

ENVIRONMENTAL IMPACT OF CRUDE OIL SPILLAGE AT AGOUBIRI COMMUNITY IN SOUTHERN IJAW LOCAL GOVERNMENT AREA OF BAYELSA STATE.

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ABSTRACT

Assessment of the result of crude oil spillage that occurred at Aguobiri Community in Southern Ijaw Local Government Area of Bayelsa State in 2007, is presented in this paper. The results of the laboratory analysis of water samples for Total Hydro carbon content (THC) was 1.56mg/l, 2.94mg/l and 23.96mg/l at 300m, 200m and 9m respectively from the spill point. Heavy metals values in plant tissues were Vanadium-2.14mg/kg, Nickel-4.06mg/kg and THC of 109,309.5mg/kg at 300m from the spill point. The values of heavy metals in soil samples were Vanadium 2.14mg/kg and Nickel 4.19mg/kg and THC of 133,886.20mg/kg at 300m from the spill point. This is to buttress the fact that oil spill is not limited to the site of occurrence but spreads to affect flora life far away from the spill point. Consequently, this negatively impacts farming and fisheries activities in such areas.

Key words: Crude Oil spill, Heavy metals, Total Hydrocarbon, Aguobiri

INTRODUCTION

Petroleum exploration, exploitation and or production are activities with high potentials to cause pollution of the environment, which have a corresponding effect on the lives of the people inhabiting such environment. The Joint Group of Experts on the scientific Aspects of Marine Pollution defined pollution as deleterious effects or harm to living resources, hazard to human health, hindrance to marine activities including fishing, impairment of quality use of seawater and reduction of amenities (GESAMP, 1991). Based on the incessant oil spillages in Bayelsa State and indeed, in the Niger Delta, the concerns of the effects of the different contaminants accompanying this incidence and the toxicity to living organisms and hitherto the effect on human land, aquaculture and other farming systems ought to be established. Environmental impact assessment is a study to predict, foresee and proffer restorative measures to ameliorate the impact a project or disaster may have on the environment. The aim of the study was to ascertain the impacts of the spill from specified distance after some months of the crude oil spill occurrence in Aguobiri community in Southern Ijaw Local Government area of Bayelsa state.

MATERIALS AND METHODS

The oil spillage occurred at Beinmo Bou 16th Nun River-Kolo Creek Oil pipeline, Aguobiri Southern Ijaw Local Government Area of Bayelsa State, in October, 2007. Aguobiri creek otherwise known as Silver creek is bounded by Igeibiri community to the North and Angiamagbene community to the south. The creek is tidal during the months of December to May, while it overflows its banks during the months of June to November. The exercise started on the 8th of May 2008 i.e six months after the oil spill. Visual observation of the impact on the flora and fauna in the environment was evaluated physically. Three point were chosen from the site of the oil spill for sampling i.e (9m, 200m and 300m. Samples of water, plant tissues and soil were collected for further analysis in the laboratory. Water samples were analysed using standard methods of APHA (1992). Heavy metals in soil and plant tissues were determined by the perchloric acid digestion method as described by Udo (1986). Total Hydrocarbon Content (THC) was determined using toluene extraction method with the absorbency measured at 420nm in a spectronic 20 spectrophotometer



Figure 1: Map Showing Area location of Aguobiri. Source: Microsoft Encarta Premium.2009

RESULTS

Visual Observation: It was observed that oil films and slicks were still floating on the ponds, pools of water and stream that flows into the Silver creek. There was no sign of life to signify presence of aquatic organism as shown in plate 1, hence no samples of aquatic organisms were collected for analysis. The plant species were already scorched by the oil spill as shown in plates 2. The soil at different areas along the pipeline and beyond the right of way to both right and left sides appear dark and scorched with oiliness nature, it was also observed that there was accumulation of oil on the bed of the creek. The results of the laboratory analysis for THC and Nickel and Vanadium concentrations in water, soil and plant tissues are shown in Table 1 for THC and Table 2 for Nickel and Vanadium in soil and plant tissues.

Table 1: Total Hydrocarbon Concentrations in the environment from three sampling points from spill point.

Sampling point	Water samples mg/l	Soil samples mg/kg	Plant tissue samples
9m from spill point	23.96	102,908.10	-
200m from spill point	2.94	175,835.10	-
300m from spill point	1.56	133,889.20	109,309.5

Table 2 Concentrations of Nickel and Vanadium in soil and plant tissues at 300m from spill point.

	Nickel mg/kg	Vanadium mg/kg
Soil sample	4.19	2.14
Plant tissue sample	4.06	2.14

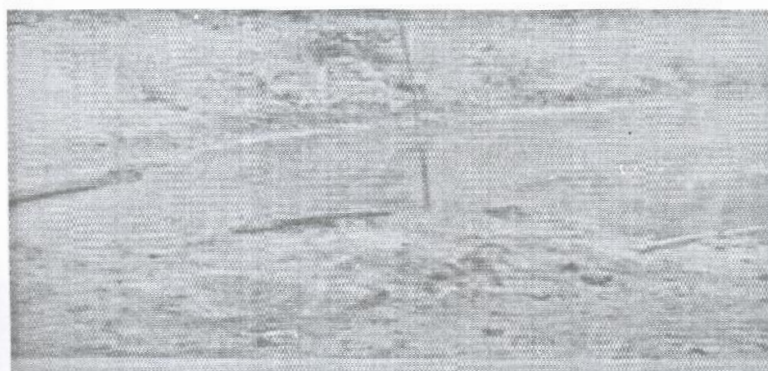


PLATE 1 : LOSS OF AQUATIC LIFE AND OILINESS OF WATER SURFACE DUE TO OIL SPILLAGE AT AGUOBIRI COMMUNITY

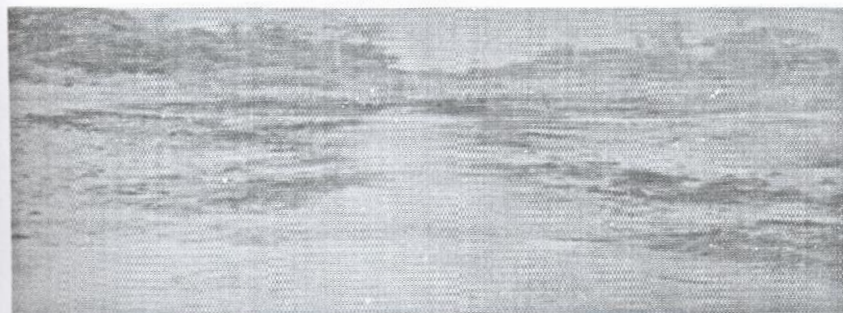


PLATE 2: VEGETATION DESTRUCTION CAUSED BY OIL SPILLAGE AT AGUOBIRI COMMUNITY

DISCUSSION

The impact of the oil spillage on the environment, the effect on the entire biota and the disturbance of the dynamic equilibrium of the entire ecosystem is quite unimaginable. The fauna diversity both aquatic and terrestrial appeared to have vacated the impacted environment since and after the occurrence of the oil spillage. This may be due to the offensive smell that emanated from spilled crude oil which contains sulphur. This in turn spelt hardship for the populace who are mainly farmers, fishers and hunters. From discussions with the community leaders, the people had experienced various types of sicknesses ranging from gastro-intestinal disturbances, chronic and acute respiratory problems. The foregoing shows the chain effect of oil spillage on entire ecosystem at the spill point and beyond, as the oil flows, spreads and soaks the surroundings, while hydrocarbon are released from the crude oil. The extent of damage is closely correlated with the length of time the oil was left untreated in the environment (Don-Pedro, 2009) Since this study was carried out six months after the spillage. The THC in soil samples from the various points were still far higher than the acceptable limits of 40mg/kg (EGASPIN, 1991) When containment fails environment is badly impacted and sensitive areas like nurseries, feeding and reproductive grounds for wildlife and aquatic resources are destroyed. Nickel is usually from metal plating materials the WHO standard in water is 0.02mg/l (Lenntech, 1998 cited by Ajah 2006) According to USEPA 1993 the regulatory limit in soil is 75 mg/kg which is more than what we obtained in this study. Nickel is also known to be abundant in the earth crust as well as vanadium. Vanadium found in this site was not at toxic level, it is usually used in the steel industry, it is also found in petroleum products and naturally in fossil fuels, it is toxic as a cation and as an anion. Plants take up vanadium from soil, groundwater, surface water and air while animals take up vanadium through contaminated water, food and polluted air. Typical fresh water concentrations should be 0.001mg/l. Vanadium does not dissolve in water but can be carried in water as much as dust. Vanadium has been demonstrated to have moderate to high acute and chronic toxicity to aquatic organisms and up to a high chronic toxicity to terrestrial organisms (CHE, 2010). The THC is the main problem as perceived in this study but it should be noted that heavy metals are highly persistent and they accumulate in the food chain and have cumulative effects in human beings through processes of bio-accumulation and bio-magnification. The threat of environmental pollution should not only be popularized especially in Bayelsa state but environmental education in school curriculum, regular seminars and workshops must be organized. Immediate containment and remediation of oil spillage must be enforced on the operators by the environmental agencies in the country.

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