

ASSESSMENT OF ENVIRONMENTAL POLLUTION THAT ARE RARELY MENTIONED SUCH AS NOISE, THERMAL AND RADIOACTIVE

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Abstract

This paper highlights on environmental pollution that are rarely mentioned such as noise, thermal and radioactive. Noise is the Category of antagonistic feeling. It is the abnormal sound in the environment which is injurious to human health. Noise pollution has a negative effect to life but could be prevented. Thermal pollution could be the physics, of heat and mass exchange of water in the environment. It has to do with the degradation of water quality in temperature change. Also it has ecological effects of warm and cold water which can be controlled. Radioactive pollution is the contaminated ion-exchange used to purify coolant liquid, or airborne. Thus, gases and substances that are naturally in the atmosphere are part of radioactive pollutants. It has front and back end of nuclear fuel cycles. Recommendations were made as forward and conclusion was given.

Noise pollution has to do with unwanted sound in the environment; it is the human activities of the machine-created sound that disrupt the balance of human life. This unwanted sound can damage physiological and psychological health of human being. It has environmental and human health effects and could be controlled.

Thermal pollution is the degradation of water quality by any process that can change ambient water temperature. It could be caused by discharging heated water into the environment because elevated temperature decreases the level of dissolved oxygen in water. Also, the use of water as a coolant in power plants and industrial

manufacturers can cause thermal pollution. According to Kadiri and Ojosipe (2008) stated that this balance is influenced by environmental parameters like air temperature, mean radiant temperature, relative humidity, air velocity, and personal parameters like activity level and clothing thermal resistance. According to <http://www.clothingthermalresistance.com> radio-active pollution originates from the nuclear fuel cycle and nuclear weapons reprocessing. It also comes from medical and industrial wastes, as well as naturally occurring radio-active materials which can be concentrated by the processing or consumption of gas, oil, coal and some minerals. Finally, noise, thermal and radioactive pollution are in line with atmospheric pollution because they have in common industrial and air pollutants, which are under atmospheric pollution.

The Noise Pollution

Noise or environmental noise is unwanted sound that damages-physiological and psychological health of human life. Asoegwu, (2005) stated that, any sound which interferes with human communication, comfort or health is noise, or environmental noise pollution. The sources of most out-door noise worldwide comes from transportation systems which comprise motor vehicle noise, rail noise and air craft noise. Other causes of indoor and outdoor noise pollution include construction work, noisy people, office equipment, car alarms, industrial power plants, gadgets like the television and radios, churches and religious groups, and recording studios often pollute the environment with noise which affects the ear-drum of human beings. The environmental noise pollution is a common phenomenon in Nigeria because of the frequent occurrence in urban centers like Lagos, Aba, Onitsha, Owerri, etc where musical equipment dealers blare music in loudspeakers. Also, poor urban planning may give rise to noise pollution because side-by-side industrial and residential buildings can result in environmental noise pollution.

Environmental Noise Effects

Interestingly, this study showed that an impact of noise on animal life can cause death because exposure to loud sound affects the brain. According to <http://www.noisepollution.com>, noise can have a detrimental effect on animals by causing stress, increasing risk to death by changing the delicate balance in predator. For instance in April 2008-2009 United Kingdom,(UK)councils received 315, 838 complaints about noise pollution from private residences. This resulted in Environmental Health officers across UK serving 8,069 noise abatement notices under the terms of -the Anti-Social Behavior. However, in the last 12 months 524 confiscations of equipment were authorized for the removal of powerful speakers ([http:// en. Wikipedia/noisepollution](http://en.wikipedia.org/wiki/Noise_pollution)).

Human Health Effects

Noise pollution can cause annoyance, aggression, hypertension, high stress levels, sleep disturbances, increasing blood pressure and affect the ear-drum of human beings. (Rosen hall U, Pedersen K. and Svanborg A. (1990).

Control Measures for Noise Pollution

1. There is variety of strategies for controlling noise pollution; limitation of heavy vehicles on our roads will enhance the reduction of environmental noise. This will address the topography of the environment too.
2. Aircraft noise can be reduced to some extent by redesigning the engines to limit the noise.
3. Industrial and urban noise could be reduced through the proper usage of the equipment and powerful machines.
4. Reduction -on volume of gadgets like television, radio, CD, etc

Thermal Pollution

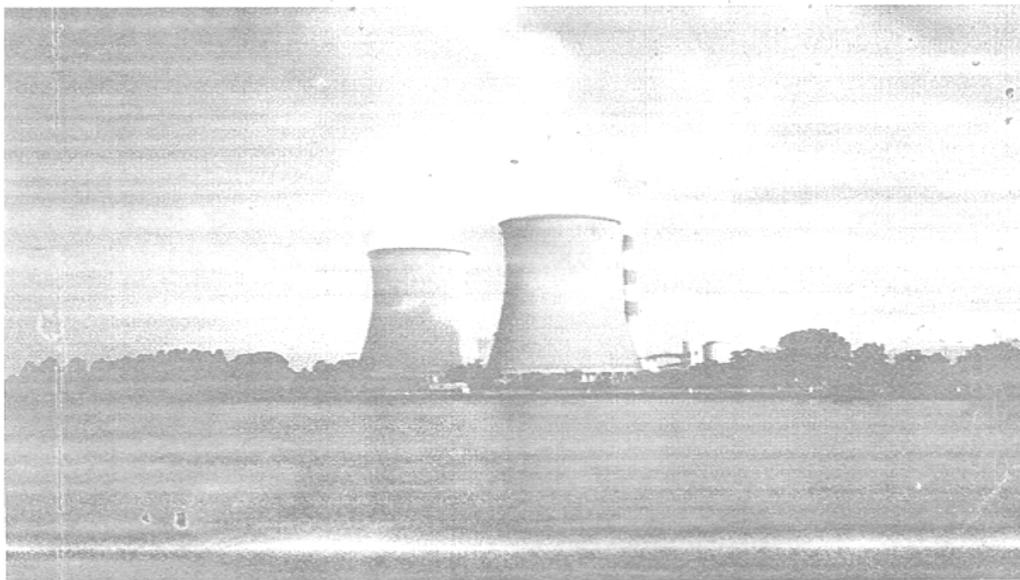
It is the degradation of water quality by changes, in temperature.

For instance according to [http://: en/wikipedia](http://en.wikipedia) when water used as a coolant is returned to the natural environment at a higher temperature, it is known as 'thermal pollution. Thus, the change in temperature decreases oxygen supply in the environment and causes harm to life.

Thermal pollution also can be described as the release of very cold water from the base of reservoirs into warm rivers causing the aquatic Organisms especially the fishes and particularly their eggs and larvae to die because of the adopted temperature range that has risen in water temperature which is known as 'thermal shock".

Furthermore according to Asoegwu (2005) thermal and photochemical reactions within the trapped air greatly increase the atmospheric pollution. For example hydrocarbons are trapped in the atmospheric smogs. Hence, trapped nitrogen oxides which underwent oxidation by photochemical reactions and mixes with water of the atmosphere to produce acid rain which is injurious to Human beings.

Example of Thermal Position



Ecological Effects of Warm Water

There are significant changes in organism metabolism when temperature changes from one to two degrees Celsius. According to free encyclopedia, a large increase in temperature can lead to the denaturing of life-supporting enzymes by breaking down hydrogen and disulphide bonds within the quaternary structure of the enzymes. Thus, decreased enzymes activity in aquatic organisms can -cause problems such as the inability to break down lipids, which leads to malnutrition. Hence, causing an algae bloom to reduce the oxygen levels to pollute leached agricultural inorganic fertilizers. In addition, changes can render cell wall less permeable to osmosis.

Furthermore elevated temperature decreases the level of dissolved oxygen (DO) in water and this can harm aquatic animals, while changes in aquatic environment may result in a migration of organisms to another suitable environment. However, limited warm water has little deleterious effect and can improve function of the aquatic ecosystem. This phenomenon is seen especially in seasonal water and is known as "thermal enrichment". Finally, the temperature of ecological warm water can be as high as 70° Fahrenheit for fresh water, 80°F for salt water and 85°F for tropical fish.

Ecological Effects of Cold Water

The unnatural cold water released from reservoirs can dramatically change the fish and macro-invertebrate fauna in rivers and reduce their growth. Thus, extreme cold water reduces river productivity and drastically alters and impoverishes aquatic animals and plants. Therefore, the temperature of the

ecological cold water for fresh Water fish can be as low as 50°F, saltwater 75°F and tropical water fish 80°F.

Control Measure of Thermal Pollution

At warm weather, urban runoff controls significantly thermal impacts on small streams as storm water passes over hot parking lots, roads and sidewalks reducing the thermal effects. This storm water management facilities will absorb runoff or direct it into groundwater as to reduce the thermal impacts. Also the storm water facilities will absorb runoff such as bio-retention systems and infiltration basins to control the thermal effects.

Under industrial waste-water the thermal pollution (heated water) generated by power plants, chemical plants, petroleum refineries; steel mills, pulp and paper mills can be controlled by:

- ❖ Cooling ponds, man-made bodies of water designed for cooling by evaporation, convection and radiation
- ❖ Cooling towers, which, transfer waste heat to the atmosphere through evaporation and/or heat transfer.
- ❖ Cogeneration, a process where waste heat is recycled for domestic and/or industrial heating purposes (<http://free.encyclopedia>).

Radio-Active Pollution

Radio-active wastes are gases and substances naturally occurring in the atmosphere. Bryant, (1992) stated that reprocessing gives rise to high and medium - level liquid wastes and some solids, for example, contaminated ion-exchanges resins, there is no question of these wastes being discharged to the environment. Asoegwu, (2005) pointed out that very serious naturally occurring radio-active gases are those emanating from the decay of radio-active isotopes of uranium namely-radium, radium and uranium²³⁵ and other naturally occurring radio-active isotopes that decay in the atmosphere such as strontium⁹⁰ and caesium¹³⁵. Thus, the activities of man tend to increase the concentration of those dangerous gases in the atmosphere. Also, modern industrial processes have raised the concentration of those gases in the atmosphere too. Activities in radioactive wastes are solid, liquid or airborne; combustible or non-combustible; aqueous; or non-aqueous, of low, intermediate or high radioactivity. However, the low or high are reviewed under relative and their absolute value range of activity levels in the waste. Furthermore, [http-\(the free encyclopedia\)](http://the free encyclopedia) supported that radioactive waste typically comprises a number of radioisotopes: unstable configurations of elements that decay, emitting ionizing radiation which can be harmful to human health and to environment.

Most of these wastes come from a number of sources like the majority of wastes originate from the nuclear fuel cycle and nuclear weapon reprocessing. Also other sources includes medical and industrial waste, as well as naturally occurring

radioactive materials, which can be concentrated as a result of the processing or consumption of coal, oil and gas and some minerals, According to Bryant (1992) control is exercised by requiring users to register with the responsible authority, such registration usually implies a system of licensing whereby licenses can be withheld or revoked if users do not satisfy the regulations. Also these may specify location, time and manner of discharge of-the upper limit of concentrations or rate of discharge of the waste. Thus, demonstrated by monitoring the Affluent stream, which can be administrative and operational control over the actual radioactive materials handled while selected samples from the environment are monitored.

The Front End of Nuclear Fuel Cycle

These are nuclear fuel cycle materials contained in the front end. The waste from the front end of the nuclear fuel cycle is usually alpha emitting waste from the extraction of uranium which often contains radium and its decayed products. Thus, as a gas, it undergoes enrichment to increase the U^{235} content from 0.7% to about 4.4% and turned into a hard ceramic oxide (UO_2) for assembly as reactor fuel elements.

Depleted uranium (DU) is the main by-product of enrichment which contains the U^{238} isotope with a U^{235} content of 0.3% that is either stored as UF_6 or as U_3O_8 . When it is extremely high density some are used in applications such as the keels of yachts, and antitank shells for making mixed oxide fuel (MOX) and it dilutes highly enriched uranium from weapons stockpiles which is being redirected to become reactor fuel and the dilution is called down blending meaning that any nation or group that acquired the finished fuel would have to repeat the enrichment process before assembling a weapon (very expensive and complex).

The Back End of Nuclear Fuel Cycle

At the back end of the nuclear fuel cycle are the fuel rods that contain fission products which emit beta and gamma radiation and actinides that emit alpha particles like uranium²³⁴, neptunium²³⁷, plutonium²³⁸ and americium²⁴¹, and at times some neutrons emit californium (CF).

These isotopes are formed in nuclear reactors

According to [http:// www.world-nuclear.org/education/waste](http://www.world-nuclear.org/education/waste).

It is important to distinguish the processing of uranium to make fuel from the reprocessing of used-fuel. Used fuel contains the highly radioactive products of fission. Many of these are neutron absorbers, called neutron poisons in this context. These eventually build up to a level where they absorb so many neutrons that the chain reaction stops, even with the control rods completely removed. At that point the fuel has to be replaced in the reactor with fresh fuel, even though there is still a substantial quantity uranium²³⁵ and plutonium present.

Conclusion

It is necessary to note that noise, thermal and radioactive pollution are inline with the atmospheric pollution. Therefore, noise pollution has been discussed under the environmental noise pollution, environmental effects, human health effects and control measure of noise pollution. The thermal pollution has also been explained under ecological effects of warm and cold water with the control measures of the thermal pollution. Finally, the radioactive pollution has been under the sub-heading: radioactive and nuclear fuel cycle of front and back ends. All the above pollutions are harmful to human life. For instance, “the World Health Organization (WHO) says orally that 3 million people are killed worldwide by outdoor air pollution annually from vehicles and industrial emissions, and 1.6 million indoors through using solid fuel”.

Recommendations

1. Government should ensure that radioactive waste disposals are discharged within safe limits which may specify location, time and manner of discharge.
2. The administrative and operational control should monitor the effluent stream over the actual thermal materials handled.
3. Government should sound warning on noisy equipment users to stop the noise.

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