmental Public Health Act.

However, EPCA is not a comprehensive consolidation, although it covers air, water, noise and hazardous substances. The law relating to waste and toxic waste management continues to remain under the Environmental Public Health Act (EPHA).

Occupational Health & Worker Safety

The principal occupational health and safety requirements are embodied in the

Factories Act 1973, revised in 1998, along with the various implementing regulations. All factories are required to be registered with the Dept. of Industrial Safety, which is part of MOM.

The Factories Act contains detailed provisions relating to the health of workers (such as cleanliness, overcrowding, ventilation, lighting, drainage of floors, toilets), safety (relating to types of dangerous equipment such as prime movers, hoists and lifts, electrical installations, steam boilers, pressure vessels, gas plants, refrigeration plants, dangerous substances, fumes, safe work procedures and welfare (e.g., supply of drinking water). It also contains special provisions on safety and health, such as provisions relating to toxic substances, material safety data sheets, protective clothing, hearing protectors. It also deals with work in special premises such as ships or construction sites, and contains provisions relating to safety officers, safety committees, and safety management systems.

Under the Factories Act, certain types of industrial facilities are required to have in-plant safety officers. For larger facilities (employing more than 50), safety committees comprised of workers and management are to be formed. Supervision and enforcement of workplace health and safety requirements are the responsibility of the chief inspector of factories.

The Factories Act is complemented by a host of subsidiary laws, such as laws that relate to abrasive blasting, asbestos, explosive powered tools, hoists and lifts, medical examinations, noise, first aid, safety management systems, safety officers, safety training courses, safety committees, and also laws that relate to safety helmets and footwear, and specify the maximum exposure level of workers to specified toxic substances.

Employers also have a general duty of care under common law relative to the safety of workers. Employers must provide a safe place of work, safe machinery, a safe system of work, and a competent staff.

Workers injured in the course of their employment are compensated under a scheme established by the Workmen's Compensation Act, if they fall within the definition of "workman" under the act. The objective of workers' compensation is to ensure that injured workers and dependants of deceased workers to receive fair compensation for work injury expeditiously.

The act is enforced by MOM's Work

Injury Compensation Department. It is applicable to all workmen as defined in the Workmen's Compensation Act. The Workmen's Compensation Scheme is an employer's liability scheme. All employers are required to take up workmen's compensation insurance for all workmen under their employment, unless they have been exempted from doing so.

Recent Developments

The Factories Act has received some revision, and construction site law has significantly developed during this time. In addition to the revisions to the Building Control Act 1999, and the Factories (Building Operations and Works of Engineering Construction) Regulations 1999, a new set of regulations and orders requires the employment of environmental control officers at construction sites (See also similar provisions in the 1999 revised edition of the Environmental Public Health Act, Section 62.).

Guidelines for Good Indoor Air Quality in Office Premises, applicable to new and existing buildings that are air-conditioned and used as office premises, were issued in 1997. Part II of the guidelines focuses on identifying indoor air quality problems, and Part III establishes criteria for improving indoor air quality. New regulations were passed to ensure that cooling towers and water fountains are kept clean, so as to prevent outbreaks of Legionnaire's disease [Environmental Public Health (Cooling Towers and Water Fountains) Regulations, 2001].

The Factories (Safety Training Courses) Order took effect June 1, 2001. This requires the occupier of a factory to ensure that certain classes of workers attend prescribed safety training courses conducted by the Occupational Safety and Health Training and Promotion Center or other approved training institution. These courses are: construction safety orientation, safety orientation (manhole), safety instruction (manholes), formwork safety course for supervisors; construction safety course for project managers; oil and petrochemical safety orientation course for workers, oil and petrochemical industry supervisors safety course; and forklift driver's training.

Several sets of fire safety laws have received revision over the past several years, including the Fire Safety (Specifications of Premises Requiring Fire Safety Managers) Notification, and

the Fire Safety (Fire Emergency Plan) Regulations.

The National Environment Agency Act was passed in June 2002, to come into effect on July 1, 2002. It established the NEA and brought changes to the designations of officers, e.g., the commissioner of public health is now called director-general of public health.

Codes of Practice & Guidelines

The following are codes of practice and guidelines issued after May 2002:

- CP 97: 2002—Code of Practice for temporary construction electronic measurements standards (CEMS) - standard method of measurement (SMM) for building works.

- Implementation of the HazMat Transportation Drivers Permit (HTDP)—new security measures on the transportation of hazardous materials (HAZMAT) on roads, effective from April 1, 2003.

- Guidelines on boundary noise limit for centralized air conditioning and ventilation systems in on-industrial buildings.

- CP 98: 2003—Code of Practice for Preparation and MSDS.

- CP 99: 2003—Code of Practice on Industrial Noise Control—developed to complement the Factories (Noise) regulations. It applies to all industrial workplaces except construction and demolition sites that are covered by SS CP 49 Code of Practice for Noise Control on Construction and Demolition Sites.

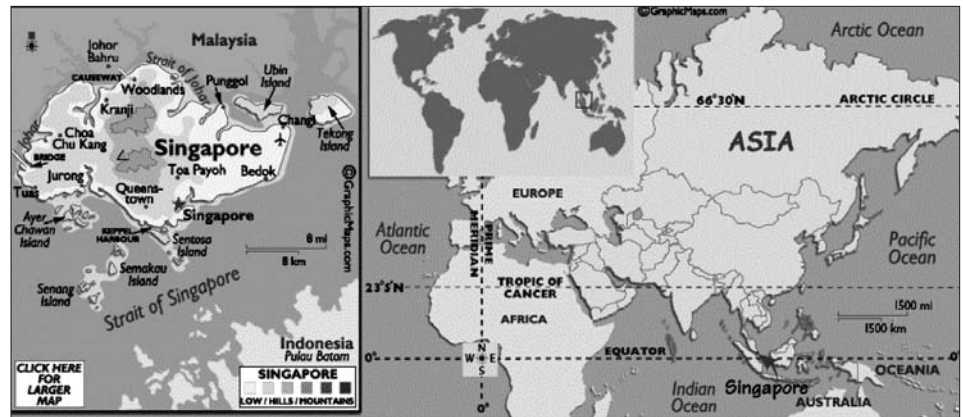
- CP 100: 2004—Code of Practice for Hazardous Waste Management. This sets out the procedures and practices on safe management and handling of hazardous wastes generated from industrial activities. It also sets out the regulatory requirements for collection, transport, storage, treatment and disposal of hazardous wastes. It does not, however, apply to bio-hazardous and radioactive wastes.

Safety Circulars

MOM issues safety circulars on occasion. These include circulars on lifts and hoists; accidents involving confined spaces; safety measures for carrying out hot work on board oil tankers or chemical carriers; safe use of oxygen-fuel gas equipment; safe work procedures; lock-out procedures; prevention of fire/explosion in shipyards; formwork safety and electrical safety.

Future SH&E Legislation

After the sweeping overhaul of environ-



mental laws, it is difficult to predict what new laws may be developed in the future. The government continues to emphasize solid waste management and waste minimization as top priorities.

Safety and health laws regarding the handling of hazardous substances may also be issued sometime in the near future. As in many other Asian countries, the health and safety feature of hazardous substance handling is receiving stronger attention by government officials. The Factories Act contains provisions relating to the handling of hazardous substances as well as the exposure of workers to such substances.

The Ministry of the Environment has implemented measures to control and minimize the risks from industrial developments that handle large quantities of hazardous substances. The Pollution Control Dept. (PCD) of MEWR controls toxic and environmentally hazardous chemicals under the EPCA and the EPC (Hazardous Substances) Regulations. Flammable petroleum products are controlled under the Fire Safety Act by the Fire Safety and Shelter Bureau of the Civil Defense Force. Radioactive substances are controlled by the Center for Radiation Protection of the Health Sciences Authority. ENV has instituted a safety audit scheme on the management of hazardous substances. There are strict controls on the handling, transportation, treatment and disposal of toxic hazardous waste under the EPHA and the EPH (Toxic Industrial Waste) regulations.

Enforcement of SH&E Regulations Administrative Actions

If a party violates environmental laws or regulations, the Ministry of the Environment and Water Resources may impose

administrative sanctions against the responsible party. These sanctions include financial penalties, the revocation of a license or permit, an order requiring the owner or occupier of premises to install, repair, alter or dismantle certain equipment, and/or an order prohibiting work and processes.

The financial penalties, which are imposed on a per-event and in some cases a daily basis vary by law. For example, EPCA Section 17 states that any person who discharges any toxic substance into any inland water “likely to cause pollution of the environment” is guilty of an offense and liable on a first conviction to a fine of up to S\$50,000 (approximately, \$29,412 U.S. at S\$1.70 to U.S. \$1) and/or imprisonment not exceeding 12 months. On a second or subsequent conviction, the fine may not exceed S\$100,000 (\$58,824 U.S.) and/or imprisonment of at least 1 month, but not exceeding 12 months. This means imprisonment is mandatory on a second or subsequent conviction. Violation of a cease and desist order under this section carries a fine of up to S\$100,000 and/or imprisonment of up to 3 months, and a S\$2,000 daily fine for a continuing offense.

Section 67 of EPCA states that any person guilty of an offense not otherwise expressly stated under EPCA on a first conviction shall receive a fine of up to S\$20,000 (\$11,764 U.S.), and for a continuing offense, a further fine of up to S\$1,000 for every day during which the offense continues after conviction. On a second or subsequent conviction, the guilty person is subject to a fine of up to S\$50,000, and a further fine of S\$2,000 per day for a continuing offense.

In addition, Section 36 (on pollution impact studies) provides that the court may

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impose on the guilty person an order to pay to the director of environmental pollution control the amount of any expense in connection with the execution of any work, together with any interest due thereon.

It should be noted that penalties for breaches of subsidiary legislation are lighter than the penalties for breaches of the main act. Several EPCA provisions empower government officials to require the installation of pollution reducing equipment, or the alteration or dismantling of pollution generating equipment (e.g., see Section 13 for air pollution control).

EPCA's Part VII provisions on hazardous substances control include several new enforcement powers. Section 25 allows the director to issue an order requiring the owner or occupier of any premises to remove stored hazardous substances to a disposal facility. Failure to comply may result in a fine of up to S\$50,000. Section 26 empowers the director to require impact analysis studies to be undertaken by the owner or occupier of any facility or installation intended to be used for storage, handling and use of hazardous substances. Failure to comply with an order may result in a fine of up to S\$20,000.

Various administrative powers are also available in controlling noise pollution at construction sites and at other workplaces under the EPCA. Section 28 permits the Director to impose noise requirements for plant and machinery used in construction. The notice may specify which machinery may be used, the hours of use, and the level of noise or vibration.

Failure to comply may result in issuance of a stop work order. Failure to comply may result in a fine of up to S\$10,000 "for every day during which the notice is not complied with" and/or imprisonment not exceeding 3 months.

A stop work order may also be issued, under Section 29, if an owner or occupier of any work place fails to comply with a noise control notice. The penalty provisions are similar to those of Section 28.

Under EPCA and other SH&E laws, government officials now have several options to stop or curtail work at a facility that is in breach of control provisions. Part IX of the EPCA, Licenses and Industrial Plant Works, establishes that a person may apply for a multimedia, or

single, license. If the license holder breaches any restriction or condition of the license or contravenes EPCA, the director may: suspend, cancel or revoke the license under Section 32(1), or prohibit the licensee from carrying out one or more activities specified in the single license under Section 31(a); or modify any condition subject to which the license was granted, under Section 31(b). Interestingly, "without giving any reasons and at any time during the validity period of the license," the director may add, amend or delete any condition imposed in any license (Section 32(2)).

Section 39 of EPCA makes clear that where the minister has reason to believe that air, water or hazardous substance pollution from any premises "is likely to cause pollution of the environment or be injurious to public health or safety," he may order the owner or occupier of premises to cease the conduct of any trade or industrial process.

Failure to comply with the stop work order may result in a fine of up to S\$100,000 and/or imprisonment of up to 3 months, and a further fine of up to S\$2,000 for every day during which the offense continues after conviction. An appeal provision permits any person aggrieved by a stop work order to appeal to the High Court.

Part XI on enforcement of EPCA provides a host of powers and tools, including the power to demand names and addresses of owners and occupiers; the power to examine and secure oral examination of "any person supposed to be acquainted with the facts and circumstances of matters under this Act or the regulations" (Section 44); powers of arrest; the power to act in cases of emergency; the power of entry; the power to enter on land adjacent to subject works; penalties for obstructing the director in his duty; and powers of search and seizure.

Note that under Section 73 of the EPCA, a district court or a magistrate's court has jurisdiction to hear and determine all proceedings under the Act or the regulations, and shall have the power to impose the full punishment in respect of any such offense, notwithstanding anything to the contrary in the Criminal Procedure Code.

Generally, penalties under the Environmental Public Health (which governs waste disposal and treatment) are less severe than under EPCA, with the

maximum fine for a first offender not exceeding S\$20,000. However, there is mandatory imprisonment of from 1 to 12 months, for illegal dumping [s.23(1A)].

Safety Data Sheets

Manufacturers or suppliers of toxic, corrosive or flammable substances used, handled or stored in a factory must produce MSDS for those substances to provide necessary information for the safe handling of those hazardous or potentially hazardous substances.

A new Code of Practice for Preparation and Use of MSDS was published in 2003 (CP 98). MOM has produced Guidelines for MSDS. Appendix 2 of the MSDS Code of Practice provides criteria for classifying hazardous chemical products (defined as substance or preparation (mixture)) as explosive, oxidizing, highly flammable, extremely flammable, toxic, very toxic, corrosive, harmful, irritant, and dangerous to the environment. Annex A of the MSDS Code of Practice describes the process of determining whether a chemical product is hazardous.

Reporting

EPCA requires anyone who imports or sells any hazardous substances to keep proper records of the sale as required by the director. The director may further require the owner or occupier, in a written notice, to identify, estimate the probability, and quantify the consequences and risk levels, of all possible potential hazards ("testing") in the storage, handling and use of hazardous substances. A record of the testing should be kept available for inspection for at least 5 years from the date of the test performed by a competent person.

The owner or occupier may also be required to submit a proposal for the implementation of new or additional measures for the prevention, reduction or control of any potential hazards endangering public health or causing environmental pollution.

The occupier of chemicals manufacturing industries that uses or stores a large quantity of hazardous substances may be required to perform "Quantitative Risk Assessment Study" and "Pollution Impact Study" (Sections 26 and 36 EPCA).

For More Information

Additional information can be found at www.mom.gov.sg or www.mewr.gov.sg. ■