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Research Article

Impact Assessment of Fertilizer Industry Waste on Environment

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Abstract: The rapid growth of industrialization and urbanization during last three decades has resulted in degradation of environment, not only in developing countries, but also in advanced countries of the world. All over the world particularly in the advanced countries e.g. U.S.A. and European countries, the burning topic of the day is environmental pollution by Industry. In the race for industrialization these countries over looked its adverse effect on the environment. Fertilizer industry is one of the major industries in the India. The industry is uniformly scattered in throughout the country. Globally, fertilizer consumption has over the past few decades increasingly shifted towards developing countries. The main forces responsible for this shift are the introduction of environmental legislation restricting the use of fertilizer in many developed countries and a significant growth in fertilizer demand in developing countries, as a result an unprecedemented growth in population in most of these regions, particularly in Asia. Nitrogenous fertilizer industry utilizes a combination of natural gas naphtha, fuel oil and filler sand at varying condition for the production of different formulation of fertilizer products viz liquid ammonia and urea. More than 99% of world nitrogen fertilizer production is based on ammonia. Ammonia is basically produced from water, air and energy. Each production process result in the release high concentration of ammonia, urea, air emission SO_x, NO_x CO_x and SPM**)**, ETP sludge and spent catalysts wastes into receiving aquatic and terrestrial ecosystems. These industrial hazardous wastes are considered highly toxic, therefore disposal of such wastes need proper attention so as to reduce possible environmental hazards. Industrial growth has resulted in generation of huge volume of hazardous wastes in country. Hazardous waste management (HWM) is very important issues and is assuming significance globally. Scientific disposal of hazardous waste has become a major environmental issue in India.

Keywords: Fertilizers industry, Environment Waste, effluent, Treatment, Pollution

INTRODUCTION

The Industrial revaluation of the 18th Century in Europe had a global impact and with the advancement in science and technology there was rapid industrialization, over the world leading to mechanized farming, motorization and urbanization. It has caused blatant destruction of the human environments, air and water and soil pollution. The slogan "Industrialize or perish" seems be to providing more justified now.

Before independence there were a few "agro based" and light engineering industries in India. After independence the leadership was in a hurry to catch up with the industrialized with the industrialized west and our planners resorted to heavy industrialized with planned development, came several ore and mining based metallurgical industries, chemicals fertilizers, pharmaceutical, automobiles and petroleum products etc. A diversified industrial base and technological infrastructure was laid in India. But it not only shaped our scare resources, but also pushed us deeper under heavy foreign dept trap. They also brought the problems of environmental pollution with them. They are potential "chemical time bombs" of India waiting to blow up the environment any time. The Bhopal gas tragedy of 1984 can be repeated anytime, anywhere in India. Today many environment problems have surfaced, because of the faulty planning and unchecked use of improper technology which are not only environmentally unsafe, but have also adverse impact on the various vital components of the environment. Industrial development of any country is the foundation stone of its prosperity provided: it is without destructions with the advent of industrial revolution and large scale technology. Man now diverts vast amount of his energy and the materials flowing through the nature environment to his own use.

Human activities are mainly responsible for modification and deterioration of the environment. In the process of development, man's relationship with the environment has changed gradually and some major modification had been brought about in the environment which is becoming detrimental to human society. Our industries, fertilizers, mining and growth of cities have expanded and their output and wastes are polluting the long unpolluted air: water and soil.

India's main problem of pollution is due to the fact that, their industrial units are located in densely populated zones. Industries complexes have been located to close to the residential areas without considering the consequences of the environmental pollution. In the past few decades industrial has increased, in individual capacity and in industries have become more concentrated in specific geographic locations. Thus there has been a greater need to decrease the percentage or total loss of undesirable by product and effluents to the environment.

The ministry of environmental and forests (MOFE) has promulgated hazardous wastes (M&H) rules 1989, as amended to date, and notified in the country under the provision of the environmental (protection) Act. EPA, 1986, these rules were amended in 2000 and 2003 to bring the rules in line with the requirement of the based conversion and also to improve the applicability and implementation aspects with regard to imports of the hazardous waste. Apart from ministry of environmental and forests (MOFE), Central Pollution Control Board (CPCB), State Pollution Control Board (SPCB) /Pollution Control Committee (PCCS) have been delegated certain powers for control and regulation of hazardous wastes of industry.

WASTE OF FERTILIZER INDUSTRIES

Nitrogen fertilizer plant during the manufacturing processes generated, contaminated liquid effluents in addition to dust, gas emission and solid by products. These wastes are pollute air, waster as well as impair soil. Hazardous wastes obtained from plant are classified into following categories.

(I) Hazardous gases (Air emissions)

(II) Waste water and liquid effluents

(III) Solid waste (spent catalyst)

LIQUID EFFLUENT AND AIR EMMISSION

The major sources of waste water generation during the production processes of plant activities are:

(a) Water treatment plant.

(b) DM plant

(c) Ammonia plant

(d) Urea Plant

(e) Blow down from cooling towers

(f) Factory and township sanitary waste

(g) Effluent from ETP

(h) Effluent from sewage treatment plant

(i) Flow from open (storm water) drains inside factory premises

All these waste water sources are the responsible to create pollution on environment. Air emission to atmosphere from ammonia plants, urea plant and nitric acid plant include: sulphur dioxide (SOx) Nitrogen oxides (NOx), Carbon oxide (COx), Hydrogen sulphide, Hydrogen cyanide, volatile organic compounds (VOCs), NH_3 and particulars (SPM). All these emissions pollutants of plant are the main source of air pollution.

Solid Wastes: Solid waste is principally spent catalyst that originates in ammonia production and in the nitric acid plant. Catalyst used in various processes has different useful lives ranging from 5 to 7 years. The plant authorities have not yet decided as to where the spent catalysts would be disposed off however, it was indicated that spent catalyst are commonly sold as scrap.

IMPACT OF WASTE ON ENVIRONMENT

Net impact from changed scenario of air emission, liquid effluent and solid waste coming out to fertilizer plant activity caused to significant adverse impact on human health and vegetation in and around the area. Due to plant activity surface and ground water quality are get affected due to the discharge of combined effluents in to water sources. So the biological environment fauna and flora get affected. The four basic environmental components are affected:-

(i) Air environment

(ii) Water environment

(iii) Land environment

(iv) Biological environment

TREATMENT OF FERTILIZER WASTE AND MANAGEMENT

Waste management systems involve a two tier universal approach viz. (1) preventation (2) Control of environmental pollution. The preventive approach aims at minimization of waste generation by all possible means of reduction through (i) improvement in process technology and equipment which may completely eliminate waste streams (ii) Improvement in plant operation, and (iii) Promotion in use of process material and through recovery/recycling/reuse of waste. (iv) Safe disposal of hazardous waste (v) Incineration. The

approach for management of hazardous waste is also similar, but it has for reaching consequences if uncared for in view of its hazard potential.

TREATMENT OF AIR EMISSIONS

In urea plants wet scrubbers or fabric filters are used to control fugitive emission from prilling towers. Fabric filters are used to control dust emission from bagging operations. These devices are an integral part of the operations to certain product. New urea plants should achieve levels of particulars matter in air emissions of less than 0-5 kg/t of product for both urea and Ammonia. In Nitric acid plants, extended absorption and technologies such as non selective catalytic reduction (NSCR) and selective catalyst reduction (SCR) are used to control nitrogen oxide in tail gases.

TREATMENT OF EFFLUENT AND SPENT CATALYSTS

The effluent which that originate in a nitrogenous fertilizer plant include boiler blow down, water treatment plant backwash, and cooling tower blow down from the ammonia and nitric acid plant. They may require pH adjustment and settling. These effluents should preferable be recycled or reused. It procured for recycling in conventional agriculture or agro forestry, or can safely be recycled without causing food chain accumulation.

Catalysts used in the process need to be disposed off after their activities are significantly reduced. Normally, the catalyst used in the plant needs to be replaced at intervals of 5 to 7 years. These catalysts are normally pyrophoric and have to be removed by taking certain standard precautions and stored in closed containers. These spent catalysts have ready market and are normally sold off, thus, as long as proper precautions are taken are not likely to pose any environment problem. The recovery of valuable elements from spent catalysts become on unavoidable task not for lowering the catalysts cost but also for reducing the catalysts waste to prevent the environmental pollution.

CONCLUSIONS

It is difficult to develop alternative technology for total elimination of hazardous waste generation. In developing countries, the thrust on economic development is often given priority to production costs than the best available technology and this result in more wastes becomes a liability on the society. The MOEE has elaborately identified various treatment and disposal options of different hazardous waste streams that include, recycle and recovery and solidification etc. As on today, the most often used option for disposal of wastes is secured land fill. The other options should be given also equal weight age to refuse and recycle of such wastes for resources recovery before deciding for a land fill. Environment impact assessment (EIA) is being practiced all over the world to decide a site of secured landfill to ensure less negative impact of such facility on human and ecological systems.

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