INDUSTRIAL POLLUTION IN ISLAMABAD

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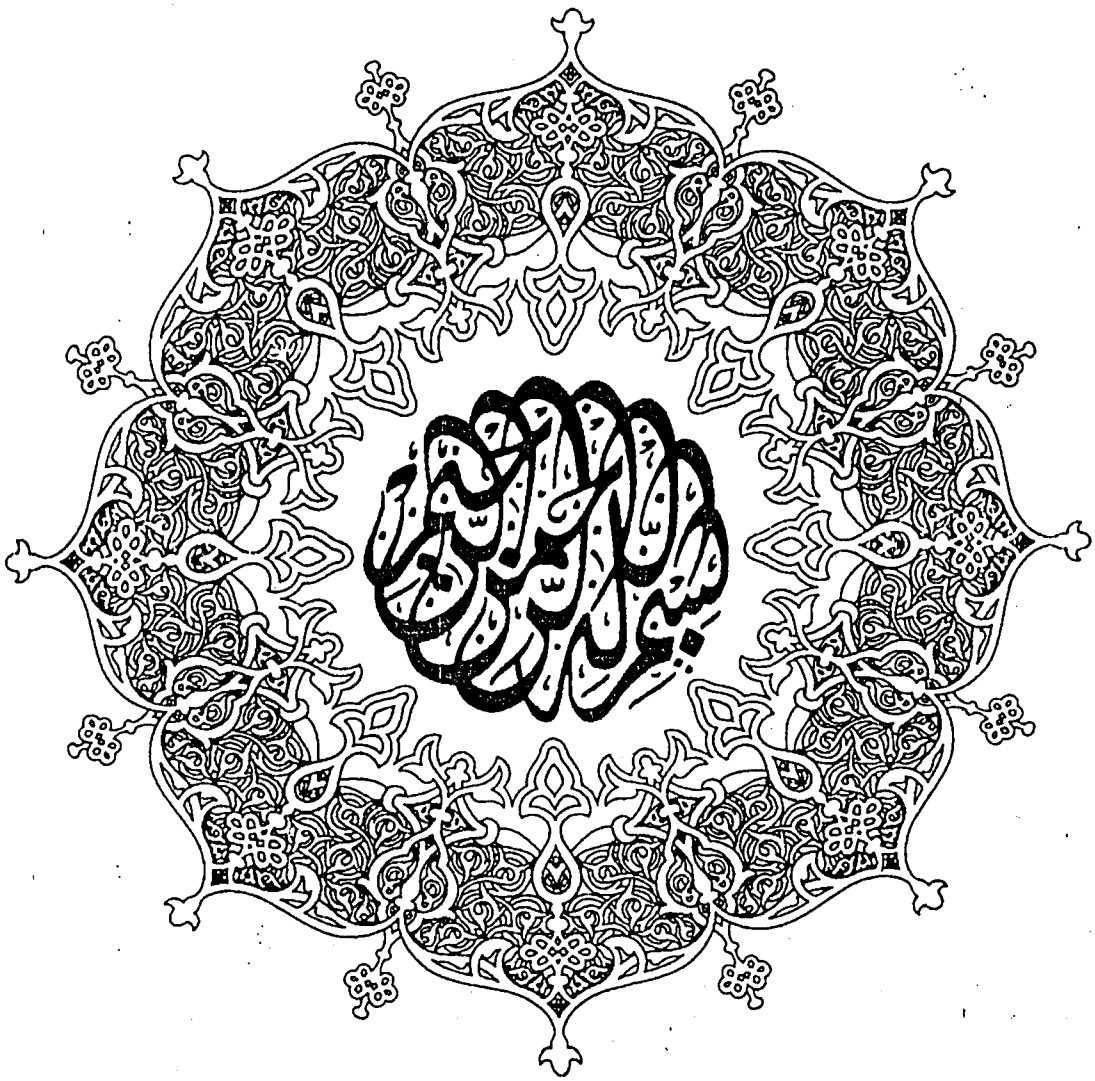
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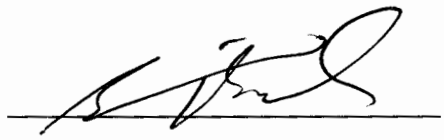

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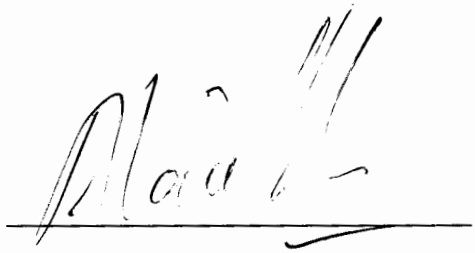

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LIST OF ABBREVIATIONS

CO	Carbon Monoxide
EIA	Environmental Impact Assessment
EIP	Environment Improvement Program'
GATT	General Agreement on Trade and Tariff
H C	High Court
IEI	Islamabad Industrial Estate
IDBP	Industrial Development Bank of Pakistan
m3	Cubic Meters
NAAQS	National Ambient Air Quality Standards
NEQS	National Environmental Quality Standard
NO_2	Nitrogen dioxide
O_3	Ozone
PASDEC	Pakistan Stone Development Company
Pb	lead

PCAP	Pakistan Clean Air Program
PEPA	Pakistan Environmental Protection Agency
Pak-EPA, 1997	Pakistan Environmental Protection Act, 1997
PEPC	Pakistan Environmental Protection Council
PICIC	Pakistan Industrial and Commercial Investment Corporation
PM	Particulate Matter
PM2.5	Particulate Matter (up to 2.5 micrometers in size)
PM10	Particulate Matter (up to 10 micrometers in size)
Provincial EPAs	Provincial Environmental Protection Agencies
S C	Supreme Court
SDPI	Sustainable Development Policy Institute
SMART	Self-Monitoring and Reporting Tools
SME	Small and Medium Enterprise
SMEDA	Small and Medium Enterprise Development Authority
SOx	Sulphur dioxide
SO_2	Sulfur dioxide
TRIPS	Trade Related Aspects of Intellectual Property Right
TSP	Total suspended particulates
UNECE	United Nation Economic Commission for Euro
UNEP	United Nation Environmental Program
WTO	World Trade Organization

LIST OF CASES

DEDICATION

This thesis is dedicated to the Holy Prophet Muhammad (Peace Be Upon Him), Who is the "MERCY" for the whole Universe.

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In the name of Allah the most merciful and helpful Who enabled me to complete this task with the help of my teachers, family and friends. First and Foremost I would like to express my regards to my supervisor, Mrs. Samina Bashirs, for her continuous guidance and advice. I am grateful to her for the cooperation, kind support and valuable time she gave for this work.

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ABSTRACT

INDUSTRIAL POLLUTION IN ISLAMABAD

Sustainable economic development is necessary to improve the standard of living and quality of life in the developing countries. It is also required to maintain their attributes for those lands already commercially developed. Past experience indicates that one of the most important elements in the economic growth is the development of the industry. It should be also recognized that developing industry, if pursued according to the traditional, entails the additional inefficient consumption of limited national resources and generation of large amount of residue that called industrial pollution.

The industrial pollution has miserably affected the ecosystem of our planet. The existence of the life is threatened. The waste, effluents, smoke and heat emanating from the factories have polluted land, water, wildlife, agriculture, forest and food resources. Those living in the surrounding of industrial complexes are suffering from myriad of diseases. The accidents occurring because of failures in the system of manufacturing units have played devastation, with the life and property.

Industrial pollution in the Pakistan is one of the major environmental problem, most of the industrial waste discharges from the industries without any prior treatment. Currently 6634 industries are registered in the country from which 1228 are considered to be highly polluting There are around 219 industries operating in Industrial Estate Islamabad (I-9 & I-10). 115 industries identified by the Pakistan Environmental Protection Agency, highly polluting. These industries are causes air, land and water pollution in the capital. Pakistan has limited resources for addressing industrial pollution. The effects of the industrial pollution on nature is so deeply damaging that before the problem become serious specifics legislation should be in hand.

The objective of the research in the industry pollution is to identify pollution sources, to determine their related contribution and propose most suitable mitigation measures for the control of this problem.

The whole thesis is divided into 4 chapters. Chapter 1 briefly introduced relevant concepts, definition, history, causes of industrial pollution and their effects. Different types of industrial pollution which are caused by various industrial sectors are also discussed in this chapter. The overview of industrial policy of Pakistan mentioned in this chapter. Chapter 2 provides an overview on the Industrial Estate Islamabad with the environment condition of industries operating here. The laws and judicial system of Pakistan related to environmental pollution are also discussed. Some leading cases have also been incorporated in foregoing two chapters. The third chapter deals with the development of international environmental

conventions and treaties. Chapter 4 contains the conclusion and recommendation on the subject. The end result of the whole research will be forwarded to the concerned authority, i.e. Pakistan Environmental Protection council, to take all steps for the enforcement of Pakistan Environmental Protection Act, 1997.

Chapter 1

INTRODUCTION; HISTORY OF INDUSTRIAL POLLOUTON

The industrial sector is one of the most dynamic sectors of the economy and plays a significant role in economic development and the mitigation of poverty. Industry is considered as a major creator of wealth for the government, the prosperity and the standard of living of a nation are measured in this respect. In the present time, it is believed that the industrial nations are the most prosperous and civilized in the world. The supremacy of the United States, Japan and China in present days is only because of their ultimate supremacy in respect of mass machine production. The secret of power and prosperity of the United Kingdom in early 19th century was based on mechanization. England has well-established water transportation system. United Kingdom plays a large role in helping to trade with other countries in the world. England also had large population resulting in large labor workforce. It was perfect country to industrialize so in 1933 with the construction of first cotton mill, industrial revolution[1] started from England.[2]

Industrial revolution has changed the agriculture, mining transportation and

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[1] Industrial revolution: Advance in science and technology that have given us power to understand and change our life. Dictionary of Environmental Appraisal. p. 999

[2] http://www.megaessays.com/viewpaper/48965.html, last visited on 25 March 2009

manufacturing condition in Britain. The revolution was a transformation from the traditional hand made items in tools to machine driven mass produced goods, and the changes eventually spread throughout the world. The industrial revolution has brought improvement in the quality of human life through mushrooming growth of industries and endless chain of discoveries and innovations. Industrialization has undoubtedly brought immediate benefits tc the comity of the nations. On one hand food, clothing, shelter, comforts, and luxuries of life are demanded at large scale and on the other hand, mankind is severely caught in the web of degraded environment. The developed and the developing countries are suffering from the ill effects of industrial pollution in one form or the other. Because of the nature of the global environment industrial pollution is never limited to the industrial countries and it affects people living even in the remote areas, for example the samples of Ice Core[3] from Antarctica and Arctic both shows high level effects of industrial pollutants.[4]

In Pakistan, the industrial sector is rapidly expanding due to liberal government policy. Almost all major cities have its industrial estate where different types of industrial units exist. Out of 6634 registered industries in the country, 1228 units considered to be highly polluting. The major industries include cement, textile, chemicals, fertilizer, steel

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[3] Ice core means core sample from the accumulation of snow and ice over many years that have re-crystallized and have trapped air bubbles from previous time periods.

[4] http://www.megaessays.com/viewpaper/48965.html, last visited on 25 March ,2008

furnaces, pulp and paper, petrochemical, tanning and sugar, which are spread all over Pakistan, with the large number located in Sind and Punjab and few in Khyber Pakhtunkhwa and Baluchistan. All industrial estates that were originally on the border are now within the municipal limits surrounded by commercial and residential areas in Karachi, Lahore, Peshawar and Islamabad. Most of these industries are inadequately, operated and maintained therefore resulting in high levels of emissions and effluents discharges.[5]

1.1 Definition of industrial pollution

Industries pollution is defined as;

> *"The unwanted and harmful thing produced by industrial activities which affect the surrounding containing land water several species as well as surrounding air by decreasing its quality or it purity is called industrial pollution."*[6]

The first and worst pollution caused by industries is air pollution. The exhausts from burning fuels in industries are a major source of pollution in the air. The primary air pollutants found in industrial areas are carbon monoxide, nitrogen oxides and sulfur oxides. One of the main sources of water pollution is the waste materials like acids, toxic metals, oil,

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[5] Mumtaz Hussain, "Environment Degradation" (Ferozesons (pvt) Ltd.Lahor(1998) p. 121
[6] http://www.dictionary.net.com , last visited on 3rd February 2010.

grease and even radioactive materials are discharged into water bodies by industries. Indiscriminate industrial waste water causes serious environmental problems as contamination of ground water, effecting aquatic life and drinking water. Industries are also responsible for land pollution large quantity of solid waste as unused and rejected chemicals like calcium, carbonate and chloride ferrous oxide etc., generated during manufacturing processes. Rejected and broken items of metal, plastic, or chemical solids, powders which are dumped over the surface of soil almost all industries with different in degree, these materials have been dumped around the factory site or around the entire city. Industrial pollution affects both, the human being and environment. The immediate environmental effects of industrial waste include air pollution, land pollution and the reduced availability of clean water. The long-term effects include the depletion of natural resources, landscape degradation and health risks.[7]

In early period, coal was the source of energy and it contains mineral ashes, sulfur and nitrogen, which produce particulates, nitrogen oxide and sulfur oxides, when coal is burned. Industrial pollution is directly linked with the industries and it is leading cause of

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[7] http://wisegeek.com ,last visited on 10 Feb. 2010.

worldwide. It is a fact that 80% of world pollution is caused by the industrialist countries. The United States, which comprises only 6% of the world population, is responsible for 50% of global pollution.[8]

1.2 INDUSTRIAL AIR EMISSIONS AND THEIR EFFECTS

An industrial air emission is one of the biggest problems in the world. Every country has problems with the toxic gases that are released into the air every day by different industrial activities. Emission is the term used to describe the gases and particles ejected into the air by different sources. Air emissions are defined as;

> *"Gas emitted into the air from industrial and chemical processes, such as ozone, carbon monoxide, nitrogen oxide, nitrogen dioxide, sulfur dioxide and others."*[9]

Two types of pollutants are found in the air, primary air pollutants and secondary air pollutants. Pollutants, those are emitted directly into the air known as primary air pollutants. Primary air pollutants include sulfur dioxide and carbon monoxide, these pollutants emitted into atmosphere from different sources such as factory chimney, exhaust pipe or through suspension of contaminated dusts by wind.

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[8] http://wisegeek.com ,last visited on 10 Feb. 2010.
[9] http://www. en.mimi.hu/environment/air-emissiom.html, last visited on 2nd , Feb. 2010

Secondary air pollutants are those, which are formed with the atmosphere itself and arise from chemical reaction of primary pollutants in the air, often involving natural components of the environment such as water and oxygen. Major secondary pollutants in the atmosphere include Ozone, Oxide of Nitrogen and Particulate Matters. Effects of industrial air pollution depend upon the specific pollutants involved, how they are vented into the atmosphere, and local conditions, such as weather patterns.[10]

Some of the major air pollutants created by industrial activities are listed here, along with their effects.

1.2.1 Primary Air Pollutants

1.2.1.1 Sulfur Dioxide (SO_2) and Its Effects

Sulfur Dioxide (SO_2) is a colourless gas and it smells like burnt matches. SO_2 can be oxidized to sulphur trioxide, which in the presence of water steam is readily transformed to sulphuric acid smog. Diesel fuel and various industrial processes produce sulfur dioxide. Transportation, cement, concrete, and miscellaneous are major sources of SO_2. Together, particulates and SO_2 make up a main part of the pollutant load in the air.[11]

Health effects caused by sulphur dioxide include breathing problems, respiratory illness, changes in the lung's defences, and worsening respiratory and cardiovascular disease.

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[10] http://www. en.mimi.hu/environment/air-emissiom.html, last visited on 2nd , Feb. 2010
[11] http://www.eoearth.org/article/Sulfur_dioxide, last visited on 2nd , Feb. 2010

People with asthma and chronic lung and heart diseases are the most sensitive to SO_2. This contributes to the acidification of streams and lakes, accelerated corrosion of buildings and reduced visibility. SO_2 along with nitrogen oxides, are the major sources of acid rain and it damages trees and crops.[12]

1.2.1.2 Carbon Monoxide (CO) and Its Effects

Carbon Monoxide (CO) is a colorless, odorless and tasteless toxic gas that has the molecular formula CO. The molecule consists of a carbon atom that is triply bonded to an oxygen atom. CO is produced by the incomplete combustion of the fossil fuels, oil, coal and wood used in boilers, engines, oil burners, gas fires, water heaters, solid fuel appliances and open fires.[13]

Carbon Monoxide (CO) poisons by entering the lungs via the normal breathing means and displacing oxygen from the bloodstream. CO break the normal supply of oxygen, puts at risk the functions of the heart, brain and other vital functions of the body. The long term effects of poisoning by carbon monoxide can be extremely serious. It can also cause permanent damage to major organs of body, such as the heart. Carbon monoxide inhibits the blood's ability to carry oxygen to body tissues including vital organs such as the heart and central nervous system and brain. The reason why CO is so harmful is that it displaces the levels of oxygen within the blood, which results in the death of cells and damages the major

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[12] Sjaak slanina, "Sulfur dioxide" available at, www.ene.gov.on.ca., last visited on 12 , Feb , 2010
[13] www.silentshadow.org/the-dangers-of-carbon-monoxide.htm. last visited on 22nd , Feb , 2010

organs like heart and brain. It is thought that the hippocampus, which is the section of the brain that deals with new memories, can be particularly susceptible to long term damage from CO poisoning.[14]

1.2.2 Secondary Air Pollutants

1.2.2.1 Particulate Matter (PM) and their Effects.

Particulate matters (PM) are defined as;

"Particulate matter (PM) is an air pollutant consisting of a mixture of particles that can be liquid, solid, or both, suspended in the air and represent a complex mixture of organic and inorganic substances." [15]

The major PM components are sulfate, nitrates, sodium chloride, carbon, ammonia, and mineral dust. Particles can come in almost any shape or size, and these particles are divided into two major groups. These groups differ in many ways; one of the differences is size, the bigger particles are called PM10 and the smaller particles are known as PM2.5.

1.2.2.1. a Big particles PM10

The bigger particles are between 2.5 and 10 micrometers (from about 25 to 100 times thinner

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[14] Brandon Guest, "Carbon Monoxide" available at, http:// biology.about.com last visited on 23, Feb , 2010
[15] www.health.stste.mn.us/divs/hpcd/cdee/ Particulate Matter last visited on 2nd , March , 2010

than a human hair). These particles called PM10 ("P M 10", which stands for Particulate Matter up to 10 micrometers in size). PM10 particles can travel little from hundred yards to 30 miles.[16]

1.2.2.1.b Small Particles

These particles are smaller than 2.5 micrometers (100 times thinner than a human hair). These particles are called PM2.5 ("P M 2.5", as in Particulate Matter up to 2.5 micrometers in size). Smaller particles are lighter and they stay in the air for long time and travel farther even hundreds of miles.[17]

Both particles matter, PM10 and PM2.5 can cause health problems. These particulate made up things that are more toxic like heavy metals and cancer causing organic compounds therefore they can have worse health affects as asthma, coughing, shortness of breath , lung cancer, and premature death. Particulate matter is also responsible for environmental effects such as corrosion, soiling and damage to vegetation and reduced visibility.[18]

1.2.3 Nitrogen Dioxide (NO_2) and its Effects

Nitrogen oxides, is the broad term for a group of reactive gases, all of which contain nitrogen and oxygen. Many of the nitrogen oxides are colorless and odorless however, one common

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[16] www.health.stste.mn.us/divs/hpcd/cdee/ Particulate Matter last visited on 2nd , March , 2010
[17] Ibid.
[18] Ibid.

pollutant, nitrogen dioxide (NO_2) along with particles in the air can often be seen as a reddish-brown layering the atmosphere. NO_2 is an important air pollutant because it contributes to the formation of photochemical smog, which can have significant impacts on human health. The major sources of NO_2 are the burning of fossil fuels, coal, oil and gas. Other sources of NO_2 are petrol and metal refining, electricity generation from coal-fired power stations, pulp mills, manufacturing industries and food processing.[19]

Nitrogen dioxide (NO_2) inflames the lining of the lungs, and it can reduce immunity to lung infections. This can cause problems such as wheezing, coughing, flu and heart disease. Increased levels of NO_2 can have significant impacts on people with asthma because it can cause more severe attacks. Excess nitrogen in the environment is associated with many large-scale environmental concerns, including, toxic algae blooms, hypoxia, acid rain, nitrogen saturation in forests, and global warming. NO_2 becomes a concern to water quality when nitrogen in the soil is converted to the nitrate (NO_3^-) form, because nitrate is very mobile and easily moves with water in the soil. The concern of nitrates and water quality is generally directed at groundwater however, nitrates can also enter surface waters such as ponds, streams and rivers.[20]

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[19] Ida Kubiszewski, "Nitrogen" available at, http://www.eoearth.org last visited on 28 , Feb. 2010
[20] Ibid.

1.2.4 Ozone (O_3) and its Environmental and Health Effects

Ozone (O_3) is a gas which is form and reacts under the action of light and present in two layers of the air. Ozone is present in low concentrations throughout the Earth's atmosphere. O_3 is called a secondary pollutant because it is produced when primary pollutants react in sunlight. Ground-level ozone (O_3) is a colorless and highly exasperating gas that forms just above the earth's surface and considered as a major air pollutant. Ozone in the lower atmosphere is a major air pollutant with harmful effects. Ozone layer in the upper atmosphere is a pale blue gas that is beneficial and provides preventing potentially damaging ultraviolet light from reaching the Earth's surface.[21]

Health effects of Ozone (O_3) include shortness of breath, pain during deep breaths, wheezing and coughing, asthma and other respiratory problems. It can also reduce the body's resistance to infections. Long-term effects of Ozone may lead to large reductions in lung function, inflammation of the lung lining and more frequent and severe respiratory discomfort. O_3 is especially dangerous for children and people with chronic lung and heart diseases even healthy people who exercise outdoors. Children are at particular risk because their lungs are still growing and developing and they breathe more rapidly and more deeply than adults do, so a greater doze of air pollution may be delivered to their lungs. Children also spend significantly more time outdoors, especially in summer when Ozone levels are highest. Ozone is known to have significant impact on vegetation and decrease the

[21] http://www.ec.gc.ca.cleanair.airpur/Health-concerns last visited on 9th Feb. 2010

productivity of some crops. It can also injure flowers and may contribute to forest decline. O_3 can also damage cotton, acetate, nylon, polyester and other textiles.[22]

1.3 TYPES OF POLLUTION CAUSED BY DIFFERENT INDUSTRIES IN PAKISTAN

1.3.1 Water Pollution

Industrial wastewaters contain dissolved solids, suspended solids, inorganic and organic compound, oil, solvents, greases, radioactive substance, thermal discharges, etc dispending in the type of industrial process. At global level 21 % of available water resources are consumed by industrial sector. The industrialized countries expended 40% water. Overall rate of increase in water use is about 6% per annum 90% of water used in the factories forms part of effluent. The wastewater is not suitably treated prior to leaving the factory premises in most of developing countries. The untreated wastewater flows in the surrounding areas and water bodies thus causing serious health hazards for the human population. The toxic elements get deposited in the bodies of fish and other aquatic life when they drink the polluted water. Half of the World Rivers are so much polluted that those are considered wastewater drains. The underground water gets polluted due to leakage of injurious chemicals and turn to be unfit for human consumption and agricultural use.[23]

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[22] http://www.ec.gc.ca.cleanair.airpur/Health-concerns last visited on 9th Feb. 2010
[23] Mumtaz Hussain, "Environment Degradation" (Ferozesons (pvt) Ltd.Lahor(1998) p. 127

Water pollution is a major environmental issue of industrial sector, posing the biggest environmental challenge to a number of industrial sectors. A brief analysis of the situation, in terms of individual industrial sectors, is given henceforth.

1.3.1.1 Automotive Industry

Vehicle painting processes including associated pre-painting operations are the major source of wastewater generation in the automotive industry. Many of the processes are batch type and the consequent discharges are episodic in nature. Unit average process wastewater generation rate is estimated at 6,700 liters per vehicle, for car manufacturing plant. Car manufacturing results into larger quantities of wastewater because of more complex painting and pre-painting operations, which are required to obtain higher finish level. The process wastewater varies significantly in its characteristics and quantity, in terms of temporal and plant-to-plant variations. Some of the wastewater streams are treated with on-site pollutant separation systems, to remove a significant portion of oil and grease, phosphate sludge and paint sludge.[24]

1.3.1.2 Sugar Industry

In sugar mills, water consumption per ton of pollutant concentration differs from mill to mill. The wastewater contains high level of pollution and does not comply with the National

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[24] Planning and Development Department Government of Sindh, "Final Report on Sindh Vision 2030", available at http:// www.managementconsultants.pk/sv2030-report-pdf :, last visited on 10 March,2010

Environmental Quality Standard (NEQS). Huge lagoons for wastewater collection are constructed in sugar mills and usually these lagoons are not properly drained. Wastewater from these lagoons is used for irrigation inside the mills or discharged outside the mills in nearby irrigation channels or saline water drains.[25]

1.3.1.3 Petroleum Refineries

Petroleum refining produces wastewater from storage tanks, desalting units, cleansing columns, solvent extraction, and boiler and cooling tower blow-downs. Around 100-130 liters of wastewater is generated per ton of crude oil refined. While the quantity is not very high, the wastewater is high in organic pollutants and may contain aromatic hydrocarbons as well. In some refineries, wastewater from oil separator is further treated biologically, while in many petroleum refineries wastewater is discharged without further treatment.[26]

1.3.1.4 Tanning Industry

In the tannery processes, water is used as a chemical carrier to render the cleaning of raw hides and skins, and to penetrate the chemicals for reaction with collagen fiber in the skins. Therefore, the wet processes of tanneries are the major source of wastewater generation. Some mechanical operations also contribute little quantities of wastewater. The processes

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[25] Planning and Development Department Government of Sindh, "Final Report on Sindh Vision 2030", available at http:// www.managementconsultants.pk/sv2030-report-pdf :, last visited on 10 March,2010

[26] Ibid.

employed at the tanneries are usually water inefficient, consuming up to three times the normal water requirements.[27]

1.3.1.5 Pharmaceutical Industry

Wastewater from pharmaceutical industry is generally small in volume, but it is highly polluted because of the presence of substantial amounts of organic pollutants. The production processes of Pharmaceutical Industry in general are batch type and the consequent discharges are periodic in nature.[28]

1.3.1.6 Dairy Industry

For dairy industry, the amounts of wastewater of effluent are of concern and the ratio of water discharge at a typical dairy unit per unit of processed milk ranges from 12.1 to 24.1. This is very high as compared to a ratio of 3.1 in cleaner industries in developed countries. The wastewater by dairy industry is usually drained through open or underground drains into water bodies without any treatment.[29]

1.3.1.7 Oil and ghee Industry

In oil and ghee industry, wastewater is produced by process, cooling system, vacuum system,

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[27] Planning and Development Department Government of Sindh, "Final Report on Sindh Vision 2030", available at http:// www.managementconsultants.pk/sv2030-report-pdf :, last visited on 10 March,2010
[28] Ibid.
[29] Ibid.

boiler and sanitary facilities. Usually, 50 – 80 Cubic Meters (m3) of process wastewater and 1400 – 3600 m3 of wastewater from secondary systems are generated per 100 tons of oil and ghee. The process wastewater stream is comparatively low in quantity but have very high concentration of pollutants.[30]

1.3.1.8 Textile Chemicals Industry

Wastewater discharged from chemical manufacturing plants is generally small in volume; but it is highly polluted, because of presence of substantial amounts of chemicals. The production processes in general are batch type and the consequent discharges are periodic in nature therefore, the wastewater flow rates show a relatively higher level of daily and seasonal fluctuations. Washings tanks, product drums, containers and floors generate most quantity of wastewater. In textile chemicals industry the total process wastewater quantities depend upon the nature of the products, process heating media and extent of water conservation measures implemented.[31]

1.3.1.9 Paint Industry

The main source of process wastewater in any paint unit is the manufacturing-plant of water-based-paint. Some wastewater is also produced due to washing of process vessels. The quantity of wastewater depends upon the size of the industry, as well as its production

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[30] Planning and Development Department Government of Sindh, "Final Report on Sindh Vision 2030", available at http:// www.managementconsultants.pk/sv2030-report-pdf :, last visited on 10 March,2010

[31] Ibid.

capacity. Usually general cleaning in a paint unit takes place once a week during which wastewater discharge levels are 5 times higher than the normal level.[32]

1.3.1.10 Steel Industry

The wastewater sources in a typical steel melting industry include cooling of moulds, water leakages and overflows, laboratory effluent, flue gas scrubber effluent, storm water, and sanitary wastewater. A unit's process wastewater production rate, excluding the sanitary wastewater and storm water, is estimated to be around 1,000 to 1,500 liters per ton of product.[33]

1.3.1.11 Pulp & Paper Industry

Pulp & Paper industry effluents are complex and variable mixtures of a large number of known and unknown compounds. Pulp and paper mills consume water in the range of 150-300 Cubic Meters per ton, apart from their quantity; these effluents are very high in certain pollutants such as Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Sulphates and Total Suspended Solids (TSS).[34]

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[32]Planning and Development Department Government of Sindh, "Final Report on Sindh Vision 2030", available at http:// www.managementconsultants.pk/sv2030-report-pdf :, last visited on 10 March,2010
[33] Ibid.
[34] Ibid.

1.3.2 Air Pollution

Air is the most important component of ecosystem; air is pollutant by both natural and man made activity as industry. Sources of air emissions from any industry could be divided into two main parts: point sources i.e. emissions from various stacks; and diffused emissions i.e. direct emissions to the air from various sources other than stacks. Point sources emissions usually damage community air, while diffused emissions mostly cause disturbance to occupational air. Following is a very brief account of air emissions sources and generation from various industrial sectors.[35]

1.3.2.1 Cement Industry

Air pollution is one of the main environmental problems of cement industry. The level of air emission varies from industry to industry, depending on the type of fuel used as well as installed control measures and their efficiency. Most of the air pollutants from a cement industry consist of particulate dust as well as flue gases including oxides of carbon, nitrogen and sulfur. For every ton of clinker, about 0.3-0.8 kg of dust is emitted and World Bank standards allow maximum of 0.2 kg of dust per ton of clinker in stack gases.[36]

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[35] http//:www.peerpapers.com, last visited on 17 April 2010

[36] Planning and Development Department Government of Sindh, "Final Report on Sindh Vision 2030", available at http:// www.managementconsultants.pk/sv2030-report-pdf :, last visited on 10 March,2010

1.3.2.2 Steel Industry

Air pollution resulting from the steel melting industry is primarily due to two major problems: firstly contamination in the raw scrap material, secondly unavailability or inadequacy of the emissions treatment system. The nature and quantities of the air emissions released depend upon proportions of contaminants and impurities in the scrap material like paint, oils, rubber, plastic, toxic metals and other hazardous matter. Other sources of air pollutants include preheating of ladle and emissions from welding and gas flame cutting operations.[37]

1.3.2.3 Sugar Industry

Major source of air emission in sugar industry is boiler. Small quantities of gaseous emission and sulphurous smoke from sulphitation process also originate. Some of the sugar use to wet scrubbing system in boiler stack for scrubbing the CO_2 gas. The emission form the boiler in sugar industry not prepared with scrubbing or cyclone system is very high and creates environmental problems around the area of mills.[38]

1.3.2.4 Fertilizer Industry

In a urea plant, particulate matter and ammonia are the emissions of concern; there is a risk

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[37] Planning and Development Department Government of Sindh, "Final Report on Sindh Vision 2030", available at http:// www.managementconsultants.pk/sv2030-report-pdf :, last visited on 10 March,2010

[38] Ibid.

of carbonate emissions from the ammonium carbonate dehydrator, and separators. Other pollutants could be carbon monoxide (CO), oxides of nitrogen (NOx), and sulphur (Sox). Major sources of ammonia and urea emissions into air include pilling towers, process condensate evaporators, vents in ammonia plant, cooling towers, start up and shutdown operations, evaporation ponds, leakage and spills through pump seals and glands.[39]

1.3.2.5 Paint Industry

Major sources of air emission at a paint manufacturing industry include solvent-based paint manufacturing plant, pigment grinding room, lead melting area, and water-based-paint manufacturing area. In the paint industry, air pollutant emitted in the form of dust.[40]

1.3.2.6 Pharmaceutical Industry

Main air emissions source in pharmaceutical industry is powdered and granular material processing where diffused emissions generate from raw ingredients dispensing operations, milling operations in tablet manufacturing, feeding of powdered and granular ingredients into open process vessels, and encapsulation process. Printing process in these units also contribute to diffused emissions. Generally oxides of nitrogen (NOx), sulphur, carbon

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[39]Planning and Development Department Government of Sindh, "Final Report on Sindh Vision 2030", available at http:// www.managementconsultants.pk/sv2030-report-pdf :, last visited on 10 March,2010
[40] Ibid.

monoxide (CO) emitted from these plants.[41]

1.3.3 Land Pollution

Solid waste is another main issue, not merely due to its aesthetic nuisance, but also because of its potential to cause land pollution. It also poses a potential threat to cause an infiltration of unwanted chemicals into human food chain.[42]

A brief synopsis of the situation of land pollution in terms of individual industrial sectors is given in the following.

1.3.3.1 Fertilizer Industry

Different typos of hazardous solid waste are produced in fertilizer plants. The waste includes spent catalyst and Chromate sludge, some units also dump it open yards. Non-hazardous solid waste include waste lubricants that are usually sold to outside vendors, dried lime sludge cake that is disposed in low lying areas in and around the factory premises.[43]

1.3.3.2 Paint Industry

Solid wastes generated from a paint industry mainly consists of empty containers, empty

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[41] Planning and Development Department Government of Sindh, "Final Report on Sindh Vision 2030", available at http:// www.managementconsultants.pk/sv2030-report-pdf :, last visited on 10 March,2010
[42] www.greenfootsteps.com, last visited on 10 March,2010
[43] Supra Note. 41

paper and polyethylene sacks, used solvent, used filter cloths, cotton waste, scrape drums, aluminum and tin scrap.[44]

1.3.3.3 Pharmaceutical Industry

In pharmaceutical industry two processes are used, contaminated and non-contaminated process and both process generated solid waste. In contaminated process, solid wastes from a typical pharmaceutical formulation plant include waste chemicals and solvents, expired or rejected medicines, spillage cleaning materials, bag filters & filter dust, contaminated glassware, and contaminated emptied drums. Normally, the waste chemicals and impure solid wastes are being incinerated. In the non-contaminated process solid wastes range up to 20 % of raw ingredients and include corrugated cartons, poly bags, fiber drums, wooden pallets, iron scrap, non contaminated glassware and aluminum cans, and damaged and rejected labels. In specialized capsule manufacturing units, major solid wastes are rejected capsule shells and a variety of packaging materials. Rejected capsule shells and cuttings are estimated 10 % of the product, by weight.[45]

1.3.3.4 Textile Chemicals Industry

Process solid wastes in textile chemicals industry are generated through different production activities, and include scraped chemicals, empty containers and packing sacks, waste filter cloths, and wooden pallets. Scraped chemicals also treated as contaminated solid waste.[46]

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[44] Planning and Development Department Government of Sindh, "Final Report on Sindh Vision 2030", available at http:// www.managementconsultants.pk/sv2030-report-pdf :, last visited on 10 March,2010
[45] Ibid.
[46] Ibid.

1.3.3.5 Sugar Industry

In sugar industry, two types of solid wastes are generated during sugar manufacturing, bagasse and filter mud press. The bagasse consists of hard and soft fibers and average bagasse production at sugar mills is about thirty percent of the cane crushed currently bagasse is completely used by the sugar mills as fuel for boilers. More than 70 % of power requirement in sugar mills is met by the help of the bagasse and it is also used for chip board manufacturing. The production of filter mud depends upon the refining process. This process produces 8 % of sugar cane crushed.[47]

1.3.3.5.6 Pesticide Industry

Pesticide industry produced both common process solid waste, and contaminated solid waste. However, the issue of contaminated solid waste is more important. It contains wasted chemicals and solid wastes contaminated with the pesticide contents and other poisonous chemicals. Some major sources and types of such solid waste from a pesticide industry are defective bottles and containers, expired products bottles and containers, expired and discarded pesticide, contaminated cotton rags and sawdust, waste media material from exhaust air filter, and liquid waste treatment sludge. Usually, the contaminated solid wastes are collected separately from common process. In the majority of the cases, the waste chemical drums and different contaminated solid wastes are not placed on duly impervious

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[47] Planning and Development Department Government of Sindh, "Final Report on Sindh Vision 2030", available at http:// www.managementconsultants.pk/sv2030-report-pdf :, last visited on 10 March,2010

floors; neither any rain protection is provided. This can lead to contamination of land and groundwater, consequent to any leakage or spillage and leaching.[48]

1.3.3.7 Cement Industry

The solid waste found at a typical cement plant include spillage of fine material, which is collected and can contain scrap particles, plant maintenance waste like scrap, grinding balls, old chemical cans, conveyors or belts etc.[49]

1.4 INDUSTRIAL POLICY OF PAKISTAN

Pakistan's industrial polices has been characterized by repeated shifts of emphasis between private sector initiative and public sector intervention. The first industrial policy was made in 1948, soon after Pakistan gained independence, and was developed further because of the Indian decision in 1949 to place a trade embargo on Pakistan. There was an impression that the Indian leadership would attempted to smother Pakistan by using economic means regarding the release of funds that were due to Pakistan because of the Partition Agreement. The Indian government blocked the transfer of funds and Pakistan at that point was dependent on India for the supply of basic goods of consumption; and a significant proportion of its imports came from India. Karachi at that time was the country's capital, encouraged private leadership in the process of industrialization, provided incentives to

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[48] Planning and Development Department Government of Sindh, "Final Report on Sindh Vision 2030", available at http:// www.managementconsultants.pk/sv2030-report-pdf :, last visited on 10 March,2010
[49] Ibid.

private entrepreneurs to invest in the production of consumption goods, and gave the fledging private sector protection from external competition. The government encouraged the development of private enterprise and growth of consumer industries and all this resulted in the rapid growth of the industrial sector and rapid increase in the rate of increase in industrial output.[50]

In the second industrial policy, the government of Ayub Khan continued with this approach with two differences. First, it used the industrial licensing policy to bring about a wider dispersal of industrial ownership second; it used development finance companies such as the Pakistan Industrial and Commercial Investment Corporation (PICIC) and the Industrial Development Bank of Pakistan (IDBP) to influence the scope of industrialization. PICIC and IDBP received financial support from the World Bank. Development in favor of using publicly owned development finance corporations to quicken the pace of industrialization. An important consequence of this policy was to encourage the establishment of small units in the areas, which by then had emerged as the industrial center of the country.[51]

In 1972, the third approach towards industrialization occurred during the tenure of the administration headed by Zulfikar Ali Bhutto. His decision to nationalize large-scale industries suddenly increased the presence of the public sector in industrial sector. The

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[50] htpp://www.pkproblems.com/index.php/industrial-grought last visited on 11th Jan. 2010
[51] Ibid.

decision to set up a number of public sector corporations to undertake new investments in the industrial sector and to provide financial assistances to them through a new development finance corporation further strengthened the role of the state in the industrial sector.[52]

In the 1990s, the democratic administrations held office and adopted the fourth industrial policy. They took some initiatives to bring back the private sector as the leader in economic development by privatizing some of the state's economic assets, in particular banks and large industries. However, privatization did not lead to a satiated of industrial activity on the parts of the owners of assets in the sector. There was no attempt at product innovation, and not much attention was given to technological improvement. The old industrialist with their assets restored to them went about doing business in the old ways. The most important policy initiative of this period was the establishment of the Small and Medium Enterprise Development Authority (SMEDA).[53]

This was set up in 1998, as a federal corporation with four regional offices, one in each province of the country. The corporation's mandate was to facilitate the development of small and medium-sized enterprises by helping them to improve their line of products, introducing new technologies, and helping them to do cost benefit analysis of the investments they were contemplating to make, and making them aware of the opportunities available in both internal and external markets.[54]

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[52] htpp://www.pkproblems.com/index.php/industrial-grought last visited on 11th Jan. 2010
[53] Ibid.
[54] Ibid.

The government of President Pervez Musharraf adopted the fifth industrial policy in 2000. However, it was only under this policy that the private sector acquired a very prominent role and the pace of privatization quickened as did deregulation and the opening of the economy to the outside world. Some significant adjustments were made in the tariff regime, which provided incentives for the development of such large-scale industries as automobiles and consumer electronics. The government also gave considerable room to the financial sector to participate in the process of industrialization by making choices made based on market considerations. While allowing considerable space to the private sector within the industrial domain, the government also developed the regulatory system to provide protection to consumers, encouraging competition in the private sector, and improving corporate efficiency. However, the private sector did not develop enough confidence among the entrepreneurial class to stand on its own feet and deal with the changes occurring in the globe economic system without government intervention.[55]

Mian Manzoor Wattoo, Federal Minister for Industries & Production said "Present government has the honor to formulate Industrial Policy, after a long time, to promote industrial sectors of the economy which will be announced in a couple of months." He said that government was working on comprehensive Industrial Policy for giving boost to that important sector of the economy in consultation with all stakeholders and accommodating their views and suggestions in the new policy. He asked the business persons to give their proposals to make this policy more industry friendly. He announced that a Marble City

[55] htpp://www.pkproblems.com/index.php/industrial-grought last visited on 11th Jan. 2010

would set up in Islamabad in collaboration with Pakistan Stone Development Company (PSDC), which will give a boost to local marble industry. In new industrial policy, government was giving priority attention to the promotion of Small and Medium Enterprise (SME) sector, which is considered engine of growth and a key source for job creation. He also said that Small and Medium Enterprise Development Authority (SMEDA) would make more active to accelerate the pace of development of SMEs in the country.[56]

1.5 LOW AND NON- WASTE TECHNOLOGY

Low-and non-waste technology is known as less polluting, use resources in a sustainable manner, recycle more of their wastes, and handle all residual wastes in a more environmentally acceptable way than the technologies for which they are substitutes. In these and other ways it was demonstrated that industry might be able to reduce its damaging emissions to the environment by adopting in various combinations , processes and materials that generate fewer potentially damaging substances , better techniques for recovering such substances from liquid and gaseous emissions prior to discharge, and new means of utilizing and re-cycling production residues. The generally agreed and very broad definition of non-waste technology, as determined by the United Nation Economic Commission for Europe (UNECE) is;

> *"the practical application of knowledge, methods and means, so as within the needs of man to provide the most rational use of national resources and energy, and to protect the environment."*

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[56] htpp://www.pkproblems.com/index.php/industrial-grought_ last visited on 11th Jan. 2010

In this sense, low–waste technology minimizes the creation of harmful wastes, from the extraction of raw material through the lifetime of consumer goods. It is a "preventive strategy" which aims to treat wastes at the end of the manufacturing process, once the product and its consequent wastes have been produced. The proceeding of the UNECE (1979) seminar on "Non–Waste Technology and Production" held in Paris in 1976, included a detailed account, with case studies of national experiences and policies on the state of non-waste technologies.

Thereafter, the UNECE, with United Nation Environmental Program's (UNEP) support and the active collaboration of national focal points, began compiling a compendium of promising. UNECE adopted, inter alia, a declaration concerning low – waste and non-waste technology, and reutilization and recycling of wastes. This listed ways means for the application of such technologies and recommendations for national actions and international co-operation, and proposed the creation of a scientific and technical body to deal with such matters.[57]

Table A. Some Examples of Low and Non-Waste technology

[57] Swarup.R, "Environmental Pollution Analysis"(Mittal Publication New Delihi,India 1992) p.31

Industry	Traditional process & problems	Alternative
1	2	3
Chemical	Nitric acid production Waste gases containing nitrogen oxide	De Reeder Process developed in Netherland (1980) uses high Pressure acid–resistant steel equipment and greatly reducing waste gases and energy demand.
Pulp and paper	Bleach Kraft pulp mill Water pollutant effluent from Wood room, unbleached pulp washing, spent cooking liquor evaporation for condensation and bleach plant	Rapson Process developed in Canada (1977) uses bleach plant effluent and evaporator condensates for pulp washing and in preparing cooking liquor, thus passing chemicals from bleach process to pulping chemical recovery cycle, Where organic matter is burned and spent bleaching chemical recovered as sodium chloride and quality of pulp also improved.
Metallurgical	Copper Smelting Traditionally in reverberatory furnacs generating a gas containing sulphur dioxide.	New furnace system developed in USSR (1980) blows drier concentrate into oxygen enriched furnaces atmosphere .sulphur combustion generates heat, reducing energy demand,So2 –rich (up to 80 %) combustion gases recovered as sulphuric acid.

Chapter 2

INDUSTRIAL POLLUTION AND SUSTAINABLE DEVELOPMENT IN ISLAMABAD

2.1 Background Information of Industrial Estate Islamabad (IEI)

The Industrial Estate Islamabad (IEI) was established in 1963, it spread over 265 acres of land. The Capital Development Authority (CDA) is managing the IEI. There is good network of road within the estate that makes transporting plant equipment and machinery to the site easier. Around 75 kilometers of metalled roads constructed in IEA. CDA is providing the water supply to the industries but many industries installed their own tube wells. The wastewater drains originating from the industrial units, connected to the nature drains within the estate and the nature drains eventually lead to the single main drain known as Nallah Lye. The entire electricity requirement of IEI is being met by Islamabad Electric Supply Company (IESCO). Similarly the nature gas facility is also available here. There are around 219 factories operating in the IEI and out of them 128 are manufacturing units. There are a total of 718 planned plots in the estate. In 1960 the Islamabad's master plan prepared by a Greek firm Dioxides Associates, the Industrial area (sectors I-9 and I-10) was isolated from

residential areas through a buffer zone but now residential areas have developed very close to it to the West and South due to the elimination of buffer zone by the CDA.[1]

2.1.2 Types of Industries at Industrial Estate Islamabad

Industries at industrial estate Islamabad categorized into eight segments i.e. steel melting furnaces, re-rolling mills, flour mills, oil and ghee mills, marble cutting and polishing units, pharmaceuticals, galvanizing and metal working and engineering. These industries have no proper facilities for the treatment of waste emissions and producing metal dust, slag and gaseous emissions besides discharging untreated effluent in the main drain that eventually falls into the River Soan. Around 1,500 tons of effluents generated by these industries are being thrown into the Nullah Lye every day. Out of the existing 219 plants, 115 had the potential of generating excessive pollution.[2]

Types of industries having potential of generating excessive pollution and their approximate numbers are shown in the following Table.[3]

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[1] Pakistan Environmental Protection Agency, "Environmental Survey of Industrial Estate Islamabad", 2006, p.1
[2] Ibid.p.7
[3] Ibid.

Types & Approximate numbers of polluting industries in Industrial Estate Islamabad.

Table B.

Types of Industries	Approximate NO.
Steel melting furnaces	8
Re rolling Mills	11
Flour Mills	25
Oil & Ghee Mills	5
Marbles cutting and Polishing Units	31
Pharmaceuticals companies	10
Galvanizing mills	2
Metal working and Engineering Units	23
TOTAL	**115**

2.1.2 Environmental condition of industries at industrial estate Islamabad

A comprehensive air quality survey of Industrial Estate Islamabad was carried out by Pakistan Environmental Protection Agency. Air quality parameters such as Particulate Matter (PM10) and total suspended particulates (TSP) were monitored to assess the status of air quality at IEI. The concentration of PM10 and TSP were higher than the acceptable

standards. The following is the present status of air polluting industries at Industrial Estate Islamabad.[4]

2.1.3.1 Steel Melting Furnaces

The steel melting furnaces in Industrial Estate Islamabad are induction types being operated on electricity. Most of industries had one to two induction furnace producing 3 tons of billets per batch. The operations of electric are furnace, is a batch process with a cycle times of 3 hours. The raw material for this industry, is scrap metal. Practically pollution is generated due to poor and low quality of scrap bundled. Scrap is used by the melter which consists mainly of spent containers of edible oils, paints and rubber. Shredded is another type of scrap, which is clean, but costly as compared to bundled scrap thus the first choice of steel melters is to use unclean scrap. Maximum pollution is generated at the time when in the furnace temperature is low and scrap is contaminated with oil. Steel melting industries are the major contributors to the air pollution in the industrial estate Islamabad. The operation of the induction furnace produces metal dusts and gaseous emission. Black smoke is produced during charging of the furnace and the paint in the scrap escapes from the charge as the temperature rises. Mostly 12 kg of particulate matter produced per ton of product. The primary hazardous components of furnace dust are zinc, lead and cadmium. Solid waste is produced as slag from the induction used in melt of metal scrap. The rate of slag production

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[4] Pakistan Environmental Protection Agency, "Environmental Survey of Industrial Estate Islamabad", 2006, p. 8

is 3 to 5 % of feed. At the electric induction furnace use for melting metal scrap, workers are directly exposed to high temperature and toxic gases which possess serious health hazards to them. Pakistan Environmental Protection Agency (Pak-EPA) and CDA have been exerting pressures on steel furnace to adhere to the Nation Environmental Quality Standards. As a result, a few industrial units have installed locally designed gadgets, which are inefficient in controlling pollution.[5]

2.1.3.2 Re-rolling Mills

In Industrial Estate Islamabad there are eleven re-rolling mills, using locally manufactured billets, which are reheated in oil or gas fired open hearth furnaces. The red-hot billet is rolled into bars of different required sizes and shapes. Except for the cooling water, which is using for cooling the rolls, contain lubricants, otherwise there are no effluents. The only environmental issue is the discharge of black smoke, which emit when the furnaces are run on furnace oil in winter due to the load shedding of gaseous fuels.[6]

2.1.3.3 Flour Mills

There are twenty five flour mills at Industrial Estate Islamabad. In milling process wheat is washed dry cleaned, milled and sieved. And overall loss of around, 1.5 % of the processed wheat, comprising mostly dust, stones and straw. The products are 80 percent flour, 10

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[5] Pakistan Environmental Protection Agency, "Environmental Survey of Industrial Estate Islamabad", 2006, p. 8

[6] Ibid p. 9

percent starch and 10 percent bran. The emissions contain flour dust which is carried along with the air that carries the material through the milling process and is ultimately filtered and vented. Some fine particles of flour escape from the system. Effluent from flourmills consists of wheat washing water, which contains flour dust and straw. The solid waste is composed mainly of dust, straw, stone and spilled wheat.[7]

2.1.3.4 Oil and Ghee Industry

In Industrial Estate Islamabad five oil and ghee mills are operational. Large quantities of steam are used as a main heating medium in ghee manufacturing process. Steam is also used for creating the vacuum required in ghee manufacturing. The main energy source for the production of steam is natural gas. However furnace oil is used during shortage in supply of natural gas in winters. Air emission is usually not a serious problem for oil and ghee industries. The stacks of boilers are the major source of air pollution. Air emissions become a matter of serious environmental concern only during those months when there is a shortage in the supply of natural gas and there is no other option but to use furnace oil. During this time, main air emissions from this industry could include Sulphur dioxide (Sox), Carbon Monoxide (CO) and Particulate Matter (PM). The extremely high level of consumption of fresh water by these units has resulted in generation of large volume of wastewater. Major wastewater pollutants from these industries include oil and grease, soaps and suspended

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[7] Pakistan Environmental Protection Agency, "Environmental Survey of Industrial Estate Islamabad", 2006, p.10

solids. The solid waste produced in gee industry consists of filter cake which produced Fuller's earth is filter from oil. Fuller's earth is used for the bleaching of oil.[8]

2.1.3.5 Marbles Cutting and Polishing Units

There are thirty one industries of marble cutting and polishing in the Industrial Estate Islamabad. The main manufacturing processes are cutting and polishing of marble tiles and slabs. Initially the marble industries were using dry cutting process but due to regulatory measures, majority of the units switched over to wet cutting. Significant quantity of fresh water is used for the cooling of cutting blades and to catch the dust formed during cutting. Water is showered on blades while marble blocks are cut into sheets of varying thickness and the water cools the blades and absorbs marble dust produced during the cutting operation. The wastewater from this process is routed to a series of settling tanks. In these tanks the marble dust settles down and relatively clarified water is recycled. The settling tanks are not being used effectively due to arbitrary usage and design.

The excess water displaced by the gathering sludge overflows without properly settling and is discharged into the effluent channels of the industrial area. This water carries large valium of marble powder, which gradually settles at the bottom of the drain channels. The marble sludge in the settling tanks is removed periodically and dumped in the vicinity of

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[8] Pakistan Environmental Protection Agency, "Environmental Survey of Industrial Estate Islamabad", 2006, p.10

the units. Eventually, the sludge dries in the sun and its particles become airborne and this causes serious air pollution problems for the inhabitants of the surrounding area. In some marble factories, fettling pits are not cleaned as scheduled. Disposal of recovered sludge is the major environmental problem facing the marble manufacturing units and another solid waste generated by the marble units is the cutting waste.[9]

2.1.3.6 Pharmaceuticals

There are about ten pharmaceutical industries in Industrial Estate Islamabad. Preliminary investigation showed that these are formulating or packing facilities, not manufacturing units. The environmental impact of these industries is insignificant. Process related effluents are negligible. The occasional washing of formulation vessels may produce wastewater in very minor quantities.[10]

2.1.3.7 Galvanizing Industry

In galvanizing industry, materials is coated with a thin protection layer after passing

through the following four stages:

- Preparation of surface
- Galvanizing reaction

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[9] Pakistan Environmental Protection Agency, "Environmental Survey of Industrial Estate Islamabad", 2006, p.11

[10] Ibid. p.12

- Coating
- Post Treatment

In the surface preparation alkaline or acidic degreasing solution is being used, in which the component is dipped. Hydrochloric acid or sulfuric acid is being used extensively to remove scale and dust. Galvanizing process releases acidic fumes and generate waste water and solid wastes. Ammonia and ammonium chloride emitted to the atmosphere from the galvanizing bath. Water discharge is released from the pre-cleaning and after coating process.[11]

2.1.3.8 Metal Working and Engineering Units

There are about twenty three Metal Working and Engineering units in Industrial Estate Islamabad. These units are non-polluting except for human wastes from washrooms, cafeterias and living quarters. Occasional spills of cutting lubricants and coolants are the only other discharges, which do not constitute an environmental concern problem.[12]

2.2 AIR QUALITY IN ISLAMABAD

Air quality is a recognition and measurement of types and quantity of pollutants contained in it. Air is polluted if it contains substances that may have harmful effects on environment and human health. One of the major environmental issues in Pakistan is degradation of ambient

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[11] Pakistan Environmental Protection Agency, "Environmental Survey of Industrial Estate Islamabad", 2006,p.12
[12] Ibid.

air quality particularly in urban areas. Depending upon natural phenomena and human activities, the ambient air may hold number of pollutants. The six pollutants, that are immediate sources of worldwide air pollution, include carbon monoxide (CO), ground level ozone (O_3), oxides of nitrogen (NO_x), sulfur dioxide (SO_2), lead (Pb) and suspended particulate matter (SPM). For SPM, two classifications is usually employed, i.e. total suspended particulate matter (TSP) and particulate matter less than 10 μm in diameter (PM_{10}). In Pakistan, the Suspended Particulate Matter (SPM) is common in the ambient air. The major sources of SPM are vehicles, industry, burning of solid waste and natural dust. Pakistan Environmental Protection Agency in cooperation with World Bank in 2007 have reported that particulate matter, both PM10 and PM2.5, is conscientious for 22,000 premature deaths among adults and 700 deaths among children annually. In Pakistan, there is no air quality monitoring network. Most of the available air quality monitoring data is done on an ad hoc basis mostly by the Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) and the Japan International Cooperation Agency (JICA) in cooperation with the Ministry of Environment.[13]

Pakistan EPA, in cooperation with JICA, carried out an analysis in 2007 about the air pollution in Pakistan and assessed the ambient air quality in Lahore, Rawalpindi, and

[13] www.environment.gov.pk/AQI/index.asplast visited on 1st April 2010

Islamabad. Air quality sampling was conducted using fixed and mobile station. The concentration of PM 2.5 was found to have greatly exceeded the WHO guideline values.[14]

Following part of the report is indicating the record of air quality in Islamabad with relation to provided WHO guideline values.

Table C. Report of EPA and JICA on Air Quality in Islamabad

	Sulfur dioxide µg/m3	Nitrogen dioxides µg/m3	$PM_{2.5}$
WHO	20.00 µg/m3	40.00 µg/m3	25.00 µg/m3
Islamabad fixed station	17.50	46.00	47.20
Islamabad mobile station	10.30	32.20	43.70

The protection of ambient air quality in Pakistan is provided through the enforcement of the National Environmental Quality Standards (NEQS), introduced in July 1996. These standards impose limits on the concentration of specified gaseous emissions from industries and automobiles. The standards were being imposed, however, without considering the desired ambient air quality. As such, the real objective of minimizing the

[14] Ibid.

risk to health of humans and of damage to the environment in general may not achieve. The data collected by Pakistan Environmental Protection Agency (PEPA) reveals existence of several pollutants in the air that people breathe in the federal capital Islamabad. The fact remains that the city is worst hit by 2.5 microgram suspended particulate matter (PM) that travels to lungs of people when breathing and result in serious diseases like asthma, lungs cancer and heart attack. The level of PM 2.5 is always high in Islamabad, when compared to permissible limits prescribed by the World Health Organization (WHO).[15]

2.3 MEASURES TAKEN BY CAPITAL DEVELOPMENT AUTHORITY (CDA) FOR THE CONTROL OF INDUSTRIAL POLLUTION IN ISLAMABAD

The Capital is facing rising environmental harms because of industries emitting pollution close to residential areas. Residents of sectors I-9 and I-10 are among the worst affect by industrial pollution. Rapidly rising industrial pollution is one of the main problems that are contributing to air and water pollution resulting from growing chemicals and industrial emissions. Capital Development Authority (CDA) has made so many plans for getting rid of problem of pollution caused by the industrial units in Islamabad.

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[15] www.environment.gov.pk/AQI/index.asp ,last visited on 1st April 2010

2.3.1Enforcement of Capital Development Authority's Environmental Protection Regulation

To check and minimize all types of pollution level in the Federal Capita, the Capital Development Authority (CDA)'s Law Wing is working on the methods of implementation Environmental Protection Regulations. In case of environmental violation, CDA has to move to Environment Ministry and due to procedural complications; it used to take months to take action against any violator, polluting the environment of the Capital. That provoked CDA to formulate its own regulations. The new law has also been formulating in consultation with the Pakistan Environmental Protection Agency. Under this regulation, a ticket valuing Rs. 100 to 100,000, depending upon the severity of the violation, will issue to the violator. CDA would refer the case to the special Senior Magistrate that would decide the amount of fine to impose fine on the violator. According to the new law, CDA also proceed against the factories discharging hazardous emissions, effluent, organic or inorganic wastes causing air, land or water pollution.[16]

2.3.2 Capital Development Authority (CDA) Prepare Plan for Relocating Polluting Industries

Capital Development Authority (CDA) will soon shift pollution causing industries from residential areas of the capital to a new industrial estate to save the residents from health

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[16] www.cda.gov.pk, last visited on 22th April 2010

risks. These industries are continuously polluting the environment and there is immediate need to resolve this problem. The CDA Board has approved establishment of an industrial estate in sector I-17. CDA had acquired land for establishment of the industrial estate in Sector I-17. CDA Chairman Tariq Mehmood while chairing a board meeting took the decision. The official said that the development work of industrial estate in sector I-17 would be complete in one and a half year. He added the CDA would provide the proposed industrial estate with all basic facilities for proper disposal of waste. In the first stage, the steel furnaces would be shift out of the city and then the marble industry. [17]

2.3.3 CDA Planning to Launch Carbon Credit Project

Capital Development Authority is planning to initiate Carbon Credit Project to make Islamabad a carbon free city. The aim of the project is declining carbon emissions in the city and controlling global warming. CDA would also install equipments to control five greenhouse gases including, methane, nitrous oxide, hydro fluorocarbon, per fluorocarbon and sulfur hexafluoride.[18]

2.3.4 Installation of Pollution Mitigating Devices

Federal Minister for Environment Hameedullah Jan Afridi directed the Capital Development Authority (CDA) and the Pakistan Environmental Protection Agency (PEPA) to ensure

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[17] www.cda.gov.pk, last visited on 22th April 2010
[18] Ibid.

installation of pollution mitigating devices' in steel furnaces located in Islamabad's I-9 and I-10 sectors to control the pollution problem. He was presiding over a joint meeting with the CDA and PEPA on pollution caused by steel furnace industry in the federal capital. It was decide that the PEPA would provide necessary training to the labor force of steel furnaces for operating the environment friendly equipments. CDA Chairman Tariq Mehmood said the authority would provide all-out cooperation and assistances to the Environment Ministry in its efforts to control the pollution in the Capital.[19]

2.3.6 CDA Offer to Owners of Steel Industry to Change of Trade

The CDA did offer incentives to owners of polluting industries especially the steel furnaces to swift to some other trade and offered not to charge the normal fee and without any formal procedure. This is an exemption to general rule. A few units availed the offer and have changed their trade.[20]

2.4 LEGAL SYSTEM AND ROLE OF JUDICIARY IN PAKISTAN IN DEALING WITH ENVIRONMENTAL CASES

The root of modern environmental laws lies in the depth of Common Law System.[21] All those countries who had been ruled by the Crown, save to certain exception, are the members

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[19] www.cda.gov.pk, last visited on 22th April 2010

[20] Ibid.

[21] Common law is the body of traditional law of England based upon the judicial decisions and it's embodied in the reports of the decided cases.

of common law family, and Pakistan is also amongst them. In common law, pollution cases generally fall under Nuisance. Under common law Nuisance is of two types;[22]

- Public nuisance

Public nuisance is an act or omission which causes any common or general injury, danger or annoyance to the public or to the people in general who dwells or occupies property in vicinity or which must necessarily cause injury, obstruction, danger or annoyance to person who may have occasion to use any public right.

- Private nuisance

Private nuisance is any lawful interference with a person's use or enjoyment of land or of some right over or in connection with it.

2.4.1 Environmental Laws in Pakistan

The Pakistani legislators drive the basic guidance for environmental protection from the Holy Quran and the saying of the Holy Prophet Muhammad (PBUH). Holy Prophet Muhammad (PBUH) saying: "cleanliness is half of the faith" clearly bring out the importance of environmental protection program. Pakistan inherited a number of laws from the British regime that were converted to environmental provisions. The purely Pakistani

[22] Fahim Ahamed Siddiqui, "The Scope of Environmental Laws in Pakistan" (Asian Law House High Court Compound Sind High Court Karachi), p.103

during late 1950s. The important activities of environmental legislations in Pakistan can be seen in three different periods.[23]

- The first period of environmental legislation runs from 1958 to 1965
- The second period of environmental legislation runs from 1970 to 1976
- The third period of environmental legislation runs from 1983 to 1997

The very effective period of environmental legislation is the third period. In this period Pakistan Environmental Protection Ordinance (PEPO) 1983 was promulgated. This Ordinance was the foundation stone of a new environmental legal system of Pakistan and a campaign of environmental legislation started which contemplated on enactment of Environmental Protection Act, 1997.[24]

2.4.1.1 The Constitution of Islamic Republic of Pakistan, 1973

The Constitution of Islamic Republic of Pakistan, 1973 safeguards the fundamental rights as to life and health of a citizen. The constitution has given full power to the state to legislate regarding this issue. The matter of Environment has been discussed in the Constitution under article 9[25] where the word "Life" includes the right to health services and quality of life.

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[23] Sohib Qader, "Environmental Laws in Pakistan" Lahore Law Times Publication) p.31
[24] Ibid.p.32
[25] The Constitution of Islamic Republic of Pakistan, 1973,
"No person shell be deprived of life or liberty save in accordance with law."

2.4.1.2 The Pakistan Environmental Protection Ordinance 1983 (PEPO, 1983)

The Pakistan Environmental Protection Ordinance 1983 was promulgated on 31st December 1938 and came into force on 6 days of February 1984. It is amole stone in terms of environmental legislation and it urges the legislatures for further legislation in the country. The main object of the PEPO, 1983 was to provide a mechanism for the control of pollution and preservation of living environment.

PEPO, 1983 was established the Pakistan Environmental Protection Agency (PAEA), Pakistan Environmental Protection Council (PEPC) and as well as introducing the concept of Environmental Impact Assessment. It can be said that this ordinance has provided a basis for legal control on environmental pollution and it has cleared the way for Pakistan Environmental Protection Act, 1997. In fact this ordinance has initiated a series of legislative or administrative activities for formation of different bodies and drafting of rules as required by the ordinance. On the hole the function of this ordinance was limited to advisory and assurance capacity.[26]

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[26]Sohib Qader, "Environmental Laws in Pakistan" Lahore Law Times Publication) 256

2.4.1.3 The Pakistan Environmental Protection Act 1997 (Pak-EPA, 1997) and its Enforcement Mechanisms.

The Pakistan Environmental Protection Act 1997 was passed by the national assembly of Pakistan on 3rd September 1997 and by the senate of Pakistan on the 7th November 1997 and received the assent of the president of Pakistan on 3rd December 1997 and now it is the law of the land of Pakistan. It is a glorious law of Pakistan regarding the matters of environment. The act was publicized in the country and environment concerned lawyers and environmentalists took part in crystallizing its shape. Although the environmentalists have some reservations regarding some part of the law and about the functions of the bodies to be formed but still it is a great achievement in all respect.[27]

The Pakistan Environmental Protection Act, 1997 provides for the protection, conservation, rehabilitation and improvement of the environment, for prevention and control of pollution. It extended on the environmental matters covered in the 1983 Ordinance. The PEPA, 1997 retained the institutional framework of the Pakistan Environmental Protection Ordinance, 1983. The Pakistan environmental protection consul (PEPC) continued to be the supreme policy-making body, supported by the PSEPA, and Provincial EPAs. Under section 9[28] Provincial Sustainable Development Funds have been established to provide financial

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[27] Ibid.

[28] Section 9 The Pakistan Environmental Protection Act, 1997,
Establishment of the Provincial Sustainable Development Funds. — (1) "there shall be established in each Province a Sustainable Development Fund."

assistance to apposite projects. Under section 11(2)[30], The Federal Government has been empowered to levy a pollution charge on persons not complying with the National Environmental Quality Slandered. Import of hazardous waste has been prohibited under section 13[31] of the Act.

2.4.1.3.1 Rules and Regulations under Pakistan Environmental Protection Act, 1997

The following Rules and Regulations have been notified under Pakistan Environmental Protection Act, 1997 to date:

a) National Environmental Quality Standards (Self -Monitoring and Reporting by Industries) Rules, 2001;

b) Provincial Sustainable Development Fund (Procedure) Rules, 2002, Provincial Sustainable Development Fund (Utilization) Rules, 2002;

c) Industrial Pollution Charge (Calculation and Collection) Rules, 2002;

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(2) "The Provincial Sustainable Development Fund shall be derived from the following sources, namely:— (a) grants made or loans advanced by the Federal Government or the Provincial Governments; (b) aid and assistance, grants, advances, donations and other non-obligatory funds received from foreign governments, national or international agencies, and nongovernmental organizations; and (c) contributions from private organizations and other persons."

[30] Section 11 (2), Ibid.
"The Federal Government may levy a pollution charge on any person who contravenes or fails to comply with the provisions of sub-section (1), to be calculated at such rate, and collected in accordance with such procedure as may be prescribed."

[31] Section 13, The Pakistan Environmental Protection Act, 1997
"Prohibition of import of hazardous waste.—No person shall import hazardous waste into Pakistan and its territorial waters, Exclusive economic Zone and historic waters."

d) Environmental Samples Rules, 2001;

e) Hospital Waste Management Rules, 2005;

f) Environmental Tribunal Rules, 1999; and

g) Pakistan Bio-safety Rules. 2005.

2.4.1.3.2 Enforcement Mechanisms contained in The Pakistan Envirnmtal Protection Act 1997 (PEPA, 1997)

Following Enforcement Mechanisms are contained in The Pakistan Envirnmtal Protection Act 1997 (PEPA, 1997

2.4.1.3.2. a Formula for Pollution Charge

According to Industrial Pollution Charge (Calculation and Collection) Rules, 2001, the industrial unit is to ensure the correct calculation, reporting and payment of the pollution charge. Director General has to establish an Inspection Team, which shall determine the pollution level of the industrial unit at least once a year.[32]

Pollution units per unit of production are the basis for calculation of the pollution charge by the industrial unit. The pollution charge is calculated by multiplying the pollution level with actual production during the charge payable period, and with the applicable rate per pollution unit for the year. Pollution charges are payable period, and with the applicable

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[32]Rule 6 Industrial Pollution Charge (Calculation and Collection) Rules, 2001.

rate per pollution unit for the year. Pollution charges are payable biannually based on the actual production in the proceeding six months. Industrial unit to the Provincial EPA shall submit a copy of the receipt. If an industrial unit reduces the pollution units up to 80%, it may apply for determination of its pollution level to Provincial Agency. Conversely, when the Director General has reason to believe that the actual pollution units being discharged by such unit are 20% or more than the level determined by the Inspection Team.[33]

Formula for Pollution Charge [34]

Pollution Charge (RS) = (C-S) X RXD XF

Where:

C= Pollution Concentration (mg/L) in Effluent/Emission

S= NEQS for the Pollution s

R=Flow Rate (m3 /Day)

D=Total number of operating days/year

U=Pollution Unit (kgs)

F=Fee (Rs per Pollution Unit)

Total payable pollution charge by an industry would be sum total of pollution charges for all pollutants present (in excess of NEQS) in effluents/emissions being discharged by the industry.

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[33] Ibid
[34] Ibid

Pollution Units For Gaseous Emissions

Carbon Monoxide(C)	=	400kg
Particulates	=	250kg
(From coal & other sources)		
Oxides of Nitrogen (NOx) and Sulphor (SOx)	=	200kgs
Particulates (from oil)	=	50kgs
Particulates (from cement)	=	100kgs

Pollution Units For Effluents

COD, TSS	=	50kgs
Oil and Grease	=	3kgs
Copper	=	1000gms
Chromium, Nickle , Lead	=	500gms
Cadmium, Pesticides, Herbicides	=	100gms
Mercury	=	20gms

Pollution Units

Quantity of pollution defined as one pollution unit reflects the relative toxicity of the pollutant and extent of damage to the environment.

One Pollution unit for (COD)	=	50kg
One Pollution unit for (TSS)	=	50kg
One Pollution unit for (Oil and Grease)	=	3kg

Pollution Level

To be determined once a year.

To be determined by the Inspection Team

Pollution charge may also be figured on the basis of the self-monitoring reports.

Level of Pollution charge to be established through a process of negotiations.

It should be such that the industry feels the impact, but should not be excessive so that it jeopardizes the financial health of industry.

Calculation Procedure

Should know the following:

Actual value of NEQS for the concerned parameters

Effluent flow of the unit

Production of the unit

No. of annual operating days

e.g.

waste water generation/ day	=	1000M3

Production / day	=	50kg of medicine A
Working days	=	300
NEQS (Actual Value) COD	=	1150
NEQS (Actual value) TSS	=	800
NEQS (Charge value) COD	=	1000
NEQS (Charge value) TSS	=	650
Effluent Flow (M3)	=	1000X300=300,000
Annual Pollution Load (kg)	=	Charge value of pollution X effluent flow/1000
Annual pollution load (kg) COD	=	1000X300,000/1000=300,000
Annual pollution load (kg) TSS	=	650 X 300,000/1000=195,000
Chargeable unit for COD	=	Annual pollution load of COD/ one pollution unit of COD
Chargeable unit for COD	=	300,000/50 = 6000
Chargeable unit for TSS	=	195,000/50 =3900
Net chargeable Units	=	6000+3900 = 9900
Let the base rate/		
Pollution Unit	=	Rs. 100
Total pollution Charge	=	9,90,000
Total pollution charge / day	=	9,90,000/300 = 3300
Pollution charge /kg of		

Medicine a manufactured = 3300/50= Rs .66

2.4.1.3.2.b Environmental Protection Orders

Under The Pakistan Environmental Protection Act 1997, if an EPA reason to believe that any offence under PEPA, 1997or rules or regulation there under is likely to occur, it may issue an Environmental Protection Order.[35] However EPA shall first give the person committing the supposed offense an opportunity to be heard. Any person disobeying an Environmental Protection Order may be punished under the same Act.

2.4.1.3.2. c Administrative Penalty

Under section 17[36] of Pak EPA, 1997 whoever contravenes or fail to comply with previsions of this Act is punishable with a fine of one million rupees. With continued violation, an additional fine of one thousand rupees pre day would be imposed.

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[35] Section16, The Pakistan Environmental Protection Act, 1997,
Environmental protection order.---(1) "Where the Federal Agency or a Provincial Agency is satisfied that the discharge or emission of any effluent, waste, air pollutant or noise, or the disposal of waste, or the handling of hazardous substances, or any other act or omission is likely to occur, or is occurring, or has occurred, in violation of the provisions of this Act, rules or regulations or of the conditions of a license, and is likely to cause, or is causing or has caused an adverse environmental effect, the Federal Agency or, as the case may be, the Provincial Agency may, after giving the person responsible for such discharge, emission, disposal, handling, act or omission an opportunity of being heard, by order direct such person to take such measures that the Federal Agency or Provincial Agency may consider necessary within such period as may be specified in the order."

[36] Section17, The Pakistan Environmental Protection Act, 1997,
Penalties.—(1)" Whoever contravenes or fails to comply with the provisions of sections 11, 12, 13 or section 16 or any order issued there under shall be punishable with fine which may extend to one million rupees, and in the case of a continuing contravention or failure, with an additional fine which may extend to one hundred thousand rupees for every day during which such contravention or failure continues: Provided that if

2.4.1.4 Laws Related to Environmental Matters in Pakistan

Prior to promulgation of PEPO of 1983 and PEPA1997, Pakistan had laws that contain provisions for environmental protection. These laws dealt with land use, water quality, air quality, noise, toxic and hazardous substances, solid waste, marine & fisheries, forest etc. These laws included;

- The Pakistan Penal Code, 1860 (Section 277 & 278)
- The Punjab Local Government Ordinance, 1979 (Section 512(L) & 93 (1),(2))
- The Motor Vehicles Ordinance, 1965(Rule 163)
- The Factories Act, 1934 (Section 33-L,33QQ & 66)
- The Criminal Procedure Code, 1898 (Section 133)

2.4.2 Role of Judiciary and Environment Protection

In Pakistan, the judiciary has played a progressive role in the enforcement of environmental laws.

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contravention of the provisions of section 11 also constitutes contravention of the provisions of section 15, such contravention shall be punishable under sub-section (2) only."
(2) "Whoever contravenes or fails to comply with the provisions of section 14 or 15 or any rule or regulation or conditions of any license, any order or direction, issued by the Council or the Federal Agency or Provincial Agency, shall be punishable with fine which may extend to one hundred thousand rupees, and in case of continuing contravention or failure with an additional fine which extend to one thousand rupees for every day during which such contravention continues."

2.4.2.1 Supreme Court of Pakistan

Article 184(3)[37] of the constitution of Islamic Republic of Pakistan has enabled the jurisdiction of the Supreme Court in respect of Public Interest litigation. Under this section the Supreme Court have the power to make an order of the enforcement of Fundamental Right. In the case of Shahla Zia v/s WAPDA[38] Mr. Justice Saleem Akhter has expanded the ambit of Article 9[39] of the Constitution of Pakistan, 1973 to include the right to health services and quality of life. According to brief facts of the case, the petitioner and three other residents of F-6/1, Islamabad protested to WAPDA against construction of a grid station in their street. In this respect a letter was written to the Chairman of WAPDA was conveying the complaint about the bad effects of the grid station on the health of the residents. The WAPDA filed their comments and the final hearing was done on 12th February, 1994. The Supreme Court held that the result hazard to life by magnetic field can not be ignored. The Supreme Court upheld the view that the word "life" in Article 9 doesn't simply mean animal life or vegetative existence. It stated that life includes all such amenities and facilities, which a person born in a free society is entitled to enjoy in dignity and constitutionally. The Court concluded that the right to a clean environment is a fundamental right of all citizens of

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[37] Article 184(3) The Constitution of Islamic Republic of Pakistan ,1973,
"Without prejudice to the provisions of Article 199, the Supreme Court shall, if it considers that a question of public importance with reference of any of the Fundamental Right."

[38] PLD 1994 SC 693

[39] Article 9 The Constitution Of Islamic Republic of Pakistan ,1973
"No person shell be deprived of life or liberty save in accordance with law."

Pakistan covered by the right to life, right to dignity and honor under Articles 9 and 14[40]of the Constitution.[41]

In the Human Rights case Environmental Pollution in Baluchistan,[42] the Supreme Court of Pakistan moved suo moto action to prevent the dumping of nuclear and industrial waste in Baluchistan. The Supreme Court noticed a news item in a daily newspaper regarding the purchase of costal area of Baluchistan for the dumping of nuclear and industrial waste.[43]

2.4.2.2 High Courts

Under Article 199 (2) [44]of the Constitution of Pakistan1973, the provincial High Courts have jurisdiction to enforce any of the Fundamental Right, moreover the High Court also acts as

Appellants Court under section 22[45] of the Pakistan Environmental Protection Act, 1997 to adjudicate against the orders of Environmental Tribunals.

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[40] Article 14, Ibid.
(1) "The dignity of the man and, subject to law, the privacy of home, shell be inviolable."
(2) "No person shell be subject to torture for the purpose of extracting evidence."
[41] Justice Syed Ahmed Ali Shah, "Brief Statement Regarding Legal System And Role Of Judiciary In Pakistan In Dealing With Environmental Cases." available at,
www.roap.unep.org/program/.../Day1/Role_of_court_Pakistan.pdf last visited on 10th April,2010
[42] 1994 PLD Supreme Court of Pakistan 102
[43] Justice Syed Ahmed Ali Shah, "Brief Statement Regarding Legal System And Role Of Judiciary In Pakistan In Dealing With Environmental Cases." available at,
www.roap.unep.org/program/.../Day1/Role_of_court_Pakistan.pdf last visited on 10th April,2010
[44] Article 199 (2), Ibid.
"Subject to the Constitution, the right to move a High Court for the enforcement of any of the Fundamental Rights conferred by Chapter I of II shall not be abridged."

In the case of Anjum Irfan v. LbA.20[46] concerning about the setting of air and noise pollution standards, the Lahore High Court, suggested that the new industries must be compelled to installed and use devices for checking and controlling pollution.[47]

2.4.2.3 Environmental Protection Tribunals

The Environmental Protection Tribunals constituted under section 20[48] of the Pak-EPA, 1997. Environmental Protection Tribunals are federal body and have the exclusive jurisdiction to try serious offences regarding Environment, and to hear appeals against the orders of Environmental Protection Agency.[49]

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[45] Section 22 The Pakistan Environmental Protection Act, 1997
Appeals to the Environmental Tribunal.—(1) " Appeals to the Environmental Tribunal.—(1) Any person aggrieved by any order or direction of the Federal Agency or any Provincial Agency under any provision of this Act, and rules or regulations may prefer an appeal with the Environmental Tribunal within thirty days of the date of communication of the impugned order or direction to such person. "
(2) "An appeal to the Environmental Tribunal shall be in such form, contain such particulars and be accompanied by such fees as may be prescribed. Pakistan Environmental Protection Act, 1997"

[46] PLD 2002 Lahore High Court 55

[47] Supra Note, 43

[48] Section 20,The Pakistan Environmental Protection Act, 1997
"Environmental Tribunals.—(1), The Federal Government may, by notification in the official gazette, establish as many Environmental Tribunals as it consider necessary and, where it establishes more than one Environmental Tribunals, it shall specify territorial limits within which, or the class of cases in respect of which, each one of them shall exercise jurisdiction under this Act."

[49] Justice Syed Ahmed Ali Shah, "Brief Statement Regarding Legal System And Role Of Judiciary In Pakistan In Dealing With Environmental Cases." available at,
www.roap.unep.org/program/.../Day1/Role_of_court_Pakistan.pdf last visited on 10th April 2010.

2.4.2.4 District and Session Court

Under section 23[50] of the Pak-EPA, 1997 District and Session Courts have appellant jurisdiction against the judgment of Environmental Magistrates.

2.4.2.5 Environmental Magistrate

The Magistrate and Civil Judge have been empowered as Environmental Magistrates under section 24 (1)[51]of the PEPA, 1997 in High Courts. A special office of Environmental Magistrate has been constituted to try offences such as disposing of hazardous waste etc. The Environmental Magistrates empowered in this behalf by the High Courts.[52]

2.4.2.6 Quasi Judicial Forums

The director General and Director of Pakistan Environmental Protection Agencies can adjudicate all the Environmental Matters and can summon any person regarding

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[50]Section 23, The Pakistan Environmental Protection Act, 1997,
"Appeals from orders of the Environmental Tribunal.---(l) Any person aggrieved by any final order or by any sentence of the Environmental Tribunal passed under this Act may, within thirty days of communication of such order or sentence, prefer an appeal to the High Court."
(2) "An appeal under sub-section (l) shall be heard by a Bench of not less than two Judges."
[51]Section 24(1), lbid.
"Jurisdiction of Environmental Magistrates.—(l) Notwithstanding anything contained in the Code of Criminal Procedure, 1898 (Act V of 1898), or any other law for the time being in force, but subject to the provisions of this Act, all contravention punishable under sub-section (2) of section 17 shall exclusively be tribal by a judicial Magistrate of the first class as Environmental Magistrate especially empowered in this behalf by the High Court."
[52] Government of Pakistan, Ministry of Law, Notification No.293 Dated 15th July 1998

environmental offences. Section 16[53] of Pak-EPA, 1997 provides a quasi judicial mechanism to tackle the harmful effects of the pollution caused by any activity, in the forms of Environmental Protection Orders (EPO). EPOs can be issued by Federal and as well as Provincial Environmental Protection Agencies.[54]

2.4.3 Institutions and Governance Structures

For the control of environmental pollution following Institutions are functional in the country.

2.4.3.1 The Federal Ministry of Environment

A Federal Minister of Environment was first appointed in Federal Cabinet in 1989. The Federal Minister of Environment is supported by the Ministry of Environment headed by a Federal Secretary. A Federal Minister of Environment was first appointed in Federal Cabinet

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[53] Section16, The Pakistan Environmental Protection Act, 1997,
"Environmental protection order.---(1) Where the Federal Agency or a Provincial Agency is satisfied that the discharge or emission of any effluent, waste, air pollutant or noise, or the disposal of waste, or the handling of hazardous substances, or any other act or omission is likely to occur, or is occurring, or has occurred, in violation of the provisions of this Act, rules or regulations or of the conditions of a license, and is likely to cause, or is causing or has caused an adverse environmental effect, the Federal Agency or, as the case may be, the Provincial Agency may, after giving the person responsible for such discharge, emission, disposal, handling, act or omission an opportunity of being heard, by order direct such person to take such measures that the Federal Agency or Provincial Agency may consider necessary within such period as may be specified in the order."

[54] Justice Syed Ahmed Ali Shah, "Brief Statement Regarding Legal System And Role Of Judiciary In Pakistan In Dealing With Environmental Cases." available at, www.roap.unep.org/program/.../Day1/Role_of_court_Pakistan.pdf last visited on 10th April 2010.

in 1989. The Federal Minister of Environment is supported by the Ministry of Environment headed by a Federal Secretary.[55]

2.4.3.2 Pakistan Environmental Protection Councils (PEPC)

The Pakistan Environmental Protection Council was established in 1983 as the supreme environmental policy making body in Pakistan. The PEPC was continued after the enactment of Pakistan Environmental Protection Act (PEPA), 1997. Under section 3[56]of the PEPA the prime minister will be the chairman of PEPC and the federal minister of environmental will be its Vice Chairman. The members of PEPC will be Chief Ministers of four provinces and other environmental ministers. The non - official members shall be drawn from civil society including chambers of commerce and industry and industrial associations, chambers of agriculture, legal and medical professions. Section 4[57] of Pakistan Environmental Protection

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[55] Ibid.

[56] Section 3, The Pakistan Environmental Protection Act, 1997
"Establishment of the Pakistan Environmental Protection Council.— (1) The Federal Government shall, by notification in the official Gazette, establish a Council to be known as the Pakistan Environmental Protection Council consisting of— (i) Prime Minister or such other person as the Prime Chairperson Minister may nominate in this behalf. (ii) Minister in charge of the Ministry or Division Vice Chairperson dealing with the subject of environment. (iii) Chief Ministers of the Provinces. ..... Members (iii) Ministers In charge of the subject of environment Members in the Provinces. ..... (iv) Such other persons not exceeding thirty- five as the Members federal Government may appoint, of which at least twenty shall be non-officials including five representatives of the Chambers of Commerce and Industry and industrial associations and one or more representatives of the Chambers of Agriculture, the medical and legal professions, trade unions, and non-governmental organizations concerned with the environment and development, and scientists, technical experts and educationists (v) Secretary to the Government of Pakistan, in charge Member/ of the Ministry or Division dealing with the subject of Secretary environment"

[57] Section 4, The Pakistan Environmental Protection Act, 1997
"Functions and powers of the Council.—(1) The Council shall— (a) co-ordinate and supervise enforcement of the provisions of this Act; and (b) approve comprehensive national environmental policies and ensure their

Act, 1997 is set out functions and powers of PEPC. Under this section PEPC shall approve comprehensive national environmental policies and ensure their implementation within the framework of a national conservation strategy as may be approved by federal Government; approved the National Environmental Quality Standards; provide guidelines for the protections of species and habitants; coordinate integration of the principles and concerns of sustainable development plans and policies.[58]

2.4.3.3 Pakistan Environmental Protection Agency (PEPA)

Pakistan Environmental Protection Agency (PEPA) was established under Pakistan Environmental Protection Ordinance (PEPO) 1983 and continued under Pakistan Environmental Protection Act 1997. PEPA is headed by Director General, which will be appointed by the Federal Government. The functions of PEPA are set out under section

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implementation within the framework of a national conservation strategy as may be approved by the Federal Government from time to time; (c) approve the National Environmental Quality Standards; (d) provide guidelines for the protection and conservation of species, habitats, and biodiversity in general, and for the conservation of renewable and non-renewable resources. (e) co-ordinate integration of the principles and concerns of sustainable development into national development plans and policies; (f) consider the National Environment Report and give appropriate directions thereon;"
(2) "The Council may, either itself or on the request of any person or organization, direct the Federal Agency or any Government Agency to prepare, submit, promote or implement projects for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, and the sustainable development of resources or to undertake research in any aspect of environment."

[58] Justice Syed Ahmed Ali Shah, "Brief Statement Regarding Legal System And Role Of Judiciary In Pakistan In Dealing With Environmental Cases." available at, www.roap.unep.org/program/.../Day1/Role_of_court_Pakistan.pdf last visited on 10th April 2010.

6[59]of Pak-EPA, 1997, which are administrations and implementations of the provisions of Pak-EPA, 1997, and rules and regulations made under it.

2.4.3.4 The Provincial Environmental Ministry

At the provincial's level, all the four provinces have Provincial Environmental Ministries headed by provincial's environmental minister, and the Environmental Department headed by Provincial Secretary.[60]

2.4.3.5 Provincial Environmental Protection Agency (Provincial EPAs)

Section 8[61] of the Pakistan Environmental Protection Act, 1997 directs to the Provincial Secretary of environment to establish Provincial Environmental Protection Agency and

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[59] Section 6, The Pakistan Environmental Protection Act, 1997
" Functions of the Federal Agency.—(1) The Federal Agency shall— (a) administer and implement this Act and the rules and regulations made; (b) prepare, in co-ordination with the appropriate Government Agency and in consultation with the concerned sect oral Advisory Committees, national environmental policies for approval by the Council; (c) take all necessary measures for the implementation of the national environmental policies approved by the Council; (d) prepare and publish an annual National Environment Report on the state of the environment; (e) prepare, establish and revise the National Environmental Quality Standards with approval of the Council: Provided that before seeking approval of the Council, the Federal Agency shall publish the proposed National Environmental Quality Standards for public opinion in accordance with the prescribed procedure; and (f) ensure enforcement of the National Environmental Quality Standards; (g) establish standards for the quality of the ambient air, water and land, by notification in the official Gazette in consultation with the Provincial Agency concerned: Provided that— (i) different standards for discharge or emission from different sources and for different areas and conditions may be specified; (ii) where standards are less stringent than the National Environmental Quality Standards prior approval of the Council shall be obtained;
(iii) certain areas, with the approval of the Council, may exclude from carrying out specific activities, projects from the application of such standards; (h) co-ordinate environmental policies and programs nationally and internationally"

[60] Justice Syed Ahmed Ali Shah, "Brief Statement Regarding Legal System And Role Of Judiciary In Pakistan In Dealing With Environmental Cases." available at,
www.roap.unep.org/program/.../Day1/Role_of_court_Pakistan.pdf ,last visited on 10th April 2010

exercise such powers and functions as delegated by the provincial government. Sections 8(6)[62] of the Pak-EPA, 1997 provides that in order to assist the Provincial EPAs the provincial government shell establish advisory committees for various sectors and appoint members from educational institutes and non government organizations.

2.5 ENVIRONMENTAL AUDITS AND THEIR PRACTICE IN PAKISTAN

Environmental Audit is review of a company's operations and processes for the purpose of assessing compliance with environmental laws, rules and regulations. Environmental audit cover a broad range of business area and activities including commercial and industrial development; building and building sites; activities and procedures and engineering hazard and operability study. This may vary from legally mandated reviews of industry safety and emissions to voluntary inspections of environmental practices.[63]

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[61] Section 8, Pakistan Environmental Protection Act, 1997
"Establishment, powers and functions of the Provincial Environmental Protection Agencies.—(1) Every Provincial Government shall, by notification in the official Gazette, establish an Environmental Protection Agency, to exercise such powers and perform such functions as may be delegated to it by the Provincial Government under sub-section (2) of section 26. (2) The Provincial Agency shall be headed by a Director-General who shall be appointed by the Provincial Government on such terms and conditions as it may determine. (3) The Provincial Agency shall have such administrative, technical and legal staff as the Provincial Government may specify, to be appointed in accordance with such procedure as may be prescribed. (4) The powers and functions of the Provincial Agency shall be exercised and performed by the Director-General. (5) The Director General may, by general or special order, delegate any of the powers and functions to staff appointed under sub-section (3).
(6) For assistance of the Provincial Agency in the discharge of its functions, the Provincial Government shall establish Sectoral Advisory Committees for various sectors and appoint members from amongst eminent representatives of the relevant sector, educational institutions, research institutes and non- governmental organizations.
[62] Supra note 60
[63] http://www.answers.com/topic/environmental-audit last visited on 20, May, 2010

Environmental audit define as;

> *"independent third party assessment of a current status of an organization compliance with local environmental laws and regulations."*[64]

A growing number of industrial companies are instituting environmental management audits at their facilities. Such audits encourage environmentally sound technology that helps decrease waste and resource expenditures and by this means increases profit. Regulatory agencies consider such auditing as an important corporate management technique because it ensures compliance with environmental requirements and related corporate polices. The regulatory agencies have accordingly encouraged more companies to evaluate and implement individualized environmental auditing programs. Many reasons subsist for companies to initiate audit programs. For example auditing system can help corporate management to:[65]

- Determine and document compliance status;
- Increase the overall level of environmental awareness;
- Improve overall environmental performance at the operation facilities;
- Improve the environmental risk management system;
- Develop a basis for optimizing environmental resources;

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[64] http://www.business.dictionary.com last visited on 20,May, 2010
[65] Thomas T. Shen, "Industrial Pollution Prevention" (ISBN 3-540-65208-6 Springer-Verlag Berlin Heidelberg New York) p.92

- Develop better relations with government agencies through the presence of an affirmative program designed to find the correct problems before they become dangers;
- Avoid the surprise, and unplanned costs of sudden enforcement actions;
- Realize savings through process changes which reduce the amount of raw materials needed or create less pollution to be a civil or criminal liability under the current environmental laws, rules and regulations; and
- Build closer links with community and government not only to minimize the chance of environmental conflict, such as enforced shutdowns and products bans but also help better the image of company and industry in general, in term of positive role and contribution they provide.

2.5.1 Environmental Management Audit

The environment management audit is the assessment of the total management system in term of being an assert or the liability for the company's environmental performance. Thus evidence could be collected in relation to environmental policies and attitudes, knowledge and skills at all levels and all divisions of the organization, and environmental success and failures which have accorded. The environmental management audit can focus on any of these mention areas. A comprehensive management audit could be carried out in the series of stages. In the first stage the audit could focus on the corporation 's management system and the role of top management in establishing and maintaining an environmentally-oriented

culture. The next stage could get involvement of senior line managers and those staff managers directly responsible for environment, external affairs and technology. The final stage of the audit would involve an investigation of each production facility and product in order to assess the extent to which they conform to all regulatory requirements.[66]

2.5.2 Facility Environmental Auditing

A facility environmental auditing is defined as a basic in plant management tool comprising of a systematic documented periodic and objective evolution of how well facility environmental management system and equipment are performing. The aim of the audit is to facility control of environmental practices and to enable the facility to assess compliance with company policies including meeting regulatory requirements.[67]

The concept of facility environmental auditing came into being during the early 1970 s but under the guise of a number of different approaches and names: environmental reviews surveys assessments and quality controls. Today the term environmental audit is widely used. In practice such audits are carried out by a small qualified independent team of people who visit a particular sit to check the environmental program and performance of plant. Although there is no set way in which an environmental audit is performed the procedures have become more formalized. One grate advantage of regular facility environmental

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[66] Thomas T. Shen, "Industrial Pollution Prevention" (ISBN 3-540-65208-6 Springer-Verlag Berlin Heidelberg New York) p.94
[67] Ibid.p. 95

auditing is that it provides with the company with a grater overall awareness of its workers and processes identifying compliance problems and areas of risk pinpointing both strengths and weaknesses and encouraging continual improvement. In that regulated facility environmental auditing encourages the use low west technologies prudent utilization of recourses and identification of potential hazards and risks.[68]

2.5.3 The Self-Monitoring and Reporting (SMART)

National Environmental Quality Standard (Self-Monitoring and Reporting by Industry) Rules, 2001, is the most important rules under the Pakistan Environmental Protection Act, 1997, to prescribe the polluting limits for the industry. These rules established an honor-based self-monitoring system. Rule 3[69] of National Environmental Quality Standard (Self-Monitoring and Reporting by Industry) Rules, 2001, puts obligation upon all the industries to submit Environmental Monitoring Reports to the Federal Environmental Protection Agency timely and correctly. Under Rule 4[70] the industrial units have been categorized into A, B and C for the liquid effluents and into A and B for gaseous emissions. The most pollutant

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[68] Thomas T. Shen, "Industrial Pollution Prevention" (ISBN 3-540-65208-6 Springer-Verlag Berlin Heidelberg New York) p.96

[69] Rule 3, National Environmental Quality Standard (Self-Monitoring And Reporting by Industry) Rules, 2001. "Responsibility for Reporting. (1) All industrial units shell be responsible for correct and timely submission of Environmental Monitoring Reports to the Federal Agency."

[70] Rule 4, Ibid. Classification of industrial units. On the basis of pollution level of an industrial unit, the Director General shell classify the unit into category "A","B" and "C" for liquid effluents, and category "A" and "B" for gaseous emissions.

industries fall under Category A[71] and these are required to send their monthly reports to their respective Provincial EPAs and Federal EPA.[72] Relatively less pollutant industries are in category B[73] and quarterly report has to be submitted to their respective Provincial EPAs and Federal EPA.[74] The least pollutant industries are in category C.[75] These industries are required to submit bi-annually reports.[76]

The self-monitoring and reporting (SMART) program for the industrial sector was officially launched in March 2006, by the Ministry of Environment, Government of Pakistan.

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[71] Schedule1. Category "A", Ibid,
(1) Chlor-Alkali (Mercury Cell). (2) Chlor-Alkali (Diaphram Cell).
(3) Metal finishing and electroplating. (4) Nitrogenous fertilizer. (5) Phosphate fertilizer.
(6) Pulp and paper. (7) Pesticides formulation. (8) Petroleum refining.
(9) Steel industry. (10) Synthetic fiber. (11) Tanning and leather
(12) Textile processing. (13) Pigments and dyes (14) Thermal Power
Plants (Oil Fired and Coal Fired). (15) Rubber products. (16) Paints, Varnishes and
Lacquers. (17) Pesticides. (18) Printing.
(19) Industrial chemicals. (20) Oil and Gas production. (21) Petrochemicals.
(22) Combined effluent treatment (23) Any other industry to be specified by Federal or Provincial
Agency

[72] Rule 5, Ibid. Category "A", Industrial units – (1) An industrial unit in Category "A", shall submit Environmental Monitoring Reports on monthly basis.

[73] Schedule1. Category "B", Ibid,
(1) Dairy industry. (2) Fruit and vegetable processing. (3) Glass manufacturing.
(4) Sugar. (5) Detergent. (6) Photographic.
(7) Glue manufacture. (8) Oil and Gas exploration. (9) Thermal Power Plants
(10) Vegetable oil and ghee mills. (11) Woolen mills. (12) Plastic materials and
products. (13) Wood and cork products. (14) Any other industry to be
specified by federal or Provincial Agency.

[74] Rule 6, Ibid. Category "B", Industrial units – (1) An industrial unit in Category "B", shall submit Environmental Monitoring Reports on quarterly basis.

[75] Schedule1. Category "C" Ibid
(1) Pharmaceutical (Formulation) Industry. (2) Marble Crushing.
(3) Cement. (4) Any other industry to be specified by Federal or Provincial
Agency

[76] Rule 8, Ibid. Category "C", Industrial units – (1) An industrial unit in Category "C", shall submit Environmental Monitoring Reports on bi-annually basis.

A current initiative to implement NEQS is a "Self-Monitoring and Reporting (SMART)" program for industrial sector. The self-monitoring and reporting guidelines were developed through a comprehensive series of consultations and roundtable discussions among all stakeholders, including representatives from the government, industry, civil society organizations, NGOs, and research and development institutions. To assist the self-monitoring and reporting program, the SMART has also been developed by the PEPA with technical assistance from the Sustainable Development Policy Institute (SDPI). SMART has been used by industrial units to make reports of the emissions levels and send the same to EPAs for compilation and analysis. A pilot-phase program for SMART revelation and testing was successfully completed which was jointly organized by PEPA and SDPI in collaboration with federation of Pakistan Chambers of Commerce and Industry (FPCCI).[77]

In the country government, industry and NGOs worked together towards implementing the NEQS through a self-monitoring and reporting program and have gone a long way in rising and testing SMART through a pilot-phase program. This challenge not only raised the level of environmental awareness but also developed a distinctive momentum in the industrial sector to adopt measures towards minimizing waste and controlling industrial pollution. An "Environment Improvement Program (EIP), to be linked with the SMART program is also under consideration. It has three main objectives:[78]

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[77] Mahmood Khwaja, "SDPI Research and News Bulletin" http://www.sdpi.org, last visited on 20th May 2010
[78] Ibid.

- First, to encourage maximum participation from industrial units to start self-monitoring and reporting to EPAs.
- Second, to seek compliance with the NEQS by primarily grading the environmental performance of industries into a color coding system.
- Third to enter into pollution-reduction agreements with the Chambers of Commerce and Industries (CCIs), Industrial Associations and individuals, to decrease the pollution levels by 25 percent within the first year of launching the EIP and achieve a 75 percent reduction by the end of the 3rd year.

2.6 CASE STUDY OF PHARMACEUTICAL INDUSTRY

I have chosen the Pharmaceutical industry for the case study with the proposal of my supervisor. In the industry, Quality Assurance Department has managed the waste materials. The head of the department was given briefing to me about the different kinds of waste and their disposal /treatment. According to him in a Pharmaceutical industry, five kinds of waste produced during the manufacturing process.

- General Waste
- Solid Waste
- Wastewater
- Pharmaceutical waste
- Micro Biological Waste

General Waste

In the mixing and packing process raw material like powder falls on the floor. This is treated like household and taken by sweepers.

Solid Waste

Soled waste includes unit cartons, master cartons, poly bags, iron scrap, damaged and rejected labels, and a variety of packaging materials. Some waste like unit cartons and master cartons and some packing material can be reused, so these cartons taken by contractors for recycling. The rest of the waste which can not be recycled or reused such kind of waste collected from industry and send to off-site for incinerate, for this purpose industry owned a separate plot.

Wastewater

In the process of equipments washing, the polluted water produced but small in volume. Being minor in quantity wastewater is simply drain.

Pharmaceutical waste

Pharmaceutical wastes include rejected and expired medicines, expired chemicals, P.V.C., aluminum fouls, glassware and aluminum cans, and rejected capsule shells. The industry has installed glass shredding machines and hydraulic presses, to crush the polluted glassware,

expired medicines and empty drums, to prevent their direct reuse. And then these crushed waste send for incineration.

Micro Biological Waste

Micro biological waste includes harmful germs which are invisible. These germs are produced by the use of different chemicals. For micro biological waste's treatment, "Sterilization Process" is used. In order to reduce environmental hazards Autoclaving is done. Effected equipments kept in the Autoclaving machine for specific time, under specific pressure and temperature.

2.6.1 Measures Taken By Industry for the Safety of Workers

For the protection of workers two type of safety measures are taken by the industry. First overcoats, gloves, capes and special shoes provided to them daily. Secondly industry also provides the facility for the annual medical checkup.

I have observed during the visit that the overall industrial environment was very neat and clean. Each and every person was dress-up with their special dress. For this purpose in the front of industry there is dressing room, and here special dresses are provided to every worker before entering the industrial lab. I have concluded that if all industries in country take these kinds of measures, surely we will not have any kind of industrial pollution.

Chapter 3

DEVELOPMENT OF INTERNATIONAL ENVIRONMENTAL LAWS

3.1 TRIAL SMELTER CASE

The international Environmental Laws principles have been developed in the 20th century. A basic legal principle applicable to environmental disputes has been that a nation should not permit action within its territorial jurisdiction to harm the interest of other states. The landmark case which has established the international law liability is the "Trial Smelter" case[1]. The brief facts of the case is that the Canadian Consolidated Mining and Smelting Company Limited operated a zinc and lead smelter along the Columbia River at Trail, British Columbia, Canada about 10 miles north of international boundary with the state of Washington ,United State of America. In the period 1925 to 1935 the USA objected Canada that sulfur dioxide emissions from the operation were causing damage to the

[1]As discussed by Sohaib. Qadar , in "Pakistan Environmental Laws and their Compliance"(Lahore Law Times Publications), p.14

Columbia River Valley. The issue was referred to the International Joint Commission (IJU) by the USA and Canada, both governments restore twice to legal arbitration, once from 1928 to 1931 and again from 1935 to 1941, in an attempt to resole the dispute. The tribunal declared:[2]

> "Under the principles of the international law as well as of the law of the United State, no state has the right to use or permit the use of its territory on such a manner as to cause injury by fumes in or to the territory of another or the properties of person therein, when the cause is of serious consequence and the injury is established by clear and convincing evidence"[3]

The Trail Smelter Award contributed significantly to the development of principal of international environmental laws.

1.2 UNITED NATIONS CONVENTION ON HUMAN ENVIRONMENT, STOCKHOLM 1972

Even though international environmental law liability principle was established by the 1941 Trail Smelter Arbitration, but the first very worldwide environment concern was initiated at

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[2]Dr Sohaib Qadar ,"Pakistan Environmental Laws and their Compliance"(Lahore Law Times Publications), p.15

[3] Ibid.p.17

the World Conference on Human and the Environment, sponsored by the United Nations in Stockholm in 1972. Principle 21 of the Stockholm Declaration 1972 affirmed;

> "The states have a sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that the activities within their jurisdiction or control do not cause damage to the environment of other state or of areas beyond the limits of national jurisdiction".

The most visible result of the Conference was the creation of the United Nations Environment Program (UNEP). As UNEP promoting environmental enhancement program around the World, it encountered tremendous resistance during the 1970's when many countries suffered much economic difficulties. It was realize that when governments are busy fighting the unemployment and other economic issues, environment become an unimportant mater. In responses to this significant revelation, the United Nations General Assembly created a World Commission on Environment and Development in 1984. After three years consideration, this commission issued its final report 'Our Common Future' which called for 'Sustainable Development' this concept was further confirmed by the United National Conference on Environment and Development which was held in Rio de Janeiro in 1992. The conference concluded that the 'Sustainable Development' is a realistic way to meet

way to meet the needs of the present without compromising the ability of future generation to meet heir own need.[4]

The countries did not incorporate the Principles of Stockholm Declaration 1972, as a part of their laws, until the series of environmental damage incidents during the seventies and eighties such as Union Carbide's Bhopal Plant accident forced national leaders to take real action. In Union Carbide Corporation v/s Union of India[5] case an American Corporation (Union Carbide Corporation UCC) was running a chemical plant in Indian city Bhopal. In 1984 tragic industrial disaster occurred in this plant, MIS leak from the plant in substantial quantities. The massive escape of the lethal MIC gas from the plan into the atmosphere caused 2660 person's death. More than two hundred thousand person suffered injuries. This was worst industrial disaster mankind has ever known. The Indian Supreme Court awarded U.S. 430 million to the Bhopal gas victims. After twenty six years the Indian Supreme Court has given the final judgment on 7th June 2010. All the eight accused, under Section 304 (A) of Indian Penal Code were convicted and tried for their negligence.[6]

The Chernobyl Disaster[7] 1986 was another important case which played major role in the development of international environmental laws. In April 1986 a nuclear accident

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[4] Mumtaz Hussain, "Environment Degradation" (Ferozesons (pvt) Ltd. Lahore (1998) p.12
[5] AIR 1990 S.C. 273
[6] http//:timesofindia.indiantimes.com , last visited on 8th June 2010
[7] http//www.who.int/mediacentral/news/releases/2005/pr38/en/index.htm ,last visited on 28th May,2010

occurred at the Chernobyl Nuclear Power Plant in the Soviet. This accident occurred during an experiment scheduled to test a potential safety emergency core cooling feature during the shutdown procedure in reactor number 4 at the Chernobyl plant had a meltdown. The resulting fire sent a plume of radioactive fallout into the atmosphere. The reactor suffered a catastrophic power rise which led to explosions in the core. This dispersed large quantities of radioactive fuel into the atmosphere. The burning graphite moderator increased the emission of radioactive particles by the smoke. The radioactivity spread over northern Europe made plants and wild animals to be more radioactive for human consumption. The Chernobyl accident was the worst accident in the history of nuclear energy; it caused 53 direct deaths and estimated that there may be up to 4,000 additional cancer deaths.[8]

3.3 THE EARTH SUMMIT

In June 1992 the United Nations Conference on Environment and Development, commonly known as the Earth Summit, convened for 12 days on the outskirts of Rio de Janeiro, Brazil. At the Earth Summit, the governments adopted agenda 21[9] which legitimizes the environmental, economic and political change. The main object of the conference was to identify long term environmental reforms and to initiate process for their implementation. The Earth Summit was an historic event of great significance, not only did it make the

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[8] http://www.iaea.org.publicatio/index/thml, last visited on 20th May 2010

[9] It is an action plan for International Cooperation towards sustainable development, which encourages states to assess the need for additional measures to protect the marine against pollution arising from offshore oil and gas platforms.

environment a priority on the World's agenda, but delegates from 178 countries attended, including 103 heads of the states.[10]

3.4 THE ENVIRONMENT AND WORLD TRADE ORGANIZATION (WTO)

The increased emphasis of environmental issues in trade policies also started as a follow up of the Earth Summit. In 1994 trade minister from participating countries of this summit decided to begin a comprehensive work program on trade and environment in World Trade Organization (WTO). They created the WTO Committee on Trade and Environment. This was to bring environmental and sustainable development issues into the mainstream of WTO work. According to the Trade and Environment Committee of the WTO the most effective way to deal with the international environmental problems is through the environmental agreement. This approach complements the WTO's work in seeking internationally agreed solution for trade problems.[11]

This committee has also noted that action taken to protect the environment and having an impact on trade can play an important role in some environmental agreements, particularly when trade is a direct cause of the environmental problems. However, Trade and

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[10] Dr. Sohaib. Qadar , "Pakistan Environmental Laws and their Compliance"(Lahore Law Times Publications), p.22

[11] Ibid.p.23

Environment Committee have pointed out that trade instructions are not the only action that can be taken, and they are not necessarily the most effective. Alternatives include:

- Helping countries acquire environmentally friendly technology,
- Giving them financial assistance,
- Providing them training.

3.4.1 Environmental Provisions in WTO Agreements

The WTO has no specific agreement dealing with the environment, however, a number of the WTO agreements include provision dealing with environmental issues are as follows:[12]

> General Agreement on Trade and Tariff (GATT) Article 20: "Policies affecting trade in goods for protecting human, animal or plant life or health are exempt from normal GATT disciplines under certain conditions."
>
> Trade Related Aspects of Intellectual Property Right (TRIPS) Article 27: "Governments can refuse to issue patents that threaten human, animals or plants life or health, or risk serious damage to the environment."

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[12] Dr. Sohaib. Qadar , "Pakistan Environmental Laws and their Compliance"(Lahore Law Times Publications), p.23

General Agreement on Trade and Services (GATS) Article14: "Policies affecting trade in services for protecting human, animal or plant life or health are exempt from normal GATS disciplines under certain conditions."

3.5. KYOTO PROTOCOL

The Kyoto Protocol under the UN Framework Convention on Climate Change is an international agreement for the control of greenhouse gases (GHG) emissions. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries for reducing greenhouse gas (GHG) emissions. The Kyoto Protocol was adopted in Kyoto, Japan in 1997 and entered into force in 2005. Under this agreement countries must meet their targets largely through national actions and measures. According to agreement each country's emissions target must be achieved by the period 2008-2012. The developed countries committed themselves to reducing their collective emissions of six key greenhouses gases.[13]

3.5.1 The Clean Development Mechanism (CDM)

The Clean Development Mechanism (CDM), defined in Article 12 of the Kyoto Protocol, allows

[13] The six GHGs are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs, a class of gases containing carbon, hydrogen and fluorine), perfluorocarbons (PFCs, a class of gases containing carbon and fluorine), and sulphur hexafluoride (SF6).

a country with an emission-reduction or emission-limitation commitment. CDM will enable industrialized countries to finance emissions-reduction projects in developing countries and receive credit for doing so. The CDM project provides real, measurable and long-term benefits relating to the mitigation of climate change. It produces a reduction in emissions that would not occur in the absence of the particular project undertaken.[14]

3.5.2 How Clean Development Mechanism works?

The Clean Development Mechanism is designed by the entity proposing to implement it, known by the Kyoto Protocol as the 'designated operational entity' (DOE). The design document is aptly known as a Project Design Document (PDD). The PDD must detail how the proposed project will reduce greenhouse gases emissions. The PDD may propose a new methodology to establish this point, or use an already accepted method for this task. It uses the same method to propose how this reduction in emissions will be monitored and verified.[15]

3.6 UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO)

The United Nations Industrial Development Organization (UNIDO) is the specialized agency of the United Nations dedicated to promoting Sustainable Industrial Development in developing countries. UNIDO provides a platform for public, private, and civil society organizations to discuss policy matters of industrial development. UNIDO focuses on micro, small, and medium

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[14] www.aph.gov.au/library/Pubs/BN/2008.../KyotoProtocol_CDM.pdf ,last visited on 10 April 2010
[15] Ibid.

enterprises with an emphasis on agro-based industries, particularly in the least-developed countries. UNIDO's thematic priorities are: [16]

- Poverty Reduction through Production Activities;
- Trade Capacity Building;
- Environment and Energy.

3.6.1 Interests of United Nations Industrial Development Organization (UNIDO) in the International Green Sector

3.6.1.1 Agro-industries and other rural enterprises

UNIDO supports producers of rural products like cotton, fish, fruits, etc. to achieve quality standards, cut back on waste and pollution, and succeed in marketing. In these activities it works with communities, enterprises, investors and industry associations.[17]

3.6.1.2 Energy

Energy is a main subject for UNIDO. Activities focus on sustainable and clean energy for industry, use of renewable energy sources, and end-use energy efficiency. UNIDO focuses on capacity building and technology transfer that support the Kyoto Protocol on climate change, and

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[16] http://www.terravivagreuts.org. last visited on 10, April, 2010
[17] Ibid.

the Clean Development Mechanisms (CDM).[18]

3.6.1.3 Clean Production Technology

UNIDO's clean production program aims to reduce waste and pollution from industrial processes. Main aspects of this are development of "eco-effective" products, transfer of environmentally sound technologies, improved environmental impact assessment and best practices for water management.[19]

3.6.1.4 Implementation of Multilateral Environmental Agreements

UNIDO plays a most important role in the implementation of the Montreal Protocol for the elimination of zone-depleting substances, and the Stockholm Convention for the elimination of persistent organic pollutants (POPs). UNIDO coordinates with the Global Environment Facility (GEF) for activities under both of these multilateral agreements. Additionally, UNIDO's interventions for energy and water connect it with global forums on climate change and international waters.[20]

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[18] http://www.terravivagreuts.org. last visited on 10, April, 2010
[19] Ibid.
[20] Ibid.

3.6.2 Role and Performance of the United Nations Industrial Development Organization (UNIDO) in Pakistan

The United Nations Industrial Development Organization (UNIDO) is operating in Pakistan since 1968. UNIDO has launched a program, the Responsible Entrepreneur Achievement Program (REAP), to assist exporting enterprises in responding to the social and environmental requirements of international buyers in ways that will minimize the impact of such requirements on their competitive position. The early phase of the program is formulating and testing an approach to corporate responsibility that is appropriate for small and medium-sized enterprises drawing on the cleaner production audit and improvement methodology of UNIDO. The REAP software package and approach is being tested in four countries, Pakistan, Sri Lanka, Thailand and India. The first step in the REAP approach is a gap analysis that compares a firm's current performance with both national and international environmental and social norms. The second step, underway with firms in Sri Lanka and Pakistan, is environmental improvements and clarified measures that might improve social performance. The third step will be a verified report on the improved performance of the firms, which will give guidance to international buyers.[21]

[21] www.un.org/jsummit/html/documents/backgrounddocs/unido_report.pdf, last visited on 1st, May 2010

Chapter: 4

CONCLUSION AND SUGGESTION

Need for environmental protection is an admitted fact, we need some good and very comprehensive laws and machinery to enforce them. Our natural environment is a common heritage to all the human being on the earth, and it is our duty to transfer it in the hand of our future generations at a better and safer.

- The first and the most important thing is that the deficiency of the Constitution of Pakistan regarding environmental issue has to be removed. It is the most annoying for the environmentalists of the country that there isn't any specific provision for environmental protection in our constitution. Although the constitution has fully empowered the federal and provincial legislative to make laws for the protection of environmental and in Shahla Zia vs.WAPDA the Supreme Court has extended the scope of article 9 of the Constitution to cover some aspect of the environmental pollution. But a separate article is needed in the constitution of the country.[1]
- For the protection of environment and speedy disposal of environmental cases special court should be created. Such court may be called "Environment Protections

[1] Fahim Ahamad Saiddiqui,"The scope of Environmental laws in pakistan" (Asian Laws House) p.269

Court. It is necessary that the Judge appointed in these courts must be free to set up their own procedure subject to basic rules of fair play. It is suggested that such court are required to be established at the lowest level and through out the country.[2]

- There are certain sections in Pakistan Penal Code (PPC) where in penalties have been provided for environmental damage. It is suggested that the existing in PPC for environmental harms should be at least thrice as to the present day's penalties.
- There is need of fresh comprehensive Environment Protection Code such Environment Protection Code is needed to simplify lexically. Legally and structurally all the prevailing environmental laws, at present a lot of laws have been enacted but it is said that too many laws also cause disruption, single codified law regarding the control of environmental pollution shall surely solve the problem. In the propose code provision should be made for appeal to the special appellate Environment Court and then to Supreme Court.[3]
- Environmental Awareness is also imported as it plays a significant part in environmental protection. For the purpose of environmental awareness special environmental programs should be prepared and addressed to specific target group such as town planner and decision makers, administrator, executives, student, workers and common people. For the purpose of environmental awareness amongst

[2] Fahim Ahamad Saiddiqui,"The scope of Environmental laws in pakistan" (Asian Laws House) p.273
[3] Ibid. p.274

the masses a comprehensive plane should be introduced at district level. In this respect electronic media may play important role.[4]

- One of the best ways to prevent environmental pollution is to ensure environmentally sound company's operations and management. Environmental audits covers small pollution control and waste management before they become large plant or environmental liabilities. The audit aims not only at minimizing potential negative impacts of the industry on the environment, but also maximizing the positive impact of an environmentally sound system on the industry's other activities.
- To encourage and reconcile excellence in any branch of research related to the environmental sciences government should award more and more award fellowships merit-certificates cash incentives, etc.
- No more licenses should be issued to new industrial units within the limits of large metropolitan cities like Karachi Lahore Faisalabad and Multan. The government and financial institutions would be advised to deny support to new industries in these areas.[5]

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[4] Fahim Ahamad Saiddiqui,"The scope of Environmental laws in pakistan" (Asian Laws House) p. 281

[5] Ibid.

- The government should also consider and providing assistance to existing large industrial which want to shift from congested metropolitan cities to approved location. Financial incentives are required to be given to industry for installing pollution abatement equipment. It is also necessary that standard condition are incorporated in the industrial licenses for the protection of environment.
- The apex body responsible for the protection of the environment i. e. Pakistan Environmental Protection Council (PEPC) could not meet annually for the last several years even though the law demanded to hold its meeting twice a year. The main reason for this irregular meeting is its executive structure as laid down by the Pakistan environmental protection Act 1997. Under the PEPA, 1997 Prime Minstar is the chairperson of the EPEC who has to perform many other important functions relating to state affairs. To overcome this lacuna it is suggested that Minstar for the Environment may be appointed as its Chairperson so that it may hold its meetings regularly.[6]
- To control the pollution from the existing activities first the National Environmental Quality Standards (NEQSs) have to be established for all the industries which again require the meetings of the PEPC.[7]

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[6] Dr. Sohaib. Qadar , "Pakistan Environmental Laws and their Compliance"(Lahore Law Times Publications), p. 43
[7] Ibid.

- Because of the curative protection of the environment being costlier than the preventive protection, environmental control over the ongoing activities must be accompanied with the fiscal incentives such as subsidies on the installation cleaning equipment and effluent treatment plants and amendment of tax and tariff structure to favor clean industries.[8]
- In the country there is need to establish environmental compliance assurance through effective linkages between activities at the national, sub-national, and local levels as well as providing parallel consistency of enforcement.[9]
- The global environmental standards for different aspects of environmental management, plays important role to tackle the industrial pollution problem, because these are often more stringent than national regulations.[10]
- The major environmental problem at the Industrial Estate Islamabad is emissions from the steel melting furnaces. These industries may be directed to install efficient pollution devices. Antipollution devices may be installed over the induction furnaces with proper collection of vent gases so that the gaseous pollutants are not emitted at the work area and to the environment. Secondly clean emitted at the work

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[8] Sohaib. Qadar , "Pakistan Environmental Laws and their Compliance"(Lahore Law Times Publications), p.44

[9] Rends And Good Practices Conference Report Paris,17-18 November 2008, " Environmental Compliance Assurance" available at www.oecd.org/dataoecd/19/44/41829282.pdf , last visited on 7 June 2010

[10] Ibid.

may be used in induction furnace. [11]

- In the Re-rolling Mills the environmental related issue is the occasional discharge of black smoke, which emit when the furnaces are run on furnace oil in winter. (During winter months, there is load shedding of gaseous fuels). Industry may be adequately provided natural gas during winter so that they could avoid using furnace oil or mixture of furnace oil and natural gas. If it is not available then anti-pollution devices may be made mandatory to control the emission gases from the furnaces.[12]
- Large quantities of steam are used as a main heating medium in Oil and Ghee Industry. Steam is also used for creating the vacuum required in ghee manufacturing. The main energy source for the production of steam is natural gas. However, furnace oil is used during shortage in supply of natural gas. Air emissions become a matter of serious concern only during these months when there is a shortage in the supply of natural gas and there is no other option but to use furnace oil. Major wastewater pollutants from this industry include oil and grease, soaps and suspended solids.

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[11] Pakistan Environmental Protection Agency,"Environmental Survey of Industrial Estate Islamabad ", p. 25

[12] Ibid.p. 25

Pollution-reduction techniques in ghee mills include water conservation, recycling of cooling and vacuum water.[13]

- The marble cutting and polishing industry in Industrial Estate Islamabad is one the major source of water and air pollution. In some marble units, settling pits are not cleaned as scheduled, clogging effluent drain channels in the vicinity of the marble unit. Disposal of recovered sludge is the major environmental problem facing the marble manufacturing units. The suggestion is, settling pits may be cleaned periodically. De-watering and drying of the sludge produces marble powder that can be used as filler in the plastic and rubber industry as well as in the construction industry. Industry can find appropriate economic disposal of their waste if not, than proper dumping of produced sludge may be managed by the marble units is the cutting waste.[14]
- In the Galvanizing industry galvanizing process releases acidic fumes and generate waste waters and solid wastes. Water discharge is released from pre-cleaning and after coating process. Degreasing, pickling and galvanizing may be carried out in a

[13] Ibid.p. 26

[14] Pakistan Environmental Protection Agency, "Environmental Survey of Industrial Estate Islamabad ", 2006 p.26

Effluents Treatment Plant for the Industrial Estate Islamabad. The individual units may be directed to install primary treatment system.[16]

- All industrial units situated in Industrial Estate Islamabad may be directed to get registered themselves in Self Monitoring and Reporting (SMART) Program for industries initiated by Pakistan Environmental Protection Agency. Under this program, the industries will have to send test reports of their air emissions and liquid effluent periodically.
- The site selection of IEI was not according to World Bank guide line for industrial estates, it was very close to residential area. CDA has plan new sector in I-17 for the industrial sector of I-9 and I-10. But still industries are working here. Industrial Estate Islamabad (I-9 and I-10) should be move from here as soon as possible.

In the end I would like to say that it is a long road to go, as Pakistan Environmental Protection Agency is still in development stage. The Sustainable Environmental goals could be achieved with the sincere devotion and attention by the government as well as by the society. Further research could be done in this field but it would worth only if it is taken into consideration and implemented in a strict way.

[16] Ibid.p.28

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