Air Pollution Report Essay, Research Paper

Air pollution is a major problem facing our environment today. This dilemma is harmful to every single living creature on this planet. How can we limit the causes of air pollution? There are industrial as well as residential causes of air pollution. How can we limit the effects of air pollution? We all know it affects the environment, but do we all know it also can affect us directly? How can we control air pollution? Is the government doing its job to protect us?

Air pollution can be defined as impureness of the air. Air pollution is all around us. It might not be as clearly visible in some areas as others but the fact is that air pollution is still there affecting us in some way, shape, or form. It has been known to cause illness and/or death. Many people are not aware of this.

The Causes of Air Pollution

There are two main causes of air pollution. One of the main causes is natural pollution. “Natural pollution is windblown dust, pollen, fog, etc.” The other main cause is people pollution. “People pollution is the chief concern and most serious form. Most of people pollution is caused by industry, cars, trucks, and airplanes.”

The causes of air pollution go on and on. There are residential causes and industrial causes. Residential causes are those such as automobile emissions and forest fires. Industrial causes are those such as factory emissions and the burning of fossil fuels.

The Residential Causes

One residential cause is the emissions of automobiles. This is probably the most harmful cause, at least in the United States of America it is. People drive automobiles every day to get from point A to point B. If automobiles did not exist, the air would most likely be cleaner but we would not be able to travel long distances in short periods. In any case, the problem remains that automobile emissions are harmful to the environment.

This is how they generate automobile emissions into the atmosphere.

Motor vehicle emissions are generated in several different ways and locations during engine/vehicle operation. The most important sources are, of course, those produced in combustion and vented through the exhaust pipe. These exhaust gases consist mainly of unburned HCs, CO, and NOx and account for approximately 90- 92% of all vehicle emissions. Some products of combustion are not vented through the exhaust system, as they slip by the piston rings and the cylinder walls. These “blowby” gases consist mainly of unburned HCs that accumulate in the crankcase exhaust port. A third source of emissions is the votalization of HCs through the carburetor and fuel tank vents. Carburetor emissions are pronounced during the “hot soak” period immediately following vehicle operation.

Forest fires caused by the carelessness of humans puts harmful smoke into the environment. These forest fires do not happen often, but when they do, there is mass destruction caused to the atmosphere. In the early 1950’s, forest fires in the Southeastern United States covered huge areas of the country with smoke so thick that flights were canceled in New York City.

Chlorofluorocarbons or CFC’s were developed by chemists at General Motors in 1928.

When they were developed, they were looked upon as “miracle” gases that could be safely used for many purposes. They were not toxic. They were not carcinogens. They did not corrode the materials with which they came in contact. Nor were they flammable. Finally they could be manufactured easily and inexpensively.

Over the years these CFC’s have been made to serve many purposes from refrigerator coolants to jet streams in aerosol cans and polystyrene material to air conditioners. When people do not properly dispose of CFC’s, they could escape into the atmosphere, creating a hole in the ozone layer.

The Industrial Causes

Air pollution was first realized as a major problem during the Industrial Revolution in Europe. “Industrial pollution is particles (especially of metal dusts) and waste gases (especially carbon monoxide, sulfur oxides, and nitrogen oxides) that are waste products of industry and end up in the air. Industrial emissions are the second largest pollutants of the atmosphere after automotive exhausts.”

Industries that are the major pollutants include petroleum refining, metal smelting, iron and steal mills, grain mills, and the flour handling industry. The most common chemical natured factory pollutant is methylene chloride.

The burning of fossil fuels is a major cause of air pollution. Fossil fuels are formed from the remains of ancient plant and animal life such as coal and natural gas. If complete combustion of fossil fuels was possible, it would only produce heat energy, water vapor, and carbon dioxide. However, since this not possible because the level of oxygen is never ideal, carbon monoxide forms.

The incombustible material enters the atmosphere as smoke, dust, soot, and particles of tarry (tar-like) hydrocarbon substances. Small amounts of mineral and metal impurities are released into the air as fly ash. “Sulfurous impurities produce sulfur oxides, especially sulfur dioxide. Sulfur dioxide combines with water in the air to form sulfuric acid, the largest component of acid rain.”

The Effects of Air Pollution

Effects on the Environment

Air pollution, as like any other pollution, is harmful to the environment. Unlike other pollutions though, air pollution is not always visible in the environment. Air pollution is the cause of acid rain, smog, and the hole in the ozone layer.

Acid rain damages living organisms and materials. Deposition from acids, such as sulfuric acid and nitric acid and mixes with the rain and goes into the soil and bodies of water. This is most common in the Northeastern United States, where fossil fuel burning is highly concentrated.

“Acid rain is killing more than lakes. It can scar the leaves of hardwood forests, wither ferns and lichens, accelerate the death of coniferous needles, sterilize seeds, and weaken the forests to disease, infestation, and decay. Below the surface, the acid neutralizes chemicals for plant growth, strips others from the soil and carries them to the lakes and literally retards the respiration of the soil.” From this you can see that biological damage is most pronounced in forests and lakes. In bodies of water, acid shock, caused by runoff of highly acidic water into lakes and streams when snow melts can greatly affect fish and other aquatic life. It also affects farmers. Vegetation may show damage through bleaching and spotting on leaves.

In urban areas acid rain discolors and speeds up the erosion of marble, cement, historic monuments, and statues. When exposed to acid rain, steel corrodes two to four times faster in urban and industrial areas than in rural areas. Soot and grit deposited by acid rain onto buildings, cars, and clothes results in these materials needing to be cleaned and restored. In the United States alone, acid rain causes billions of dollars damage to materials.

Smog is dirty fog. “Smog is a sort of ?atmospheric soup’ of pollutants cooked up by the action of sunlight. This thick, brown haze is made of air polluted by automobile exhaust fumes, smoke, and aerosols.” Smog contains chlorinated and organic phosphates that get unleashed into the air from blowing farm particles, heavy metals, and evaporating acid. These chemicals make the smog even more toxic than most people think. Smog is developed when weather conditions are in the mid- eighties and there is little wind. Therefore, smog does not affect all parts of the world. It is most common in a city such as Los Angeles where these weather conditions exist.

Ozone depletion is looked upon as a problem that up till now, we can not fix. Air pollution has caused this hole in the ozone layer. The ozone layer absorbs 99% of the sun’s harmful energy. It prevents ultraviolet radiation from reaching the Earth’s surface and the troposphere. It protects humans from sunburn, skin and eye cancer, and cataracts. It also prevents much of the oxygen in the troposphere from being converted to ozone (gas). In the mid-seventies chemists F. Sherwood Rowland and Mario J. Malian discovered “CFC’s were creating a global chemical time bomb by lowering the average concentration of ozone in the stratosphere.” In other words, the CFC’s were and are creating a hole in the ozone layer. As long as we keep using these CFC’s the hole is going to continue to grow wider and wider.

Effects on the Health of Living Organisms

Air pollution is hazardous to our health. It can endanger the health of living organisms in several ways. One way, is by introducing particulate matter and poisonous gases into the respiratory systems of humans, animals, and plant leaves. Another way is by increasing the acidity of precipitation, which alters the chemistry of soil and water. One more way, is that it engages chemical reactions in the atmosphere that increase the exposure of living organisms to harmful radiation. Yet another way that it affects living organisms is by altering globally, the composition and ultimately the temperature of the atmosphere and thus producing conditions that threaten the survival of living organisms.

In humans air pollution especially affects our respiratory system. Our respiratory system has a number of protective mechanisms built to protect against exposure to air pollution. Hairs in the nose filter out large particles. The mucus lining in the upper respiratory tract helps capture and dissolve smaller particles and gaseous pollutants. Sneezing and coughing helps to remove contaminated air and mucus when the respiratory system is exposed to pollutants. Long term exposure to cigarette smoke and other air pollutants can ruin the natural defenses, resulting in respiratory conditions such as allergic reactions like asthma, and diseases such as lung cancer, emphysema, or chronic bronchitis.

Air pollution can also cause other health problems. It can cause extreme allergic reactions. It also can cause headaches, nausea, rashes, and swelling. Such activities as jogging, bicycling, and other strenuous outdoor activities, while being done in areas with high concentrations of air pollution, can cause vigorous coughing and chest pain. The hole in the ozone layer is the cause of many cases of skin cancer.

Control of Air Pollution

There are three basic approaches to control air pollution. The first approach is called preventive measures. This means that they would change the raw materials

used in industry or the ingredients of fuel. The second approach is called dispersal measures. That is raising of the smokestacks. The third one is called collection measures. This is done by designing equipment to trap pollutants before they get into the atmosphere.

Government Control

Most highly industrialized countries have legislation to prevent and/or control air pollution. In the U.S. air pollution is the responsibility of the state and local governments. All states have an air quality management program that are patterned after federal laws. The basic federal law is the Clean Air Act of 1970. It was last amended in 1990. Under law the Federal Environmental Protection Agency sets the standards for air quality. The EPA sets the limits on the amounts of air pollutants that can be given off by automobiles, factories, and other sources. Air quality programs have improved many areas. There are several examples on how these air quality programs have improved areas. One example is that burning low sulfur coal and oil in factories and power plants has lowered levels of air pollution in the areas of the factories and plants. Another example is that automobile engines have been redesigned to emit lower emissions. New cars are equipped with devices such as catalytic converters which change pollutants into harmless substances. Because of this, air pollution from car exhaust has also been reduced.

The EPA released the Pollution Prevention Strategy in February of 1991. The strategy provides guidance on the EPA’s ongoing environmental protection efforts and includes a plan for achieving substantial voluntary reductions of targeted high risk industrial chemicals. The major component of the strategy is the Industrial Toxics Project. The EPA has identified seventeen high risk industrial chemicals that offer significant opportunities for prevention. These seventeen pollutants present both significant risks to human health and the environment and opportunities to reduce such risks through prevention.

“Scrubbers are pollution control devices used in industry to remove aerosols and waste gases.” Wet scrubbers operate by directing sprays of water or other liquids into chambers containing exhaust gases. The gases are then washed away in the liquid. Another form of scrubber works by a process called adsorption in which gases are removed by activated charcoal and filtering.

Alternate Energy Forms

Another way to control air pollution is to use alternate or renewable sources of energy. One of these alternate sources is solar power. The number of solar power plants is increasing as the markets expand for this power source. There is absolutely no pollution from solar power. “However, backup systems using conventional fuels are needed at night, during bad weather, and in the snowbelt areas, where the sun is often obscured during the winter months.” Another thing is that the cost of solar energy is much higher than fossil fuels.

Another alternate form of energy is nuclear power. Nuclear power is energy that is generated by radioactive fuels at nuclear plants. Nuclear power is often described as clean power when it is compare to fossil fuels. Nuclear power would limit air pollution problems since nuclear plants do not produce carbon dioxide or any of the gases that cause acid rain. On the downside, if there are nuclear power plants, there is always the threat of a nuclear fallout. If any radioactive materials escape from the plant, they could expose the people to radioactive contamination.

Conclusion

The dilemma of air pollution is a major problem that faces our world today. What if we can’t go outside because the smog is to thick? What happens when the acid rain gets potent enough to eat right through our skin? What do we do when the hole in the ozone layer widens and melts the polar ice caps? These could be some of the questions we will ask if we don’t find ways to control the problem of air pollution.

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