CHAPTER I

INTRODUCTION

"It has rightly been said that man is nature's best promise and worst enemy"[1]

Since independence industrial policy resolution fostered the growth of industries in India. Through rapid industrialization India wants to grow its economy $ 5 trillion marked by 2024. But on the run industries are polluting environment through generating huge quantity of hazardous wastes and its improper management. Increasing modern lifestyle of every human being introduces new kind of hazardous and toxic wastes into the environment. Economic development of a country is strongly related to the industrial growth and its activities. An industrial activity generates million tons of hazardous wastes. Unfortunately, there is only a finite amount of land to dispose of it. The quantity of hazardous waste generated all over the world is ever being reliable as because the submission of data regarding hazardous waste is voluntary in nature. Thus, only 84 parties have submitted national report on the generation of hazardous waste in 2017[2]. Therefore it is impossible to get reliable figure on absolute amount of hazardous waste generated worldwide.

Since its inception human are totally dependent on natural process. History is witness to the fact that the man has been continuingly struggling to protect environment. They use to work without destroying the natural resources. But as the

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[1] V.R. Krishna Iyer, V.R., *Environmental Pollution and the law* 93 (Vedpal Law House, Indor, 1st edn.,1984)

[2] The National Report 2017, *available at:* www. Basel.int/countries/NationalReports/BC2017/ tabid/7799/Default.aspx (Visited on March 21, 2019)

time passed, human mentality also passed through greediness. Their unlimited desire results in evolution of industrial activities that slowly and silently creates ecological imbalance. There are witnesses of several incidents due to ecological imbalance in present era. Excessive level of pollution in air, water and soil, makes environment unfit for living. Destruction of forest damages ozone layer that reaches at a stage to rise our global temperature gradually. Our glacier is melted due to the global warming. Climate change and global warming is the direct result of industrial activities.

Increasing trend of global temperatures melted the glacial ice that significantly increases the amount of water which contributing to global sea level rises day by day. The Arctic has warmed by 0.75 degrees Celsius in the last decade same as whole earth's in past 137 years. Heating in the polar regions would cause sea level rise resulting from rapid melting of land ice in the Arctic and Antarctic. This may lead to an increased risk of extreme weather, deadly heat and wildfires in parts of the earth. The only solution to this treat is reducing carbon emissions to slowing high latitude warming. The relationship between hazardous waste and greenhouse gas is two way. On the one way their generation and treatment are potential sources of emission and on the other hand they are also an opportunity to reduce emissions as they can be converted into alternative fuels. Waste reduce, prevention and recycles offers significant potential for decreasing green house gas (GHG) emission[3].

Any kinds of wastes are integral to almost all sectors of society. In 21st Century environmental hazards basically industrial hazardous substances and waste

[3] Bijeta Chetry, "Implementation of Hazardous Wastes Managements Rules to Mitigate the Impact of Climate Change: Issues and Challenges in Assam" in India/Northeast India Issues, Dynamics & Emerging Realities- RGURSF, 3rd edn.2020 (EBH publishers (India), Guwahati) p.19

poses a serious threat not only in India but also all over the World. The waste generated by households, hospitals, industries and its improper disposal creates health hazardous. There is growing evidence of dangerous levels of pollution of soil, air, water in many parts of India that results in major and undesirable disturbance to the ecological balance of the biosphere, destruction and depletion of irreplaceable resources; and gross deficiencies harmful to the physical and mental health of human being. The economic development and advancement of a country is definitely depended on the growth of industrial activities. Basically, industries using and generating hazardous wastes, at petroleum refinery, chemical and pesticide manufacturers, mines and makers of synthetics and weapons has played vital impact on our economy. Simultaneously, it has adverse impact on our environment. Therefore, it should be regulated with effective legal system so that sustainable development and environment can be sustained into same footing[4].

The unhindered flow of hazardous waste into the river and massive rise in the hazardous waste in the State are the responsible for such situation. The State of India's Environment report was released by environment jurist and former Supreme Court Justice Madan B Lokur, Centre for Science (CSE) director general Sunita Narain. According to the State of India's Environment Report of 2019, number of critically polluted river increased in 15 State on the country including three northeastern States. It has been increased from 32 to 45 in the country. The numbers of polluted river highest in Maharashtra are nine and followed by Gujarat are five. There is

[4] N.S. Kamboj, "Population Growth –Prime Cause of Environmental Pollution and its Legal Control in India" XXIH (i) *IBR* 1 (1995)

disagreement between the Central Pollution Control Board (CPCB) and Maharashtra Pollution Control Board (PCB) on the number of polluted river in the State.

Regarding the legal response to environmental protection, much legislation has been enacted during pre-independence. However, the only thing was that due to lack of environmental consciousness this provision could not be put too much use. In post-independence era some basic statute enacted for regulating environmental hazards. The Constitution[5] was amended in the mid-seventies with specific provisions[6] relating to certain aspects of the environment, more especially for the protection of the forests and wildlife in the country. Article 21 - the life and liberty of individuals is the celebrity provision of the Indian Constitution and occupies a unique place as a fundamental right for the people of India, which also includes right to pollutant free environment.

Environmental legislation relating to hazardous wastes management has been enacted as a result of confrontation with the serious problems of improper management and handling of hazardous wastes. Environmental law seeks to protect and promote environment and designed to prevent and control environmental pollution. Toxic hazardous waste has seriously threatened the human life, health and livelihood. The environment which surrounds us is being damaged, disturbed and polluted by hazardous wastes. Therefore, people wants such a strict regulatory framework to proper management of hazardous wastes so that nature's gift to human and animal such as water, air, earth and atmosphere are protected from toxicity of

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5 Forty-second Amendment Act, 1976

6 Article 48A and Article 51-A of the Indian constitution.

industrial wastes disposals. Improper management of hazardous wastes is a one of the major factor responsible for environmental pollution.

International environmental rules and regulation are framed by the united nation in its various conventions. The idea for a global meeting on the environment was put forward at the 1972 UN conference on human environment held in Stockholm. India with its participation in the conference and empowering under Article 253 of our constitution enacted The Air (Prevention Control of Pollution) Act 1981. The Bhopal gas tragedy triggered the Government of India to enact the Environment (Protection) Act (EPA) of 1986. In 1985, Indian government created the Ministry of Environment, Forests and Climate Change (MoEF&CC). This ministry is the central administrative organization in India for regulating and ensuring environmental protection. Empowering under Article 6, 8 and 25 of the aforesaid EPA the Central Government notified Hazardous Waste (Management and Handling) (HWM) Rules, 1989. The Rules is amended for several times recently in 2016 known as Hazardous and Other Wastes (Management and Handling) (H&OWM) Rules, 2016. The Rules directed some responsibilities of occupier for handling of hazardous waste and its disposal sites have to be designed in such a way that no harmful substances reach the biosphere and hydrosphere in an unacceptable quantity.[7]

India is also a signatory of Basel, Rotterdam, Stockholm convention on Persistent Organic Pollutants (POP), Minamata convention and ratified Basel Convention. It is commendable that the H&OWM Rules, 2016 adopted wastes hierarchy concept of Europe. This concept prioritized to conserve resources, minimize

[7] P. M. Prasad, "Environment Protection: Role of Regulatory System in India" 41 *E&PW* 1280 (2006)

environmental damages and maximum recycle of hazardous wastes. Hazardous wastes should be reduced to a minimum consistent with their environmentally sound management; hazardous wastes should be treated and disposed of as close as possible to their source of generation; and hazardous waste generation should be reduced and minimized at source. Scientific disposal of hazardous wastes has become a major environmental issue in India.

Therefore the regulatory frame work relating to the H&OWM should be implemented properly by the boards and agencies authorised by the Government. The H&OWM control mechanism consists of the legal, institutional, scientific and technological arrangements should be established to avoid or mitigate such excesses in the environment. New technological devise should be used by the hazardous wastes generating industries and the occupier of the premises to reduce or eliminate hazardous wastes and reusing materials and commodities through reprocessing, reuse and recovery.

Industrial effluents can be reused to significant extend after suitable treatment. The waste water which is beyond the assimilating capacity of land and water should be settled in appropriate treatment plant. Sources of water are either polluted or contaminated, hence treatment is absolutely essential and water quality must be protected. Therefore recycling project an economically viable proposition should be adopted by the public and private sectors with the co-ordination of appropriate Government. The recovery of raw materials (caustic soda) in the case of Textile Mill results in saving of huge amount of money. Such caustic soda can also be recovered from waste water, which results in the control of environmental pollution. Therefore

emphasis should be given to the recycling aspect in the early stage of industrial development.

Principle 14 of the United Nation Framework Convention on Climate Change (UNFCCC) provides that state should effectively cooperate to discourage or prevent the relocation and transfer to other states of any activities and substances that are found to be harmful to human health. The frame work convention set no binding limits on greenhouse gas emissions for individual countries and contains no enforcement mechanisms. The Paris agreement 2015 called for emission reductions from 2020 in ambitious nationally determined contributions through commitments of countries. China and the US are the largest emitters; though India comes after them, it has finally submitted its Intended Nationally Determined Contribution to UNFCCC committing to cut the emissions intensity of GDP by 33-35% by 2030 from 2005 levels. The issue is a key challenge faced by India.

India must learn from the China that how it is most astonishing economic growth story though its highest populated country. It has highly competitive waste management market and heavily relies on the imports of recycled materials as industrial raw materials. It has a regulation scheme for overseas supplier, which the India abandoned earlier. India must attempt to restore, everything is not over yet. The Government of India adopted measures to protect our environment and the human inhabiting it through providing necessary protection for future generations and their interest in a healthy environment. There should be specific Act for the protection of environment from hazardous substances and waste released from various manufacturing industries. The Central Government, State Government, Local

Authority should realize the gravity of danger of the industrial hazardous waste and has adopted appropriate legislative measure or any integrated approach for tackling the problem. With the use of new technological devises management of waste should avail and the Government should also take policies for waste management to reduce environment pollution.

The Indian judiciary has made remarkable contribution in resolving environmental issues and proper implementation of H&OWM Rules, 2016. During the recent years, the people as well as the Court have shown their concern about the situation arising out of industrial growth and pollution. Industrial accidents involving environmental hazards give rise to judicial concern. The judiciary in India has played a very important role for the protection of environmental rights and has applied the principle of sustainable development while deciding the case. The judiciary has used the device of public interest litigation to provide a forum for legal action to overcome the legal standing or *locus standi* principle where the environmental right of a person is violated. The judiciary has adopted a balance approach to environment and development in recognizing environmental rights of the individual.

The real impetus on implementation of H&OWM Rules, 2016 in India came only after direction of Hon'ble Supreme Court (SC) that the industry not having valid authorization under the Rules will not operate and State Pollution Control Boards (SPCB) and Pollution Control Committees (PCC) have submitted details of hazardous waste generation.[8] The Supreme Court also directed to every State Pollution Control Board to prepare inventory of hazardous waste in their respective State and other

[8] Hon'ble Supreme Court of India WP(c) No. 657/95(order dated on 14.10.2003)

directions also issues for construction of treatment, storage and disposal facilities of hazardous waste. The MoEF&CC, CPCB, SPCB all these agencies are entrusted with the implementation of hazardous wastes management system across the country.

The Pollution Control Board of Assam, constituted in 1975, is the main agency responsible for the administration and implementation of Acts and Rules pertaining to environment in the state of Assam. It has played pivotal and significant role in implementation of HWM Rules. The boar has to provide strict glance in the activities of hazardous wastes generating industries so that ecological balance would be maintained in the region. The state has generated 50,576.5 MT of wastes from the ninety one hazardous wastes generating industries around the state for the year 2017-2018. Although the state does not generate a large quantity or variations hazardous wastes in comparison to more developed states of India. It is found from the observation that there are a number of anomalies in the functioning of board. Over the years the board has not in possession of total quantity and number of hazardous waste generation and generating industries in Assam. The existing infrastructure requires strengthening for effective implementation of H&OWM Rules, 2016 in Assam.

Despite a furry of legislation, the truth remains that the regulatory measures have failed to combat environmental degradation. Practical problems emerge in implementation of the H&OWM Rules. A periodical internal audit should be conducted for identifying non-compliance and addressing them efficiently. It is not enough to protect the country from the import of hazardous wastes; we should also look carefully at the import of those industries that will generate problematic hazardous wastes. Particular care must be taken by the regulatory authority to prevent

industries that use our Indian soil for processing of products and commodities. Units which propose to engage in this activity should not be permitted or licensed under any circumstances. The Rules should effectively prevent this. The legislative measures designed to control and abate environmental pollution due to hazardous substances and waste have failed to achieve the objectives of the National Policy on Environment; and existing mechanism need to be replaced by a more effective one.

India just has started to work and it is very complicated to manage due to economic condition which is very critical. Safe and scientific disposal of waste is a critical and pressing issue in India. Landfill and incineration are most popular, easy as well as cheap method of hazardous waste disposal. It is very useful method in developing but also has a risk of contamination of ground water and surface water that leads to health and environmental threat. Operation of incineration plant causes air emission and toxic residue. Modern scientific incineration plant is also expensive for developing country.

Creation is never ending nature of human activities that result in generation of wastes. It would not be a problem if nature’s own treatment processes like dispersion, dilution and degradation are possible. Due to modern industrial processes, generation of wastes is contained critical chemicals that needed proper scientific treatment. If modernization is for our well being then such hazardous chemicals or products should be managed environmentally sound manner. The organization and industries has had great role for modernization of a society. Such organization and industries must have authorization certificate for disposal of hazardous waste from concerned pollution control board. More attention should be given on maximization of production, recovery and minimal disposal of hazardous waste.

1.1. Meaning and concept

A used or discard material that can damage the environment and behaviour of health is known as hazardous waste. It may be an unusable or unwanted material from any production or consumption process that have adverse characteristic. It includes heavy metals and toxic chemicals used in the industrial product and processes as well as radioactive material such as spent nuclear fume etc. it may based on origin, component, and characteristic of waste. Hazardous waste is term applied to those wastes that because of their chemical reactivity, toxicity, explosiveness, corrosiveness, radioactivity or other characteristics constitutes a risk to human health or the environment. Hazardous wastes management is a very important issue and is assuming significance globally. The adverse impacts caused due to the indiscriminate disposal of hazardous wastes are considered as technological disasters.

To see the gravity of problem the hazardous wastes regulation in India has been developed continuously by including new provisions and items in the legislation through its various amendments that can be easily illustrated by comparing the definition of the hazardous wastes as stipulated in rules;

1. **1989:** "Hazardous Wastes" means any waste which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes or substances, and shall include waste specified in column (3) and of Schedule I; wastes listed in Schedule II if their concentration is equal to or more than the limit indicated in the said Schedule; and wastes listed in 'A' 'B' of Schedule 3 (Part A) applicable only in cases of

import and export of hazardous wastes under rule 12,13,14 if they possess any of the hazardous characteristics listed in Part B of Schedule III.[9]

2. **2008:** "Hazardous Wastes" means any waste which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes or substances, and shall include waste specified in column (3) and of Schedule I; wastes listed in Schedule II if their concentration is equal to or more than the limit indicated in the said Schedule; and wastes listed in 'A' or 'B' of Schedule III applicable only in cases of import and export of hazardous wastes under rule 12,13,14 or the wastes other than those specified in Part A or B if they possess any of the hazardous characteristics specified in Part C of that Schedule 3.[10]
3. **2016:** "Hazardous Wastes" means any waste which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes or substances, and shall include waste specified under the column 3 of Schedule I, wastes having equal or more than the concentration level specified for the constituents in class A and B of Schedule II or any of the characteristics as specified in class C of Schedule II; and wastes specified in Part A of Schedule III in the matter of import and export or the wastes not specified in Part A but exhibit hazardous characteristics specified in

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[9] Rule 3(14) of The Hazardous Wastes (Management and Handling) Rules, 1989

[10] Rule 3(1)(l) of The Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008.

Part C of Schedule III of the Rule**s.**[11]The draft rule of 2016[12] does not include: a/ wastewater, exhaust gases. b/ The waste arising out of the operation from ships beyond five kilometers of the relevant baseline. c/ radioactive waste. d/ bio-medical wastes. e/ municipal solid waste.

The H&OWM Rules of 2016 states that it will not be applicable to the wastes as covered under Merchant Shipping Act 1958 i.e. wastes arising out of the operation from ships beyond five kilometers of the relevant baseline. The rules do not cover hazardous wastes arising from the end-of –life ships, as covered under Basel Convention. India has banned 29 items under the HWM Rules of 1989 whereas the convention banned import of 76 items. Furthermore, the Supreme Court directed that the government should incorporate Basel list in the existing rules and should expand the list of prohibition items for import. Instead of amendment, the government tries to import hazardous wastes freely if it is only meant for recycle, reuse and recovery. The H&OWM Rules of 2016 totally ignored the matter of cleanup of hazardous wastes dump site, development of national inventory for such dump sites, legal measures against damages arising out of transportation, handling and disposal of hazardous wastes, online monitoring of such activities etc.

Hazardous substances and Waste management is a very significant and controversial issue in India. Before 1989 there was no legal mechanism in India to regulate hazardous waste generated by households, hospitals, industries and plants. In

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[11] Rule 17 of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.published in the Gazette of India, extraordinary part II, section 3, sub-section (i)

[12] The draft rule of 2016 was published by the Government of India in July 24, 2015. It was published in the vide number G.S.R. 582(E), in the gazette of India, Extraordinary part II, section 3, sub-section (ii).

the year 1989, the Central Government of India notified HWM Rules, 1989 under the provision of EPA of 1986, to direct the occupier generating hazardous wastes to take all practical steps to ensure that such wastes are properly handled and disposed of without any adverse effects which may result from such wastes and the occupier shall also be responsible for proper collection, reception, treatment, storage and disposal of these wastes either himself or through the operator of a facility. Subsequently, these Rules have been amended later in several years.

Environmental policy encouraging hazardous waste reduction began in 1976 with an Environmental Protection Agency (EPA) statement promoting source reduction as the preferred method of hazardous waste management. In order to best protect public health and the environment without unfairly burdening the people of developing countries, policy makers of all developed and developing nations must redesign the approach to hazardous waste management and to create awareness among them. Keeping the environment and people safe from harmful substances and hazardous wastes goes beyond management. It means working to avoid these dangers entirely by removing them, wherever possible, from production and use.

According to Resource Conservation Recovery Act[13] these are not included in the hazardous solid waste if it is a house hold waste, agriculture waste return to the soil and fertilizer, mining over burden return to the mine site fly ales, scrubber sludge, waste associated with the production of crude oil gas or the geo-thermal energy, the waste which fall the test for toxicity characteristic, waste from extraction,

[13] The Resource Conservation and Recovery Act 1976, which is the principal federal law in the United States that governs the disposal of solid waste and hazardous waste.

beneficiation and processing of ors and minerals and distillation bottoms. According to the legal definitions of waste in most international convention combine objectives and subjective elements and as a general criterion, are based on the actual, intended or legally required disposal of the substances or materials in question[14]. The characteristics of hazardous waste are as follows:-

1. **Reactivity:** The wastes that are hazardous due to the reactivity characteristic may be unstable under normal condition. It may react with water, give off toxic gases, capable of detonation or explosion under normal condition or when heated.
2. **Toxicity:** Even in a very small or grass amount the hazardous wastes may have acquit effect causing death or violent illness or it may have chronic effect slowing causing irreparable damage whenever harm. Some are the carcinogenic and causing cancer after many years of exposed.
3. **Ignitability:** wastes that are hazardous due to the ignitability characteristic include liquids with flash points below 60^0C, non-liquids that cause fire through specific conditions and ignitable compress gases and oxidizer.
4. **Corrosives:** corrosive waste includes strong acidic or alkaline substances. It destroys solid material and living tissue upon contact by chemical reaction.

The problem of hazardous waste is large and diverse. It may be solid, liquid and gaseous form. According to the Basel Convention hazardous waste means any wastes that possess following characteristics[15]:-

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[14] Basel convention Article 2(1); Bamako Convention Article 1(1), OECD Council Decision C(2001)107/ Final, A(1); EU Directives 2008/98/EC, Article 3(1)

[15] All these wastes with hazardous characteristics listed in Annex III of the Basel Convention.

1. Explosive
2. Flammable
3. Flammable Solid
4. Combustible
5. Oxidizer
6. Organic peroxide
7. Poison
8. Infectious substance

Basically there are three types of hazardous waste. These are:-

1. **Chemically hazardous**: These types of hazardous are poisonous if we eat them, we die. Such as heavy metal one of the of course is lead and lead causes a lots of problem particularly as we used in petrol as the car run through street and they exhaust fume which is contain of lead. Therefore we breathe such lead which is not good for our health. Lead content of our body is increased.
2. **Physically hazardous**: It comes to be really ferocious after the invention of nuclear weapon and the radioactive material comes from their reaction. On clock there are small amount of radium that is very radioactive and quite dangerous. This kind of thing has increased quite a lot over the last few decades and now it is significant. It includes things redial, micro waves from mobile phones and cell phones. Current of manganese electricity, radiation from magnetic field are the example of physically hazardous wastes.
3. **Biologically hazardous**: It is one we had for longest because all we have biological hazardous. Before human dies in diseases which is carried by viruses,

bacteria produced by human and animal waste. A practical society must have to separate the drinking water from waste water is a very healthy society.

The options for handling hazardous waste are as follows:-

a. **Measures that prevent generation of waste**: This can be done by the product manufacture to reduce hazardousness, by modify manufacturing process by following green chemistry, increase efficiency, new business models. Prevention can also be implemented by influencing consumer behaviour to choose products do not contain hazardous material.

b. **Recovery and recycle of the waste constituents**: Recovery, recycle, treatment, and disposal of hazardous waste due to recollections of beneficially bio products of the products and some gases are released directly into the atmosphere. So we can either recycle or reclaim as a bio product which can be useful in the other processes. Recycle is the best process to control pollution and to utilize the waste material for the other processes. Destruction and treatment and conversion to non hazardous waste form and disposal either on the landfill site or storage and the treatment storage and disposal facility, waste reduction and minimization and the waste treatment.

1. 1. 1. Sources of hazardous waste

In 21st century, there are growing concerns with different kind of hazardous substances and wastes that pollutes environment. India is a developing country, and industries is a major source of hazardous waste in developing countries, but industrial hazardous waste sources presents greater risks in developing countries than in developed countries because of poor management and obsolete technologies,

multinational companies often set their plants in developing countries so, that they can use technologies banned in their country. The accident at the Bhopal plant in India, which belonged to union carbide of USA, is a prime example of this situation. The major source of hazardous wastes in our country is industrial activities, agriculture and agro-industries, commercial centers, and the informal sector. Small competitive and labour intensive businesses that are not regulated by government are the source of hazardous waste that is currently recognized as major problem in developing countries.

Hazardous waste arises from multiple sources. The sources of hazardous wastes cover a wide range of substances and materials. Chemical manufacturing, petroleum and coal product manufacturing, mining, quarrying or dredging activities, pulp and paper industries, pharmaceutical industries, and small scale business such as car workshops, leather tanning electroplating of metals, photofinishing etc. In spite of its voletively low share its impact should not be neglected. The sources of hazardous wastes are listed in rule 3(14) (a) of schedule 1 of the HWM Rules of 1989.

The sources of hazardous wastes are listed by Environmental Protection Agency which includes:-

1. **Specific sources of waste**: Such type of wastes is called ‘K’ wastes. This code identified industries such as wood preserving, petroleum refining, and organic chemical manufacturing. These wastes include wastes water, spent catalysts; wastes water treatment sludge from pigment etc.
2. **Non-specific sources of waste**: The EPA identification codes begin with the letter ‘F’ therefore non-specific sources are called ‘F’ wastes. These are generic

waste commonly produced by manufacturing and industrial processes. Most of these wastes are acutely hazardous due to the danger they present to human health and the environment. Benzene, methylene chloride, trichloroethylene, carbon tetrachloride are few of the solvents listed in f list.

3. **Commercial chemical products**: It is denoted by ‘P’ and ‘U’ code and includes specific commercial products or manufacturing chemical intermediates. Commercial pure grade chemicals or any formulations with either of chemicals as active ingredient are listed under these codes. ‘P’ list is differentiated from ‘U’ list based on quantity at which the chemical is regulated. An acute toxic waste whose generation exceeds 1 kg per month is fall under the P list unlike U list whose generation is 25 kg per month. It includes chemicals, chloroform, creosote, acids such as sulfuric and hydrochloric acids, and pesticides such as DDT etc. EPA has also ruled that listed hazardous wastes must be manages accordingly.

1. 1.2. Classification of Hazardous Waste

There are too many compounds, products and product combinations that came under the definition of hazardous wastes. Broadly hazardous wastes materials are categorized into two types; characteristic hazardous wastes; and listed hazardous wastes. Characteristic hazardous wastes are exhibit to one or more hazardous wastes likely ignitibility. Listed hazardous wastes are those waste recognized by authorities. According to the CPCB rise in application and manufacture of hazardous materials and its evident disposal issues, made way for the development of regulations on Hazardous waste (management and handling) Rules of 1989. The current rules on

Hazardous and Other Waste (Management and Transboundary) Rules of 2016 have replaced the older regulation. The new rules distinguish hazardous waste from other waste such as waste tires, paper waste, and metal scrap and used electronic teams. It ensures resource recovery and disposal of hazardous wastes in an environmentally sound manner. The general characteristics of hazardous waste are given in Table no. 1.

Table no. 1: The general characteristics of hazardous waste

Waste Categories	Type of wastes	Regulatory Quantities
Waste Category No.1	Cyanide Wastes	1 kilogram per year calculated as cynide.
Waste Category No.2	Metal Finishing Wastes	10 kilograms per year (the sum of the specified substance calculated as pure metal)
Waste Category No.3	Waste containing water soluble chemical compounds of lead, copper, zin chromium, nickel, selenium, barium and antimony	10 kilograms per year (the sum of the specified substance calculated as pure metal)
Waste Category No.4	Mercury, Arsenic, Thallium and Cadmium bearing wastes	5 kilograms per year (the sum of the specified substance calculated as pure metal)
Waste Category No.5	Non-halogenated hydrocarbons including solvents.	200 kilograms per year calculated as non-halogenated hydrocarbons.
Waste Category No.6	Halogenated hydrocarbon including	50 kilograms per year calculated as halogenated hydrocarbons.

Waste Category No.7	Wastes from paints, pigments, glue, varnish and printing ink	250 kilograms per year calculated as oil or oil emulsions.
Waste Category No.8	Wastes from dyes and dye intermediate containing inorganic chemical compounds.	200 kilogrammes per year calculated as inorganic chemicals.
Waste Category No.9	Wastes from dyes and dye intermediate containing organic chemical compounds.	50 kilograms per year calculated as organic chemicals.
Waste Category No.10	Waste oil and oil emulsions.	1000 kilograms per year calculated as oil and oil emulsions.
Waste Category No.11	Tarry wastes from refining and tar residues from distillation or pyrolytic treatment.	200 Kilograms per year calculated as tar.
Waste Category No.12	Sludges arising from treatment of wastewaters containing heavy metals, toxic organics, oils emulsions and spent chemicals and incineration ash.	Irrespective of any quantity
Waste Category No.13	Phenols	5 kilogrammes per year calculated as phenols

Waste Category No.14	Asbestos	200 kilogrammes per year calculated asbestos.
Waste Category No.15	Wastes from manufacturing of pesticides and herbicides and residues from pesticides and herbicides formulation units.	5 kilogrammes per year calculated as pesticides and their intermediate products.
Waste Category No.16	Acids/alkalies/slurry	200 kilogrammes per year calculated as acids/alkalies.
Waste Category No.17	Off specification and discarded products.	Irrespective of any quantity.
Waste Category No.18	Discarded containers and containers, liners hazardous and toxic wastes.	Irrespective of any quantity.

Source: Rule 3(1), 3(n) and 4 of Hazardous Waste (Management & Handling) Rules 1989

1.1.3. Hazardous waste and its effects on environment and human health

Today the entire world is worried about the deterioration and depleting condition of environment. The protection and improvement of environment has become a major issue which affects the well being of the people and economic development. There is an increased focus from regulators towards the need for sustainable environment. Industrialization has increased pollution of air, water and soil. The disposal of untreated industrial effluents into environment has caused a lot of

damage to the soil and vegetation. Soils have become highly saline in nature due to open effluent discharges. The concentration of sulphates, chlorides, sodium and electrical conductivity was abnormally high. Proper handling and disposal of hazardous waste as a reasonable cost within the minimum adverse effect on the environment can only be possible by appropriate management.

Nature reserves immense potential to manage ecological balance. At a one time there was a perfect ecological balance of nature. With the growth economic power and unplanned industrial development the pressure on natural resources has increased considerably. Today, human have faced havoc situation due to the ecological imbalance because increasing human activities are augmenting the risk of natural disasters in the ecologically sensitive regions. It is evident that the incident of Kedarnath triggered by cloudburst in June, 2013 had created devastation. Very recently the cyclone creates a havoc situation in Orissa and Andhra Pradesh, thousands of people and cattle, houses and villages vanished forever. Such disaster are happening or waiting to happen, along the entire coastline of India. Most important thing is that people's awareness towards environmental pollution and active participation in a systematic and non-violent manner for the protection of environment is need of hour.

Every person has a right against discharge of pollutant emissions from industries and other operations. No person carrying on any industry shall discharge any environmental pollutant in excess of standards as prescribed.[16] The hazardous wastes generating industries has statutory obligation for not to generate or handle

[16] Section 7 of the Environment Protection Act, 1986.

hazardous wastes in excess of prescribed standard by the regulatory bodies in India.[17] H&OWM Rules 2016 provides procedure and safeguard for accident prevention and handling of hazardous wastes. The Central Government has laid down guidelines and specific standard for the hazardous wastes generating industries make it responsible as well as liable for any kind of accident or damage due to the leakage or discharge of hazardous wastes from their premises. The Central Government has laid down industry specific standards for the emission of discharge of environmental pollutants.[18]

Industrial sector has intrinsically linked with the Indian economical growth. Such industries are inherently polluting our environment. Industrial processes result in use and formation of dangerous toxic wastes that increases risk and threats to public health. It is hence imperative that we need to adopt proper wastes management strategies. Risk and threat can be reduced through adopting scientific management practices in designated facilities. Improper management of hazardous wastes may directly lead to air, water and soil pollution. Hazardous substance may contaminate ground and surface water or may even be introduced into food supply thereby poising major human health risk. It is highly toxic and considered to be harmful so that should be managed or disposed scientifically to reduce effects on environment and human health. Various possible effects have been studied by several government or private organizations or individual researchers. Identification of contaminants of emerging concerns (CESs) that are likely to be found in future hazardous waste sites is need of hour. There are significant research gaps in detection and quantification, health and

[17] Section 8 of the Environment Protection Act, 1986

[18] Rule 3 of theEnvironment Protection Act, 1986

risk assessment for CESs. Therefore careful consideration of programmatic efforts to identify, evaluate and manage CESs of hazardous wastes sites that focus on a holistic approach. Currently, no fixed screening list of chemicals has been developed for the U.S. EPA. Therefore a few chemicals are screened during site characterization which in some cases may increase exposure to CESs[19]. Exposure to hazardous wastes can lead to behavioral abnormalities, cancer, genetic mutations, birth defects etc.

Identification and quantification of different categories of hazardous wastes generated from the industries is the first and foremost scientific step of efficient management of such wastes. Rule 6 of the H&OWM Rules, 2016 provides for regulatory document for tracking of quantity of generation, dispose, recycle, co-process, reuse, utilize etc. of hazardous wastes. Assessment of various steps of production is required to identify different categories of hazardous wastes. Some time it is found that paint shop and paint sludge are listed as hazardous wastes in the authorisation certificate but other associated wastes such as wastes solvent, empty drums containing paint or solvent, containing cotton rags gets escaped. The workers are used to wash the escaped material leading to adverse impact on health and environment. Unscientific disposal of hazardous wastes contains heavy metal and carcinogens which may affects genes thereby posing threat to future generation like reproductive abnormalities, physical deformities, permanent disorder or even death also.Table no. 2 defines various possible effects of hazardous wastes to human health.

[19] Wendell P. Ela, David L. Sedlak (*et.al.*)," Towards Identifying the Next Generation of Superfund and Hazardous Waste Site Contaminants" 119 Environmental Health Perspective, 7 (January 2011)

Table 2: Health effect of Hazardous Waste

Hazardous waste	Source	Health effects
Heavy metals		
Arsenic	Mining, non anthropogenic geo-chemical formation	Carcinogenic, cardiac disorders, anemia,
Cadmium	Mining, fertilizer industry, battery waste	Carcinogenic, damage to livers and kidneys, chronic obstructive pulmonary diseases, cardiovascular and skeletal disorders.
Chromium	Mining areas, Tanneries	Kidney damage, skin disease, acute tubular damage.
Lead	Lead acid battery smelters	Lead poisoning, neurotoxic, mental impairment in children, damage to brain, kidney and liver
Manganese	Mining areas	Respiratory disease, neuropsychiatric disorder
Mercury	Chlor-alkali industries, health care institutes	Hg poisoning affects human brain, central nervous system, kidneys and liver. High Hg exposure causes vision, speech and hearing impairment. May lead to death
Nickel	Mining, metal refining	Lung and nasal cancer, damage to gastrointestinal system, cerebral edema, respiratory failure

Hydrocarbons		
Benzene	Petrochemical industries, solvents	Headaches, nausea, leukemia, damage to bone marrow
Vinyl chloride	Plastics	Carcinogenic (liver and lung cancer), depression of central nervous system, embryotoxic
Pesticides	Insecticides	Cancers, genetic damage, stillbirths, immune system disturbances, embryo damage
Organic chemicals		
Dioxins	Waste incineration, herbicides	Cancer, birth defects, skin disease
PCBs	Fluorescent lights, E-waste, Hydraulic fluid	Skin damage, possibly carcinogenic, gastro-intestinal damage

Source: Shantanuk K Dutta, VPupadhyan (et.al) "Environmental Management of industrial hazardous wastes in India" 48 JES&E 147 (2006)

The existing mechanisms are turning out to be a serious environmental and health hazards. It is also found that there are substantial or potential threats to public health and environment due to improper management of hazardous wastes. Lack of proper infrastructure and strict enforcement mechanism has led to hazardous wastes still remaining a grave problem. Development of common Treatment, Storage, Disposal Facility (TSDF) and secured landfill are suitable option for environmentally sound management of hazardous wastes. National environment policy 2006, emphasized on the collection and treatment system of recycling wastes. Therefore, the

situation calls for to pay attention on minimization of generation and maximization of recycle, reuse and recovery of hazardous wastes.

1.1.4. Environment impact assessment

The industry driven economy of India has resulted in hazardous waste problems, which are difficult to manage in an environmentally friendly manner. Problems, due to hazardous wastes are likely to become serious in near future in India. There exists an urgent need for a detailed assessment of the current and future scenario including quantification, characteristics, existing disposal practices, environmental impacts etc. Proper treatment, storage prior to treatment or disposal of hazardous waste is the need of the hour. Guidelines are available in India for management and handling of HWs. Reduction and minimization of hazardous wastes is absolute requirement in today's world. Historically, some hazardous wastes were disposed of in regular landfills, oceans; open dumping etc. which resulted in unfavorable amounts of hazardous materials seeping into the ground. Another important role that the MoEF&CC has to play is to create awareness in society and other stakeholders at large, and to ensure educational training programs. The latter should certainly cover those directly concerned with implementation programs, e.g. environmental scientist, officials' etc.

The present trend in the developed countries clearly depicts a shift from 'land filling of waste' to cleaner production technologies. Considering the present industrial scenario, it may also not be possible to make the transition to clean technology at the present moment. But, it is possible that the government declares and takes steps to ensure that expansion of hazardous waste generating industries and new industries of

similar nature is discouraged. All the states are required to inventoried the current hazardous waste generation in terms of recyclable, incinerable and disposable waste and project the figures for the forthcoming decades. However, since this is not sustainable in the long run, the entrepreneurs are bound to shift away from waste intensive processes to cleaner production technology.

There is an urgent need for formulating proper hazardous waste management strategies, implementation of hazardous wastes management regulations and establishment of proper hazardous waste treatment and disposal facilities for controlling the unscientific disposal of hazardous wastes. While formulating integrated solutions, it is important that we consider the time period associated with various technologies and methods, and their applicability. Planning at the national and local levels to deliver long term solutions should maintain focus on addressing the immediate problems.

Environmental Impact Assessment (EIA) originated in the United States in 1969 and has become one of the most successful legal mechanisms for protecting the environment globally[20].It is a crucial instrument of environmental policy to analyze the likely impact of various actions on the environment. The EIA is a decision tool employed to identify and evaluate the probable environmental consequences of certain proposed development actions. The first formal EIA system was established on the 1st January 1970 by the US National Environmental Policy Act[21] (NEPA).

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[20] K.K. Jayasshankar and Philip Johnson, *Environmental Law* 201 (Pacific Books International, Delhi, 1st edn., 2011)

[21] It is the United State environmental law of 1969.

The EIA identifies and evaluates any potential environmental impacts and, when appropriate, proposes measures to mitigate negative impacts. The need for safe, responsible, and sustainable management of wastes is vital in order to eliminate health hazards and adverse ecological effects. This EIA study was conducted according to the guidelines set in the proposed draft EIA decree. It describes the policy, legal, and administrative frameworks, the proposed project, and the existing environmental conditions, identifies potential environmental impacts, proposes alternatives, and recommends an environmental management plan with mitigation, monitoring, institutional and capacity building schemes.

The Environmental Impact Assessment has been used as a management tool to minimize adverse impacts of the developmental projects on the environment and to achieve sustainable development through timely, adequate, corrective and protective mitigation measures. The MoEF&CC has used Environmental Impact Assessment Notification 2006 as a major tool to regulate rapid industrial development of the country for minimizing the adverse impact on environment and reversing the trends which may lead to climate change in long run. The developmental projects have been categorized into category ‘A’ and category ‘B’ depending on their threshold capacity and likely pollution potential in the re-engineered. Category A projects are looked into by central government. Category B projects are looked into by state government. Category B is further sub-divided into B_1 and B_2. B_1 required public hearing and B_2 don’t require.

The EIA notification of 2006 required prior Environmental Clearance (EC) from MoEF&CC or the concerned State Environmental Impact Assessment

Authorities. Further the notification provided for screening, scoping, public consultation and appraisal of project proposals. Amended EIA Notification 2009 With a view to further simplify the procedure for obtaining the environmental clearance without compromising or diluting the regulatory framework, the EIA notification has been amended in December, 2009. It exempts the biomass based power plants up to 15 MW, power plants based on non hazardous municipal solid waste and power plants based on waste heat recovery boilers without using auxiliary fuel from the EC process.

In 1994, the Ministry of Environment and Forest released Environmental Impact Assessment notification to take environment Clearance for projects from centre or state level to strengthen environmental protection. Initially the EIA programme was not respond due to lake of public participation. It is a much elaborated process involving many steps in India. These are screening, preliminary assessment, scoping, main EIA. A development project must have with an EIA report based on which it may be either comprehensive or rapid EIA. A comprehensive EIA report incorporated data of all four seasons of a year. A rapid EIA report has only one season data and is required in India. This report is submitted to the regulatory agency and the authority based on this report may decide whether it go for formal EIA or not.

The project needs EIA or not is the first process called screening. It includes value of investments, environmental consequences due to the project, technical processes etc. it could decide whether the developer will proceed for next step i.e., preliminary assessment. It involves sufficient research on available data to evaluate the importance of environmental impact. After this assessment, the expert group engaged with the other bodies such as local people, scientific institution etc. to study and

address all the issues is called scoping stage. After this stage the group would select the primary impacts for main EIA. It requires a cycle of questions until scientific solution are reached. Completion of this stage the developer has to submit 20 copies of summary of EIA to the SPCB to conduct public hearing. The board shall provide NOC to the developer if it fulfils all necessary requirements. Then the developer can submit application to get environmental clearance to construct the project.

In keeping with the aim of 'Digital India' Hon'ble Prime Minister has launched single-window integrated environmental management named 'PARIVESH' for complete online, expeditious and transparent system for environment, forest, wildlife and coastal regulation zone clearance in the country to facilitate speedy, transparent and informed decision making[22].

1. 2. Objectives of the Study

In order to investigate the role of State Pollution Control Board of Assam in implement the Hazardous waste management rules in Assam, to control environmental degradation caused by various hazardous wastes generating industrial activities, in mitigating the effects of such degradation through its regulatory and oversight functions, a research work has been carried out on the topic **"Role of State Pollution Control Board of Assam in implementation of Hazardous waste Management Rules: A Study".** This scientific study focuses on the current status, problems and challenges, policy issues, and future strategies for improvement in hazardous waste management system in Assam.

[22] Government of India, Report: Annual Report 2018-19(MoEF&CC)

The objectives of the present research work are to find out whether;

- State Pollution Control Board of Assam and concerned stakeholders complied with Acts, Rules and regulations amended and notified by the Central Government and state government relating to Hazardous waste management from time to time.
- Effective mechanisms are in the Hazardous waste management rules to be exercised by the State Pollution Control Board of Assam to minimize environmental hazards.
- There are any other causes, facts and factor for non-implementation of the Hazardous waste management rules by the State Pollution Control Board of Assam.
- The role played by State Pollution Control Board of Assam for implementation of the Hazardous waste management rules is satisfactory or not.

1.3. Purpose of the Study

The Pollution Control Board of Assam is responsible for formulation of policies regarding environmental protection and other functions including inspection of industries is important function amongst other. It is also responsible for implementation of programmes to prevent, reduce, minimized the generation of hazardous waste. There is periodical analysis of the impact of environmental degradation and remedial measures which need to be implemented by the board. The board needs to initiate any tangible step to control improper management of hazardous waste across the State. It is observed from considerable number of research work that there are various studies relating to the Hazardous Waste Management Handling and Disposal Rules but the researcher flees that no interest had been involved on

Implementation of Hazardous Waste Management Rules in Assam. However, it was observed in Audit report that despite, the alarming levels of hazardous waste handling and disposal in Assam, the PCBA failed to prepare any action plan for implementation of hazardous waste management rules. It demands bolder action from the board to combat the impact of improper management of hazardous waste before it is too late. This study is an enquiry into this problem.

It looks into possible options for implementation of hazardous waste management rule in Assam. The board should take a lead in the race to tackle the problem. It is therefore essential to address the problem. Though the rules are amended severally but there is a feeling that these amendments do not go far enough to extinguish the fear and apprehension of the people. Another important thing is that the role of pollution control board of Assam in implementation of hazardous waste management rules in the State need to be examined, the researcher feels. In view of the above, a scientific study will enable to fulfill its mandate need to be analyzed. Therefore the researcher feels that such a study will have much more importance to effective working of the board. However no such extensive academic research evaluation in the opinion of the researcher has been undertaken till date. Hence, the present study is undertaken. It is also endeavored to study the various aspects of the laws or rules relating to the HWM.

1. 4. Literature review

A considerable number of studies regarding the functioning of PCBs, rules, regulations and implementation of hazardous substances and waste law in India have been conducted by academicians, environmentalist, human rights activist, social scientist, research scholars as well as Human Right commission (HRC) in India,

MoEF&CC etc. Some of the previous research work, outcomes and evaluative work are presented

Books

Paul E. Rosenfeld. Lydia G.H. Feng in their book *Risk of Hazardous Wastes*[23] the author emphasizes that since 1978, Corporations and Government agencies to some degree have continued to release Hazardous Waste into our environment and there were case studies and records of Hazardous Waste Management. It explains the legislations and regulations relating to Hazardous Waste as well as describes deficiencies in policy and regulations that assists this researcher to understand current scenario. The book provide a look into some of the major generators of Hazardous Waste, explained the path ways by which humans and wild life are exposed and includes discussions of the adverse health effects linked to these pollutants. Finally it provides a discussion of measures that will be necessary to control society's Hazardous Waste problem.

Lawrence K.Wang, Yung-Tse Hung, *et.al.*, in their book *Hand books of Advanced Industrial and Hazardous Waste Treatment*[24] the authors has featured the major industries and hazardous pollutants that have significant effects on the environment and public health. The handbook forms complete and up to date resources that contains all the necessary information on hazardous industrial waste treatment. This researcher's observations on the environment and health effect of hazardous wastes have much more similarity with the authors view. It covers basic and

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[23] Paul E. Rosenfeld and Lydia G.H. Feng, *Risk of Hazardous Wastes*(ELSEVIER: UK, 1st edn., 2011)

[24] Lawrence K.Wang, Yung-TseHung, *et.al*., *Hand book of Advanced Industrial and Hazardous Waste Treatment* (CRC Press Taylor & Francis Group, Boca Raton, London, New York, 1st edn. 2009)

advance principles and applications in contemporary hazardous and industrial waste treatment and latest developments in legislation, regulations and much more.

Michael D. LaGrege, Phillip L. Buc Kengharu, *et.al.,* in their book, *Hazardous Waste Management*[25] stated that Management of Hazardous Waste has changed dramatically since the 1960s and continued to evolve as our knowledge of both the hazardous and management methods grows. This book provides a comprehensive introduction to Hazardous Waste Management. The author provides a sufficient background to students so that they begin to think about how to approach Hazardous Waste problems rather than provides simple cookbook solutions. The book is an historical understanding of the field of Hazardous Waste Management.

Denah Shelton, Alexendre Kissin in the book *Judicial Handbook on Environmental Law*[26] appreciated that the specific character of environmental problems will necessarily differ from one country to another and that environmental legislation and case law will thus also differ from jurisdiction to jurisdiction. It includes information on international and comparative environmental law and references to relevant cases. In short, the handbook attempts to identify a common core of law and policy most relevant to the world's judiciary, in the hope that judges might be better equipped to discharge their key role in breathing life into those environmental requirements upon which the world's collective heritage depends.

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[25] Michael D. LaGrege, Phillip L. Buc Kengharu ,*et.al*., *Hazardous Waste Management*(Wareland Press, INC. Long Grove, Illinous, 2nd edn., 2010)

[26] Denah Shelton, Alexendre Kiss, *Judicial Handbook on Environmental Law*(United Nations Environment Programme,UK, 2005). Book Judicial-Handbook-Environmental-Law. pdf. *available at:* http://books.google.co. (Visited onFebruary 2, 2017)

L.V. Gangawane, V.C. Khilare (ed.s), in *Sustainable Environmental management:Dr. Jayashree Deshpande Fertschrift Volume*[27], in the Chapter 16 of book the author emphasis on major sources of Hazardous Waste and its adverse impact on the environment. They emphasized on the need of scientific disposal of waste and policies to encourage waste minimization and adoption of cleaner technologies.

Anand S. Bal in his book *An Introduction to Environmental Management*[28] stated that lower emphasis on Hazardous Wastes Management practices in previous decades resulted in the creation of several environmental contamination problems that need to be addressed today. Some industries still continue to generate large quantities of hazardous wastes, to the point that there is a crisis situation with managing such wastes. Lacks of facilities, manpower and infrastructure are required for proper surveillance on the part of government agencies, with regards to such industries, is one of the reasons behind these pollution aspects. The author's points are matched with this researcher's observations about the infrastructure of the government agencies. However, ultimately it can be considered that taking proactive measures such as formulation of good waste management program and pollution abatement strategies and policies can minimized the extent of their harmful effects. Several types of regulatory decisions including framing of policies have to be taken for implementation of Hazardous Wastes Management programs.

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[27] L.V. Gangawane, V.C. Khilare (ed.s), *Sustainable Environmental management: Dr. Jayashree Deshpande Fertschrift Volume*, (New Delhi: Daya Publishing House, 3rd edn. 2007)

[28] Anand S. Bal, *An Introduction to Environmental Management* (Himalaya Publishing House, Mumbai, 1stedn. 2005)

N.L.N.S. Prasad and V.T. Darlong, in their work *Industries and Eco-Degradation in the North East-An analysis*[29] emphasizes that the industries set up in the Northeast have definitely contributed to the development of the region to some extend vis-a vis eco-degradation of the region. Particularly chemical and cement industries have a cumulative effect on the flora and fauna. In case of oil refinery established during British Rule had no in built processes or provision for pollution control equipment and wastes treatment plants to suffice the treatment of wastes generated.

Mahesh Menon, ManjeriSubin Sunder Raj, *et.al.*, *Enforcing Hazardous Wastes Rules in India* [30], in this handbook the authors emphasizes that there is a fairly comprehensive legal and regulatory framework in place in India to address its Hazardous Wastes Management. Indeed, it has been remark that if the number of laws were any measure of their effectiveness India would have one of the cleanest environments in the World. India is facing several challenges in ensuring compliance and effectively enforcing its hazardous wastes laws. The purpose of this handbook is to provide tools to State Pollution Control Boards to assists in their day to day enforcement duties.

Articles

P.M. Prasad, in his article "Environment Protection: Role of Regulatory System in India"[31] has found that the Central Pollution Control Board(CPCB) and

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[29] Zahid Husain (ed.), *Environmental Degradation and Conservation in North East India* (OMSONS publications, New Delhi, 1st edn. 1996)

[30] Mahesh Menon, ManjeriSubin Sunder Raj, *et.al., Enforcing Hazardous Wastes Rules in India*(Environmental Law Institute: Washington, D.C, May 6, 2014), eli-nlsiu-enforcing-hazardous-wastes-riles-india-handbook.pdf. *available at:* www. eli.org. (Visited on May 11, 2017)

[31] P.M. Prasad, "Environment Protection: Role of Regulatory System in India"41 *E&PW* 1280(2006)

Andhra Pradesh Pollution Control Board have been unable to improve environmental quality effectively because of an increase in their responsibilities, absence of deterrence mechanisms and inadequate human and financial resources. Although the board provides expert opinion to the courts about the state of affairs of environmental pollution, some of the officials conceded that their expert reports may hide factual information about the polluting industry. The PCBs also do not provide citizens information about the activities of polluters. For instance, disclosure of information about the industries may create panic amongst the public. In addition, they argue that the disclosure of information about the negative externalities of the polluters may be exploited by rival/competitive industries. However, dissemination of information about polluters is the bedrock function of the PCBs.

Priti Mahesh in her article "proposed hazardous waste management rule a real hazard to environment"[32] It has found that the hazardous waste generated in the country per annum currently is estimated to be around 8 million tonnes out of which 70% is being generated by five states, namely Gujarat, Maharashtra, Tamil Nadu, Karnataka and Andhra Pradesh. Only three States have developed common TSDF (Treatment, Storage, Disposal Facility), which are essential component of proper hazardous waste management activity for ultimate disposal of the hazardous wastes in an environmentally sound manner. Though the Hazardous Wastes (Management & Handling) Rules were notified in 1989, the implementation on the ground has left a lot

[32] Priti Mahesh, "proposed hazardous waste management rule: a real hazard to environment", *available at:* www.toxicslink.org (Visited on March 4, 2017)

to be desired. Lack of proper infrastructure and strict enforcement mechanism has led to hazardous waste still remaining a grave problem.

Shantanuk Dutta (et.al.) in his article "environmental management of industrial hazardous wastes in India"[33] have found that Hazardous wastes are considered highly toxic and therefore disposal of such wastes needs proper attention so as to reduce possible environmental hazards. Inventorisation of hazardous wastes generating units in the country is not yet completed. Scientific disposal of hazardous wastes has become a major environmental issue in India. He tried to give details about the hazardous wastes management in India.

Shalini Rawat (et.al.) in their article "Hazardous Waste Management Handling and Disposal"[34] has been found that there is no proper secured landfill facility available in India to dispose of hazardous waste till 1997. Very few industries in India, mostly in large scale and a few in medium scales, own proper treatment and disposal facilities. A common waste treatment and disposal facility such as Treatment, Storage and Disposal Facility (TSDF) for management of HWs generated from industries is one of the useful options.

VinishKathuria, G S Haripriya on their research work "Industrial Pollution Control Choosing the Right Option"[35] has found numerous laws enacted and policy statements issued in the last 30 years or so to check environmental degradation and the

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[33] Shantunuk Dutta, V P Upadhayay (et.al), "Environmental Management of Industrial Hazardous Wastes in India",48 *JoES&E*,143(2006)

[34] Shalini Rawat, Rajesh Yadav, et.al., "Hazardous Waste Management Handling and Disposal" 3 *SSRG-IJCE* 205 (2016)

[35] VinishKathuria , G S Haripriya, "Industrial Pollution Control Choosing the Right Option" 35 *E&PW* 3870 (2000)

numerous institutions set up to implement these laws have failed to control the pollution. The entire effort holds the command and control type regulations and enforcement of standards to be sacrosanct. The state PCBs are empowered by the MoEF&CC as monitoring and implementing agency to act on its behalf and can demand information from any person or industry about the amount of discharge of effluents into a stream or on land and details about the installation and operation of pollution control equipment.

Arya Tripathy (2015) in her *article "India: Waste Management In India: An Overview" has found that In India"*[36], It has found thatthe National Environment Policy, 2006 while suggesting measures for controlling various forms of environmental pollution lays emphasis on the need for collection and treatment systems for recycling wastes and devising measures for environmentally safe disposal of residues. Various practical problems emerge in the implementation of these rules. The applicable law is spread over a number of rules. These rules mandate separate authorizations for each scenario. In order to avoid adverse consequences such as revocation of authorization or prosecution, it is advisable that periodic internal audits and checks are conducted for identifying non-compliances and addressing them efficiently.

B.V Babu, V. Ramakrisna[37] in their article "Hazardous Waste Management in India" they focused on the physical model developed by the author for TSDF sites

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[36] AryaTripathy, "India: Waste Management In India: An Overview" has found that In India". *available at:* www.mondaq.com. (Visited on December 26, 2017)

[37] B.V Babu, V. Ramakrisna "Hazardous Waste Management in India", available at:https//www.researchgate.net/publication/2883921(Visiated on April 20,2020)

based on the guidelines available under the rules and regulation in India which help this researcher to analyze the proper TSDF and secured landfill facility in India. The author emphasized that selection of ideal sites confirming with the appropriate factors is a difficult task, few guidelines are available in India for selection of best sites for the same purpose.

Documents/Acts/Report

The Hazardous Wastes (Management and Handling) Rules, 1989, notified by the Government of India. The Rule empowered the State Pollution Control Boards to grant authorisation or to cancel authorisation for management of Hazardous and Other Waste if an occupier of a particular facility does not comply with the provisions of the Hazardous Waste (Management and Handling) Rules, 1989 and as amended in later years. The Rules mentioned the responsibility of the Government and occupier for environmentally sound management of Hazardous and Other Waste.

Report No. 3 of 2016, Government of Assam "*covering the period 2010-15 contains the results of performance audit of 'Environmental Degradation in the greater Guwahati Area with special emphasis on the role of Pollution Control Board, Assam."*[38]The Performance Audit revealed that though the Pollution Control Board of Assam was not short of funds, it had not fulfilled its role effectively. Instead of focusing on strengthening its technical manpower for carrying out the essential inspection of industrial establishments and scientific analysis of air and water samples,

[38] Report of the controlier and Auditor General of India:**"***performance audit* ***of*** *Environmental Degradation in the greater Guwahati Area with special emphasis on the role of Pollution Control Board, Assam."* (Report No. 3 of 2016, Government of Assam)

the Pollution Control Board of Assam had a disproportionately large non-technical staff which resulted in huge arrears in mandatory inspections. (Paragraph 2.1)

There was a shortfall of 68 per cent to 84 per cent in mandatory inspections of Industries conducted by the Pollution Control Board of Assam. In four out of nine industries jointly inspected along with Audit, effluent treatment plants were either not installed or not functioning resulting in discharge of untreated effluents containing oil, grease etc. into the water bodies. (Paragraphs 3.8 & 4.4.2)

Out of 243 hazardous waste generating industries, 185 industries (76 per cent) were functioning without obtaining authorisation from the Pollution Control Board of Assam. As a result, the Pollution Control Board of Assam was not in possession of information regarding the total quantity of hazardous waste generated in the State. (Paragraph 7.1)

There were 15 unregistered plastic manufacturing/ recycling units, but the Pollution Control Board of Assam had not taken any action against them. As a result, in Guwahati city, plastic carry bags of less than 40 microns were being sold/used openly despite a District Administration ban on such use. (Paragraph 7.2)

For implementing its mandate, the Pollution Control Board of Assam earns revenue comprising of Grants in aid from MoEF&CC/CPCB, State Government, reimbursement of water cess, consent fee, authorisation fee, interest earned, etc. The Pollution Control Board of Assam failed to collect from 84 local bodies in Assam during 2010-15 and the receipt consistently exceeded the expenditure every year from 2010-11 to 2014-15. Further, the expenditure on pollution control measures did not even touch five per cent of the total expenditure of the PCB of Assam during the same period.

Unpublished work

Anita Bhatt, *Hazardous Wastes Diplomacy of Brazil India and South Africa*[39] in her research work it is found that the Basel Convention was an unsatisfactory compromise due to so many environmental agreements it become lower priority . The ratification process of the convention is slow. The developed country wants such an agreement that would manage transboundary movement without imposing strict control. The developing country believed it as an opportunity to impose a ban on the hazardous wastes trade and wants technical assistance for wastes disposal. The developing country like Brazil, India and South Africa wants complete ban on the transboundary movements of hazardous wastes.

Pandiya P, *A decision making tool for selection of economically sustainable hazardous wastes landfill site*[40] in his research work the researcher tries to presents an integrated economic and environmental based approach for developing a decision making tool for hazardous wastes landfill site selection. The researcher suggested for development of economically viability tool to guide the government and other implementing authorities for prioritizing actions to select hazardous wastes landfill site that have minimal impact on environment.

Nelaturi, **Jesu Ratna Kumar**, *Industrial pollution and environmental protection: A study with reference to the implementation of water act air act and*

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[39] Anita Bhatt, *Hazardous Wastes Diplomacy of Brazil India and South Africa* (2005) (Unpublished Ph.D Thesis, Jawaharlal Nehru University).

[40] Pandiya P, *A decision making tool for selection of economically sustainable hazardous wastes landfill site* (2011) (unpublished ph.D Thesis, Anna University)

environmental act in Medak district Andhra Pradesh[41] the researcher attempts to analyze the implementation of environmental legislation in the Medak district of Andhra Pradesh. The researcher mentioned that Medak district have lead to deterioration of living condition because this district is highly industrialized and become wastes effluent site in spite of a number of legislation. The researcher found that there are 3, 284 industries in Medak district and out of these industries 326 are identified as polluting industries that creates havoc in the region due to uncontrolled emission. The industrial units of the research area did not mentioned in the questionnaire information related to the quantity and the composition of the industrial pollutant. The authority refused to permit the researcher to verify the relevant records. The Andhra Pradesh pollution control board did not disclose the quantity and composition of the industrial pollutants.

It is observed that some information relating to the international documents of Hazardous Waste Management Laws, Rules and Regulations would be gatheredfrom the above literature which helps the researcher to know the present scenario of hazardous waste management. The books and articles help the researcher to collect data relating to the national and state level mechanisms of Hazardous Waste Management Rules that helps the researcher to know the implementation of Hazardous Waste Management Rules in real perspectives. However a review of the existing literature has disclosed that no attempt has been made to study the role of State

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[41] Nelaturi, Jesu Ratna Kumar, *Industrial pollution and environmental protection: A study with reference to the implementation of water act air act and environmental act in Medak district Andhra Pradesh*(2002) (Unpublished ph. D Thesis, Acharya Nagarjuna University)

Pollution Control Board of Assam in implementation of hazardous wastes rules in Assam that to fill up this gap present research work is undertaken.

1.5. Research methodology

Methodology is the vital component of a particular scientific study. Research methodology is a systematic and scientific investigation to find out truth and new knowledge about the phenomenon or research problem. The present study is made on "Role of State Pollution Control Board of Assam in implementation of Hazardous waste Management Rules: A Study". This study is based on doctrinal as well as empirical method of Research. Empirical evidences are collected through direct or indirect observations and analyzed qualitatively. Chapter V of the present work is mainly deals with empirical study to analyze the research problem.

In this research work state pollution control board of Assam is the main source of information. The researcher visited the office of state pollution control board of Assam for detail discussion, collection of information and personal observation. In order to study the implementation of hazardous wastes management rules in Assam, information are collect through questionnaire and personal observations.

The methodology adopted in this research comprises both Primary and secondary sources. The primary sources are responses to the questionnaire, copy of annual inventory on hazardous waste management by the occupiers in Assam, copy of annual inventory on recycling/utilization/co-processing of hazardous waste in Assam, copy of authorised recyclers/utilizes/co-processors in Assam, copy of grant of authorisation, copy of annual return, copy of site emergency plan etc. provided by the pollution control board of Assam. The researcher has conducted personal interviews

with the officers of pollution control board of Assam regarding their functions and problems in implementation of hazardous wastes management rules. It is discussed with references to the cases decided by SC, various HC and NGT, Governmental publications, report of various commissions.

The information collected from secondary sources are like various books relevant to the subjects, materials collected from various research articles published in legal as well as other journals, , unpublished works, materials collected from previous research in the related field whenever found relevant, access to internet etc. The sources that are expressed by the several person's writings or analysis of study reports of different institutions, scholars and of various implementing agencies of the Government of Assam etc. are examined. For this purpose the researcher visited the libraries of Dibrugarh University, Gauhati University, Administrative Staff College, library of Assam Secretariat etc. In this study descriptive analysis has been carried out and the findings have been represented textually.

In this study no hypothesis is framed to be proved or disproved as it has not been felt necessary.

1. 6. Framework of the Study

In 21st Century environmental hazards basically hazardous waste poses a serious threat all over the World. Therefore proper disposal of hazardous waste may responsible to the ecological balance and protection of our earth. For this aspect, implementation of hazardous waste management treaty conferences, Acts, rules and regulation at international, national and state level may assist to achieve this goal. Therefore an analytical approach regarding the implementation of hazardous waste

rule at the grass root level is need of hour. In this study the researcher attempts to analyze the role of State Pollution Control Board of Assam on implementation of Hazardous Waste Management rules and regulation of the Government under which the State Pollution Control Board of Assam came into existence and exercise its power and functions and also to find out probable remedies which can make the State Pollution Control Board Assam more effective.

For this purpose the present research has been divided into seven chapters. Following are the framework of the Study:

Chapter I: The first chapter is an introductory one gives a brief exposure of the enormity of the problem of hazardous waste; and its impact on our environment. It also highlights our national concern and raises some of the basic issues which have come to the forefront and required immediate implementation of hazardous waste rules to protection our environment. This chapter comprises of review of relevant literature, methodology adopted for study and objectives of the study etc.

Chapter II: Second chapter is devoted to a discussion on International documents relating to the hazardous waste enactments at international level. The chapter analyses all implementation and enforcement mechanism and examine the availability and adequacy of such mechanism. It has been made an attempted to give current scenario and recent developments relating to hazardous waste management system.

Chapter III: The third chapter is an attempt to Study National laws relating to the hazardous waste management rules in India. The study looks at the Constitutional Mandates to pollution free Environment. The incorporation of many provisions has

added new dimension, making it obligatory on the State and the every citizen to protect and improve the environment. The chapter also covers discussion on the Environmental Legislation and its legal aspect for the protection of environment.

Chapter IV: The fourth chapter is power and function of State Pollution Control Board of Assam that have to exercise under the respective legislation. In this chapter the researcher attempts to make a critical analysis on working of the board in respect of management of hazardous in the states.

Chapter V: The fifth chapter is an attempt to investigate the role of State Pollution Control Board of Assam to implement the hazardous waste management rules in Assam. There was substantial shortfall in conducting inspections of highest polluting industries. Handling and management of Hazardous Wastes is inadequate due to lack of active participation by all stake holders. The Board failed to take action against the defaulting individuals organizations to ensure the implementation of the provisions of the hazardous waste Rules. It is hoped that this initiative will serve a useful purpose for the society.

Chapter VI: Chapter six is the concluding observation and knowledge of the researcher about the unknown fact of the entire working system of the pollution control board of Assam. In this chapter the researcher tries to hold a truth and real picture of the board in implementation of hazardous waste management rules in Assam. The researcher feels that so many areas that need to be revamped so that the hazardous waste would be managed effectively. The researcher tries to give a concrete conclusion through direct and indirect observation on the problematic areas.

Chapter VII: The last chapter is a summary of the discussion and incorporates a few suggestions for strengthening the efficacy of the existing legal mechanism to control the improper disposal of hazardous waste released from various industries. The researcher believes that if the shortcomings are removed and suggestions implemented the very purpose of the hazardous waste management legislation would be effective in Assam.