



---

## **Health Issues: Related to Air Pollution posed by Ledo Opencast Mining**

**Noble Kishore Buragohain**

**Assistant Professor, Department of Economics**

**Ledo College, Ledo, District: Tinsukia, Assam, PIN: 786182**

### **Abstract:**

Ledo coal mine is one of the most productive coal mines of North-eastern Coal Fields. Ledo is a small town situated in Tinsukia district, Assam. The co-ordinates of the region range from 27°17.272' N & 95°04.012' E. Ledo is a part of Makum coalfields, which is an opencast type of mine. As the consequence of wide range of open cast mining, the inhabitants of the area are facing a massive pollution hazard. Besides different types of pollutions, air pollution is the most common type, creating different issues in different aspects. This paper tries to explore the different types of issues related to air pollution caused by Ledo opencast coal mine.

**Keywords:** Air pollution, Ledo opencast mine, environmental issues.

### **1. Introduction:**

Ledo coal mine is one of the most productive coal mines of North-eastern Coal Fields. Ledo is a small town situated in Tinsukia district, Assam. Ledo Mechanised OCP block, covering an area of 0.85 sq km, in the Northern part of Makum Coalfield and is defined by 27°17.272' N & 95°04.012' E. Ledo is a part of Makum coalfields, which is an opencast type of mine. The Ledo area comprises of 11717 population (Census of India 2011), among which maximum number of people are engaged in Ledo coal mine. Ledo area is well known for its opencast coal mine. Ledo coal mine is a part of the biggest coalfield, i.e. the Makum coalfield. Ledo coal mine was started in 1884 when British-owned Assam Railways and Trading Company (ARTC) (District Census Handbook, Tinsukia 2011).

### **1.1 Ecological Degradation in Ledo Coal Fields:**

'The North Eastern Coal Fields' is a pioneer and primary coal industry of a large magnitude in the easternmost part of India. Being located in the extreme remote area of North Eastern part of India and that too in public sector, this industry has been entrusted with some responsibilities of acting as a nucleus for future industrialization of this region and thus plays its assigned role in the socio-economic and cultural development of the people of this region. This has not only been contributing a huge amount of revenue in every year to the nation made historic contribution to create a developed society. People from the different parts of the country migrated to this area and have strengthened the socio-economic and cultural integrity of this region. The unit came into existence in 1975 after Nationalization of coal mines in India. At present, there are five working mines three underground and two opencast mines under this unit. The coal mining activity (both underground and open cast) in Margherita has resulted significant ecological degradation in the area. Although coal was discovered in the northeastern region more than 250 years ago, systematic mining of coal was started only in 1888 by the erstwhile AR & T Co. (Assam Railways and Trading Company). Mining was first started at Makum coalfields near Margherita. In the following years many new collieries were started in the nearby areas. Coal in Margherita Coal Fields



like any other mineral, lies in the earth's body and extraction of coal by mining, is carried out in either of the two ways – Open Cast Mining & Under-Ground Mining Among the collieries of the North Eastern Coalfields under Margherita, “Tikak” and “Tirap” mines use opencast mining method and, in the rest, underground mining system is used. Presently, Ecological Degradation two more OCPs (Open Cast Mining) namely “Ledo” & “Tikak Extension” are being developed to augment the production capacity. Coal shares over 61.6% of total commercial primary energy sources in India (as estimated in 1991- 92) and hence coal is essential for development and progress of a nation. Development, Environment and Mining all have become complimentary to each other and none of them can be separated or ignored in the interest of the development of a particular country. Environmental problems, related to coal mining activities, start from extraction, continues during beneficiation, during transportation of the minerals to the users and during ultimate use. Process of coal mining, thus, is not the only one, which creates environmental problems. During the use of coal and other fossil fuels also, emissions of gases take place resulting in greenhouse effect and other related environmental problems. Coal mining operation though, particularly opencast mining always causes certain environmental degradation. The Environmental damages associated with coal mining are as follows: a) By Open Cast Mining Method: Damages to the landscape and topography. Dumping of mine waste/ overburden in an unplanned manner. Loss of topsoil and greenery due to disruption of topography. Effect of rainfall in eroding and transporting topsoil/ OB material with consequent siltation in downstream of watercourses and water bodies. Potential health hazard due to storage of water in abandoned quarries.

## 2 Objectives

This paper aims:

- I) To study different types of air pollution emitted by coal mines.
- II) To throw light on the health issues related to air pollution caused by Ledo opencast mining.

## 3.Methodology:

To fulfill the objectives of the study, both primary and secondary data have been used. Information from local health centers is used to analyze the health-related issues.

## 4. Opencast Mining and Air pollution:

Open cast coal mining, also known as surface or strip mining, involves removing large swaths of earth to extract coal near the surface. This method of mining has several environmental impacts, one of the most significant being air pollution. Here are key ways open cast coal mines contribute to air pollution:

### a) Dust and Particulate Matter (PM)

**Blasting and Excavation:** When coal and overburden (soil and rock above the coal seam) are removed, large amounts of dust are released into the air. These particles can range in size from coarse dust (PM10) to fine particles (PM2.5), which can penetrate deep into the lungs and cause respiratory issues.

**Transportation:** Trucks and conveyors that move coal and overburden generate dust as they travel on unpaved roads and work sites.

**Stockpiling:** Coal and waste materials are often piled up in large heaps, which can erode and release dust into the atmosphere, especially on windy days.



### **b)Emissions from Machinery and Vehicles**

Heavy machinery, such as excavators, trucks, and drilling equipment, burn large amounts of diesel fuel, releasing pollutants like nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), and carbon monoxide (CO). These contribute to smog formation and respiratory diseases. The mining process also emits carbon dioxide (CO<sub>2</sub>), contributing to climate change.

### **c) Methane Emissions**

Coal seams contain methane (CH<sub>4</sub>), a potent greenhouse gas. During mining, methane is released into the atmosphere, contributing to global warming. Methane has a much higher global warming potential than CO<sub>2</sub> over a 20-year period.

### **d) Coal Processing**

Crushing, washing, and processing coal can generate dust and release harmful volatile organic compounds (VOCs) into the air, some of which are hazardous to human health.

### **e) Impact on Nearby Communities**

People living near open cast mines are at risk of respiratory diseases, such as asthma, bronchitis, and lung cancer, due to prolonged exposure to dust and toxic air pollutants. Open cast mining can degrade local air quality, leading to a higher incidence of cardiovascular and pulmonary diseases in nearby populations.

## **5. Health issues caused by air pollution:**

Despite these efforts, open cast mining remains a significant source of air pollution, contributing to both local health issues and broader climate impacts.

Open cast coal mining has significant health impacts, especially for people living or working near the mining areas. The health issues arise due to exposure to airborne pollutants like dust, particulate matter, and toxic gases, as well as other environmental and occupational hazards. Here are some key health problems associated with open cast coal mines:

### **a) Respiratory Problems**

**Chronic Obstructive Pulmonary Disease (COPD):** Long-term exposure to dust and fine particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) can lead to chronic lung diseases, including COPD, characterized by obstructed airflow and breathing difficulties.

**Asthma and Bronchitis:** The inhalation of coal dust and other pollutants from mining operations can trigger asthma attacks and cause chronic bronchitis, especially in children, the elderly, and those with pre-existing respiratory conditions.

**Pneumoconiosis (Black Lung Disease):** Miners and workers directly involved in coal extraction are at risk of developing coal workers' pneumoconiosis, commonly known as black lung disease. This occupational disease occurs due to prolonged exposure to coal dust, leading to scarring and stiffening of lung tissue.

### **b) Cardiovascular Diseases**

Exposure to particulate matter, especially fine particles (PM<sub>2.5</sub>), has been linked to an increased risk of heart disease, high blood pressure, and stroke. Airborne pollutants from mining activities can enter the bloodstream through the lungs, causing inflammation and contributing to cardiovascular problems.

### **c) Cancers**

**Lung Cancer:** Long-term exposure to coal dust, silica, and toxic gases such as benzene can increase the risk of lung cancer. Studies have shown that people living near open cast coal mines have higher incidences of lung cancer.



---

**Bladder and Kidney Cancer:** Prolonged exposure to certain carcinogens released during coal mining also increasing the risk of bladder and kidney cancer.

**d) Silicosis**

Silica, found in the earth's crust and often released during mining, can cause silicosis, a lung disease that leads to inflammation and scarring in the lungs. This condition is debilitating and is common in workers who are frequently exposed to silica dust.

**e) Mental Health and Stress**

Communities near open cast mines are often suffering from mental health problems due to environmental degradation, loss of livelihood, noise pollution, and fear of long-term health impacts. These issues are one of main reasons leading to anxiety, depression, and chronic stress.

**f) Skin and Eye Irritation**

Dust and particulate matter can cause skin and eye irritation. Prolonged exposure to coal dust can lead to conditions like dermatitis (skin inflammation), and exposure to certain chemicals used in mining processes are resulting in allergic reactions or chemical burns.

**g) Occupational Hazards**

Miners and workers in coal mining operations are facing additional risks from:

**Accidents:** Mining is a dangerous occupation with risks of injury or death from equipment failures, cave-ins, or blasting accidents.

**Noise-Induced Hearing Loss:** Continuous exposure to loud machinery and explosions are leading to permanent hearing loss.

**Heat Exhaustion and Heat Stroke:** Miners working in hot environments, especially in deep or surface mines, are at risk of heat-related illnesses.

**h) Developmental and Reproductive Health Issues**

Some studies have suggested that exposure to mining pollutants are affecting reproductive health. Pregnant women exposed to air pollution may face an increased risk of preterm birth, low birth weight, or birth defects.

**Children's Health:** Children living near open cast mines are particularly vulnerable to the effects of air pollution, as their lungs and immune systems are still developing. Exposure to coal dust and toxic substances may lead to developmental delays and reduced lung function.

**i) Allergic Reactions**

Chemicals used in coal washing and processing cause allergic reactions, such as rashes, asthma, or other hypersensitivity disorders. This occurs from direct contact or inhalation of airborne chemicals.

**j) Water Contamination and Health Effects**

Open cast mining is leading to the contamination of local water supplies with heavy metals and other toxic substances. Consumption of contaminated water is causing a range of health problems, including gastrointestinal disorders, neurological damage, and developmental issues in children.

**6. Conclusion**

In conclusion, opencast coal mining poses significant health risks to both workers and nearby communities, primarily due to exposure to airborne pollutants, dust, and environmental contamination. Respiratory diseases, cardiovascular problems, noise-induced hearing loss, and mental health challenges are among the most prevalent issues. To reduce these risks, strict regulatory measures, improved mining practices, and enhanced



protective measures for workers and residents are essential. Addressing these concerns is critical to safeguarding public health in regions affected by opencast coal mining. The health risks posed by open cast coal mining are significant, particularly for nearby residents and workers. These health issues emphasize the need for stricter regulation of mining activities, improved dust control measures, and better healthcare services in mining regions.

**References:**

1. Bhagabati Runa 1\* and Borkakoti Aparajita 2\* --- Status of Patkai Lake Near Tikak Open Cast Mine, Assam: A Hydro-Biological Approach—*ISSN (online):2320-4257(BioLife)*.
2. A Report on Ambient Air Quality: Water/Waste Water Quality & Ambient Noise Level at NECF. Margherita-Submitted by ENVIROCON-Digboi Stores Building, New Market, and Digboi-2012.
3. Dutta Ranjit, North Eastern Coal fields at a Glance in DehingPatkaiFesival. A souvenir, (2003).

**Web sources:**

1. [www.neccoal.co.in](http://www.neccoal.co.in)