Asia Pacific Environmental and Occupational Health Journal (ISSN 2462-2214); Vol 2 (3): 21 - 24, 2016

SCIENTIFIC PAPER:

Environmental Health Issues and Industries

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1. Introduction

Environmental issues are no longer issues restricted within national borders but are fast becoming regional and international concerns. International agendas such as the 1989 Basle Convention to curb the movement of toxic wastes across the globe, the 1992 UNCED meeting in Rio de Janeiro to minimise the impacts of development on the environment, and the continuing discussions on the establishment of the ISO 14000 environmental standardisation for industries, are testimonies to the extent of international attention being given to environmental issues.

These international events have caught the attention of government, public and the corporate world. It is therefore obvious from these recent developments that we will have to change the way in which we view the environment. This means that governments, especially those of developing countries have to update and tighten their legislation and enforcement efforts, while industries have to streamline their management and production activities and modify their polluting processes. As it is in any process of change, those who change first will benefit the most and suffers the least impediment from the change. This is probably why many large corporations, especially the multinationals, are gearing themselves up to face this emerging worldwide environmental wind of change. As it normally is in the business world, those who response earliest to an inevitable change will enjoy the competitive edge over their competitors. With this world scenario in mind, let us review the current and future environmental issues confronting the corporate world.

2. Definitions

Let us start by defining certain terms to help in our understanding of environmental issues. The environment is defined as:

> *the whole complex of physical, social, cultural, economic and aesthetic factors which affect individuals and communities, and ultimately determine their form, character, relationship and survival* (J. G. Rau, 1980).

The above definition clearly emphasises the expanding concept of the environmental. As we understand more and more about our environment, the more we realise that man's impact on the environment is more extensive than we initially thought it to be. For example, the realisation of the effect of ozone depleting substances (ODS) such as the chloroflorocarbons (CFCs) on the ozone layer has extended man's environment to also include the stratospheric layer of the atmosphere which is more than 10 km above the earth surface. Our understanding of the environmentally persistent nature of lead, which almost all of it comes from the consumption of leaded gasoline, taught us an important lesson that non-biodegradable chemicals emitted into the environment will stay in circulation in the environment long after we stop emitting them. Global lead pollution is so prominent that almost all individuals in any developed society will have lead in their body system even thought the human body has no known biological use for it.

As man changes and modifies the environment to meet his development needs such as incresing his food and energy supply, he will induce impacts on the environment. An environmental impact is defined as:

> a*ny alteration of environmental conditions or creation of a new set of environmental cconditions, adverse or beneficial, caused or induced by the action or set of actions under consideration* (J. G. Rau, 1980).

The above definition stresses that environmental impact can be both adverse as well as benefical. This is a condition that is often overlooked by those involved in the assessment of environmental impacts. As such the assessment is often imbalanced and biased towards highlighting only the adverse impacts. Therefore, an environmental impact assessment is essentially a social cost-benefit analysis.

Environmental health is a multidisciplinary science which is concerned with the control of biological, chemical and physical hazards or pollutants from anthropogenic as well as natural sources, which have the potential of producing significant health effects on humans. Human exposure to these hazards may occur directly or indirectly. For example, we are directly exposed to lead in the atmosphere through inhalation, besides being indirectly exposed to it

through the ingestion of lead contaminated foods and water. The lead in foods and water originate from that in the atmosphere which has been deposited on land and water and taken up by the biotas of the ecosystems. As man degrades his environment, the physical changes inflicted first show their impacts on the lower plants and animals. Subsequently, as the extent and intensity of environmental pollution escalate, the seriousness of the effects on humans become more apparent. For example the effects of moderate level of lead pollution such as hypertension, male sterility and IQ development.

3. Corporate Environmental Health Concerns

All environmental issues have an environmental health component and concern. Any impact on the environment that has a bearing on the physical, mental or social well-being of humans is also an environmental health concern. By such a broad definition, the destruction of forest is an environmental health issue. This is because it reduces the earth's capacity to absorb the excess carbon dioxide released into the atmosphere from the combustion of fossil fuels, which in turn results in the greenhouse effect which warms the earth atmosphere. This warming effect will melt the polar ice causing the flooding of low-lying coastal areas, and also changes the global winds and weather patterns. This may lead to human sufferings in terms of its effects on food productions due to changing weather and loss of lives and properties due to floods and famines. Thus, the destruction of forest has an ultimate impact on the physical, mental and social wellbeing of human.

3.1 Environmental Impact Assessment

Many developed and developing countries have now adopted mandatory requirement for environmental impact assessment (E.I.A.) into their environmental legislative system. While the bulk of environmental legislation are curative in nature because they deal with pollution control only after pollution has actually occurred, E.I.A. is essentially preventive piece of environmental legislation because it is intended to prevent pollution before it happens. As an example, the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order, 1987 promulgated under the Environmental Quality Act, 1974 prescribed E.I.A. to be mandatory for the following activities associated with the petroleum industry in Malaysia (Department of Environment, Malaysia, 1987).

1. Oil and gas fields development
2. Construction of off-shore and on-shore pipelines in excess of 50 kilometers in length.
3. Construction of oil and gas separation, processing, handling, and storage facilities.
4. Construction of oil refineries.
5. Construction of product depots for the storage of petrol, gas or diesel (excluding service stations) which are located within 3 kilometers of any commercial, industrial or residential areas and which have a combined storage capacity of 60,000 barrels or more.

The aim of E.I.A. in Malaysia is to assess the overall impact of development projects proposed by public and private sectors, on the environment. The objectives of the E.I.A. process are defined below.

1. To examine and select the best from among the project options available.
2. To identify and incorporate appropriate abatement and mitigating measures into the project plan.
3. To predict significant residual environmental impacts predicted.
4. To identify the environmental costs and benefits of the project to the community.

Therefore the salient points of an E.I.A. exercise are to select the project option which will minimise environmental impacts, to propose effective abatement and mitigating measures to further minimise the environmental impacts, to identify any residual environmental impact for which no effective mitigating measure can be suggested, and finally to weight the costs and benefits of the project. If the project can generate more benefits than costs to the community, then by all means it should proceed. If otherwise, then it should be abandoned for the sake of the community.

3.2 Sustainable Development

The concept of sustainable development was first proposed by the World Commission on Environmental and Development in 1987 which defines it as *development that meets the needs of the present without compromising the ability of future generations to meet their own needs.* This definition which was later adopted by the United Nation Conference on Environmental and Development (UNCED) at Rio de Janeiro in 1992 is indeed a noble but ambitious goal. By this definition alone, the exploitation of petroleum, gas and coal will be totally unsustainable. This is because we are depleting the earth fossil fuel resources at a much faster rate than it can be replenished. We are doing so at the expense of the future generations whom we assume will discover an alternative source of energy, besides nuclear energy. We must remember though that their

energy needs will be much greater than ours due to their larger population and more sophisticated lifestyles.

Therefore to be more realistic of the present condition, a more practical definition of sustainable development is needed. The following definition is suggested

A planned network of coordinated development processes or Actions by the public and private sectors, for the accumulation of infrastructural, financial and social assets within a geographical location, that maximizes the economic and social benefits while minimizing the negative impacts on the physical, biological and human environmental that will accrue from such development process, and which insures that development benefits outweigh costs (Jamal H.H., 1996).

This definition assumes that development benefits such as better housing, educational and health facilities will benefits both the present as well as future generations. On the other hand, the impacts on the environment or development costs can be minimized to a magnitude which nature is able to cope with if the ecosystem's inherent ability to repair and rejuvenate itself is not overtaxed. This may mean that development has to be gradual, and that the impacts have to be evenly spread as not to overburden any particular ecosystem.

3.3 Community Right-to-Know

The right-to-know principle obligates employers and other parties to make information on hazardous exposures available to workers, the public, health care providers and government agencies (Frumkin, 1994). In the U.S., this obligation started out as worker right-to-know which was made mandatory in 1983 through the Toxic and Hazardous Substances Hazard Communication Standard, established under the Occupational Safety and Health Act. This obligation was extended to the general public in the wake of the Bhopal disaster, which showed that the community in the vicinity of an industrial installation is constantly facing a health risk and should therefore be adequately informed of such a risk. Thus the Emergency Planning and Community Right-to-Know Act (EPRA) were promulgated in 1986 under the Superfund Amendments and Reauthorization act (SARA).

It is obvious that in the future, companies have to be more transparent not just to their workers and investors but also to the public and the mass media, with respect to their manufacturing processes, effluent releases and waste generation. In the U.S., the community right-to-know obligation requires industrial facilities to report the amount of chemicals they use and emit, how these amounts were calculated, and how the chemicals are emitted (eg. through a smoke stack or into a river), both regularly and under emergency conditions. These data then form the Environmental Protection Agency's (EPA) Toxic Release Inventory, which is a publicly available document. The rationale behind this is that local and state emergency authorities, equipped with information about chemicals used and emitted at industrial facilities, would be better prepared to anticipate and respond to chemical release into the environment.

3.4 Self-Regulation

As companies become more and more socially responsible and socially accountable, self-regulating activities become more prominent. Even in a developing country like Malaysia, there have been cases whereby large corporations carried out E.I.A. voluntarily for development activities for which E.I.A. has not yet been prescribed. The Responsible Care Programme (R.C.P.) is a good example of self-regulation. The programme was started by the chemical industry in Canada in 1984, and has now spread worldwide (Anon., 1995). In Malaysia, R.C.P. is being adopted by the Chemical Industries Council of Malaysia. R.C.P. signifies commitment to responsible management of the total live cycle of chemical products, namely the 'cradle to grave' concept in chemical management.

3.5 ISO 14000

The newest development in international effort to standardize conformity to environmental standards are the ISO 14000 standard series. It is a new international series of quality standards proposed by the International Organization for Standardization, against which an industry's environmental management system will be judged and certified. It will probably be implemented in early 1997, and is designed to provide a common approach to environmental management, enhances the measurement of environmental performance and facilities international trade.

There will be 2 major concerns in ISO 14000. The first is organizational evaluation and comprised guidelines on principles and supporting techniques for an environmental management system, environmental auditing and environmental performance evaluation. The second which is not as well developed, is product evaluation which includes life-style assessment, environmental labeling and environmental aspects in product standards (Wong S.L., 1995). ISO 14000 will adopt a top-down approach involving management at the highest level. It also differs from ISO 9000 in that the certification applicant has to comply with environmental legislation. Figure 1 show an example of an environmental management system

which can be adopted in working towards ISO 14000 certification.

4. Selected Environmental Health Issues

4.1 Air Pollution

Among the more critical environmental problems of this decade is obviously air pollution. However, it tends to be localized in the urban and industrial regions of a country due to the higher density of polluting sources in these regions. Figure 2 depicts the air pollution situation in 20 megacities of the world with respect to selected air pollutants, as identified by the World Health Organization and the United Nations Environmental Programme. Kuala Lumpur was not identified as a megacity but air pollution information for the city was included in the Figure as comparison. According to Figure 2, the air pollutants for which the W.H.O. guidelines were most often violated are suspended particulate matter (SPM) and ozone (O_3).

Figure 3 gives the major sources of respirable particulates or particulates that are less than 10 μm in diameter (PM 10), in the atmosphere over Klang Valley, Malaysia. The Klang Valley represents the most urbanized region in Malaysia, and the air pollution profile for this region would be typical of other large cities. Here, the major sources of PM 10 are diesel (35%) and wood combustion (15%). Surprisingly, gasoline combustion only contributes towards 1 % of the PM 10. However, we must remember that gasoline also generates gaseous pollutants like oxides of nitrogen, carbon monoxides and volatile organic.

4.2 Marine Pollution

Marine pollution has also surfaced as an important environmental issue across the world. Control of marine pollution, especially in international waters, has been a very difficult task. This is especially true for small countries like Malaysia, with a relatively extensive coastline but limited enforcement resources. Figure 4 shows the types of pollutants most commonly detected in Malaysian marine environment. Oil and grease from oil spill incidents due to mainly minor collisions, pipeline leak, oily water discharges, leakage during transfer and tanker cleaning activities, represent major marine pollutants. In 1993, 20 oil spills occurred in the marine environment around Malaysia (Department of Environment,
1994).The other significant contributor of marine pollution is suspended solids which come mainly from land development and logging activities.

5. Conclusion

Environmental issues, especially environmental health concerns, will become the most critical social and industrial challenge of the 21 st century, both in the developed as well as the developing world. Both the government as the keeper of public welfare as well as the public themselves as consumers, will pressure their commercial and industrial counterparts to assume a more environmental-friendly and socially responsible role. This may dampen business performance and profit initially over an acute time frame, but over the long run both businesses as well as the public will gain greatly. As an ending note, we must always bear in mind that this only world of ours is not something that we borrow from our children and grandchildren.

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