Presence atmosphere in the form of manufactured chemicals,

Presence of solids causing turbidity may be included as forms of water pollution. Thermal Pollution of ir and water, a form of energy infusion, raises the quantity of sensible heat in those fluids to abnormally high levels. Noise Pollution illustrates energy infusion into the environment by sound wave transmission Particulate Matter in the Atmosphere: Air pollution: The contents of the atmosphere fall into two basic categories: Particulate matter and gases. Particulate matter consists of particles of matter in either the liquid state or the solid state. In the language of air pollution science, these particles are called Particulates. Particulate matter injected into the atmosphere is of both Man-made and natural origins.

Particulate matter may include sea salt crystals, mineral dust, and volcanic dust. These particulates play a vital role in the atmospheric processes by serving as nuclei of moisture condensation to form clouds. Another class of natural solid particulate matter is smoke from forest fires, and grass fires. Living plants release pollens and spores into the air.

These are organic compounds. From forest fires certain hydrocarbon compounds called terrenes are also released into the atmosphere in the form of minute droplets. These compounds are important in producing atmospheric haze that builds up naturally within stagnant air masses far from industrial pollution sources. Man-made particulate matter comes from many sources but the major source is the combustion of hydrocarbon flues petroleum products, coal, peat, and wood. Combustion of solid wastes is another source. Other kinds of particular are introduced into the atmosphere in the form of manufactured chemicals, refining fossil fuels, mining and smelting ores, quarrying, cement manufacturing. Sizes of Particulates:

Particulates range in size from ultramicroscopic particles, consisting of a few molecules clustered together, to grains of ash, or dust large enough to be seen under a magnifying glass. Small particulate remain suspended almost indefinitely in the atmosphere.

They travel freely at the seed of the wind. They can rise to great heights and may enter the stratosphere. Upward Diffusion of Pollutants: If particulates larger than 1 micron settle continually downward through the air, how do they arrive at high level in the first place? The answer lies in atmospheric turbulence and convection. Wind consists of innumerable small eddies, resembling light, corkscrew motion. When the upward airspeed is greater than the natural rate of fall of a particle, the particular is lifted. Thus particulates generally diffuse upward into the atmosphere through the same wind flow that also carries them long distances horizontal’. Convection, another mechanism of the rise of particulates, consists of updrafts somewhat like the rise of hot air in a chimney.

Many industrial sources, particularly large smokestacks emit hot air that rises rapidly in a column because the air is less dense than its surroundings. In this way many pollutants can be carried up many hundreds of feet before the heat of the rising air column is lost to the surrounding air, halting further rise. Primary and Secondary Particulates: We can now investigate further the Man-made particulates in terms of their origin. Scientists dealing with air pollution recognize two classes of Man-made particulates: Primary and Secondary. Primary particulates are injected into the atmosphere from ground sources.

The chemical and physical properties of the primary particulates are acquired at ground level sources. Most of the primary particulates are in the size range larger than micron. They belong to the size grade that settles through the air under the force of gravity. Secondary particulates are produced by chemical reactions that take place within the atmosphere. Gases are involved in the production of many secondary particulates; energy for certain of the chemical reactions is supplied by sunlight. The particulates themselves result from the attachment of the newly formed chemical compounds to the water films that surround solid condensation nuclei, already present in the atmosphere.

Because these host particulates are of the free-floating ultramicroscopic size, smaller than 1 micron, the secondary particulates are for the most part also very samil-between 0. 1 to1 micron. This very small size assures that secondary particulates will remain suspended in the air over cities for long periods of time, increasing steadily in numbers to produce a distinctive and unpleasant man-made haze known as smog. Removal of the primary particulates can only be accomplished by was shout during precipitation. Or by dilution, the particulates are carried downward and mixed with large masses of cleaner air.

Gaseous Pollutants and their Reactions: To understand how the pollutants are formed, it is necessary first to name important pollutant gases injected into the atmosphere from man-made source; for the most part, these are oxides of sulphur and nitrogen, along with carbon and monoxide. Because of their importance in urban air pollution, they need monitoring and control.

Fong and Fog Dispersal: Fog is an environmental hazard, as those who drive

the city streets and highways know all too well. In marine navigation, fog brings grave danger of collision of one vessel with another or with an iceberg or running aground. To these classic perils of the sea, are now added the dangers of aircraft operation in and out of fogbound landing fields, a large airport closed down by fog, incurs heavy losses of revenue due to flight cancellations, to say nothing of the productive time to thousands of people forced to wait in airports of seek some alternative means of transportation. Fog is simply a Stratford cloud lying very close to the ground.

One type known as a radiation fog is formed at night. The type of fog requires still air and clear skies, so that the nocturnal net radiation loss is large and mixing cannot occur. When the air temperature near the ground falls below the dew point, fog is formed. Another type, advection fog, results from the movement of warm, moist air over a cold or snow-capped ground surface. Losing heat to the ground, the air layer undergoes a drop of temperature below the dew point, and condensation sets in. A similar type of advection fog is formed over oceans where air over a warm current blows across the cold surface of an adjacent cold current.

Fogs of the Grand Banks off Newfoundland are largely of this origin because here the cold Labrador Current comes in contact with hot waters of the Gulf Stream origin. Frequency of occurrence of dense fog varies greatly from region to region. For example, in the United States and Canada (Southern), fog incidence Is highest in coastal areas, specially adjacent to cold currents (Pacific Coast, New England), over large inland water bodies (Great Lakes), and over mountainous areas in humid climates (Appalachian Region). In

contrast dense fogs are rare in interior continental regions, especially in the deserts and semi-arid grasslands of the West.

Fog dispersal is a form of weather modification that has invited research and experimentation because of its great potential use in airports. Seeding experiments have shown that fog consisting of super cooled droplets can be cleared by seeding, using liquid propane or dry ice. Seeding causes rapid transformation of water droplets, into ice particles, the very cold fog to which this method applies is only a small percentage of all fogs that occur in middle and high altitudes. Warm fogs require other methods for dispersal and these have met with some success, but at high cost.