

## **1.0 Introduction**

### **1.1 Background of the Study**

Globally, water is one of the most abundant and essential commodities of man and covers about 71% of the earth's surface. On earth, 96.5% of water is found in the seas and oceans, 1.7% in groundwater, 1.7% in glaciers and the ice caps of Antarctica and Greenland, and 0.001% in the air as vapor. The various uses of water include drinking and household needs, recreation, navigation, agriculture, industry, electricity generation etc. Water also serves as a medium for chemical reactions, temperature regulation, and removal of waste products. Water is an essential, natural resource, a basic human need and a very important national asset, therefore its use requires appropriate planning, development and management (Yadav et al 2013). Considering the fact that Water is very important in the sustenance of life a satisfactory, safe, adequate and accessible supply must be made available to all (WHO, 2011).

The term surface water refers to water on the surface of the planet such as in oceans, rivers, natural and artificial lakes, wetlands and streams. (Popek, 2003) defined surface water as water that flows or rest on land and is open to the atmosphere; lakes, ponds, lagoons, rivers, streams, ditches and man-made impoundments are bodies of surface water. Water is needed in the right quality and quantity by human beings and to avoid water pollution, these water bodies has to be free from toxic substances and large amounts of minerals (Kumar and Padhy, 2013). Water pollution is the contamination of water bodies by the introduction of certain pollutants directly or indirectly by the activities of man. Pollution not only makes water unsafe for drinking but also unsuitable for other industrial and agricultural purposes (Kumar and Padhy, 2013)

Nigeria is the 6<sup>th</sup> largest producer of oil in the world and it is also endowed with a very large gas reserve. In the course of exploration, drilling, refining and distribution operations in the oil and gas industries waste in the solid, liquid and gaseous form are

produced and discharged into the environment and one of the wastes produced in these industries is flared gas.

Flaring refers to a high temperature oxidation process used to burn combustible components mostly hydro carbons of waste gases from industrial operations. Gas flaring is the process of burning off unwanted flammable gasses via combustion in an open atmosphere with the aid of safety devices called Flare stack (McWen and Johnson, 2010). As at 2013 the World Bank estimated that about 150 billion cubic meters ( $5.3 \times 10^{12}$  cubic feet) of associated gas are flared annually. This is equivalent to about 25 percent of the annual natural gas consumption in the United States or about 30 percent of the annual gas consumption in the European Union (GGFR, 2011). If it were to reach the market, this quantity of gas (at a nominal value of \$5.62 per 1000 cubic feet) would be worth \$29.8 billion USD. As at 2013, the top 10 gas flaring countries included Russia (35 bcm), Nigeria (15 bcm), Iran (10.5 bcm), Iraq (10 bcm), USA (5 bcm), Algeria (5 bcm), Kazakhstan (4.5 bcm), Venezuela (4 bcm), Saudi Arabia (3 bcm), Angola (3 bcm).

The flaring of associated gas in Nigeria's oil exploration fields dates back to about 58 years when oil production began in the Niger Delta. Over 170 trillion cubic feet of gas is produced in Nigeria, of which more than 70% is burnt off. According to World Bank estimation in 2012, Nigeria flares about 15 billion cubic meter of associated gas annually which makes them the highest in terms of gas flaring in Africa and second in the world. Gas flaring has serious implications for both Nigeria and the rest of world because when these gases are burnt off into the atmosphere, they in turn form acid rain. The acid rain, when it falls to the earth's surface, is corrosive in nature, and causes widespread damage to the environment. The Niger Delta region, where Nigeria's large oil and gas resources are located as remained a source of global interest. With openness to the Atlantic Ocean and water courses and with access to the seas and rivers such as River Niger and River Benue, the Niger Delta is ranked among the most productive coastal and offshore waters in the world. However over

exploitation and exploration of Oil and Gas resources have led to rapid degradation of vulnerable land, coastal and offshore habitats and shared living marine resources of the region putting the health and the economic activities at risk.

Petroleum exploitation and production in the Niger delta over the years have resulted in a number of environmental, socio-economic and political problems in the region. Gas flaring has caused severe environmental damages, loss of plants, animals and human lives, and loss of revenue to both the oil producing companies and the government.

## **1.2 Statement of the Problem**

Although the exploitation and exploration of crude oil and the establishment of oil servicing companies have been of benefit to Nigeria, the negative consequences emanating from such production processes has been very disastrous. Gas flaring threatens global health by emitting significant volumes of Greenhouse Gases which contributes to climate change and global warming. It also threatens global health by emitting toxins that are dangerous to people, land, water and air. Gas flaring is associated with many of the devastating health problems like cancer, asthma, blood disorders etc. Heat generated from gas flaring kills surrounding plant, suppresses the growth and flowering of some plants thereby reducing crop yield, induces soil degradation, destroys aquatic life and diminishes agricultural production (UNDP, 2006) The issue of gas flaring and its environmental effects has become a serious problem and a major cause for concern globally. Apart from wastage of natural resources, it is a menace to the global existence and continuous survival of man. The incidences of acid rain, Green House Gas emissions have disrupted the economic lives of the locals which is basically fishing and farming and have led to the continuous and irresistible research and study on how to minimize, control and eliminate the flaring of combustible gasses especially for people in the Niger Delta region of Nigeria where it is most common.

## **1.3 Objectives of the Study**

The aim of the study is to examine the effects of gas flaring on surface water in the study area. This aim will be achieved through the following objectives:

To determine if there is a significant relationship between Gas flaring and surface water quality in the study area.

To estimate the level of pollution by gas flaring using known world standards.

To estimate the effect of pollution by gas flaring on surface water in the study area.

To create awareness on various effects that may arise as a result of gas flaring in the study area.

## **THE IMPACT OF GAS FLARING ON SURFACE WATERS IN IBENO LOCAL GOVERNMENT AREA, AKWA IBOM STATE**

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