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Elementary Analysis of Effluents from the Refinery Algiers

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ABSTRACT

The oil and natural gas industry generates the energy needed to carry out many human and industrial activities. The high volume of water resources consumed by this industry implies the need to design efficient, sustainable and cost-effective solutions for the treatment of waste water generated in oil refineries, for sludge produced in extraction wells, etc., as these effluents have a direct impact on resource sustainability, the environment and the rest of industries and sectors. In order to assess the heavy metals that may be present in the liquid waste, samples of industrial waste of liquid origin were taken at the refinery in Algiers. The samples were analyzed to determine concentrations in heavy metals (Cd, Zn and Pb) using XRF (Fluorescence X) and ICP techniques. The results generally show a variation in the content of heavy metals at the refinery in Algiers.

Keywords: Industrial discharge, heavy metals, XRF technique and ICP technique

1 Introduction:

The petroleum industry in general and the refining activity in particular are designated as a source of pollution. Pollution by petroleum products is essentially a pollution by hydrocarbons which, due to their properties, presents the particularity of being all the more harmful. Effluents from oil refineries can be contaminated by crude oil, water inflows, rainwater, water from tankers, sewage, processing chemicals and catalysts, reaction products, chemical additives...The harmful effects of this type of pollution can be significantly reduced or mitigated by implementing solutions including treatment by coagulation flocculation.

2 Experimental

X-ray fluorescence spectrometry is a global elemental analysis technique allowing the identification and determination of most of the chemical elements that make up a sample with precise and, above all, reproducible results. In X-ray fluorescence spectrometry, the X-ray sources usually used are X-ray tubes or radioactive sources.

3 Results and Discussion

The results of the XRF analyzes of the liquid discharge show that several elements were detected by the device. The results obtained for the sampling points at the Algiers refinery are grouped and compared with the Algerian standards in the tables below.

Table 1. *Concentration of heavy metals in liquid discharges*

Elements	Concentrations (mg/l) XRF	OMS standards 1998 (mg/l)	Values maximum limit (mg/l) 2006	Values maximum limit(mg/l)2009
Pb	0.03	0.05	0,5	0 ,5
Cd	1.1	-----	-----	-----
Zn	2 .1	----	3	2

The results in Table I show that the metals which were measured in liquid discharges by XRF present results

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in the norm Algerian standards.

4 Conclusions

Lead (Pb), Cadmium (Cd) and Zinc (Zn) are the elements that were detected in most articles and show fairly good correlations with laboratory methods. This is probably linked to the good detection limits of these elements by the device and the fairly high atomic numbers of these elements.

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