MONITORING AND ANALYSIS OF EFFLUENT WATER OF EXPLOSIVE FACTORY, PAKISTAN ORDNANCE FACTORY, WAH CANTONMENT

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Abstract

The study is about the examination and testing of multitudinous physical and chemical parameters in the effluent waters and comparing the results and outcomes to National Environmental Quality Standards. The area selected for the study is Pakistan Ordinance Factory (POF) in Wah Cantonment. Basically factory is divided into many sections and various sub- factories each having its own specifications in terms of services, products and quality certifications. Main area of the study is the Explosive Factory and its effluent waters, collected from different selected sample points. All the testing were carried out in instrumental and water analysis lab of POF. Effluents were tested using conventional methods including volumetric analysis, iodometric analysis, gravimetric analysis, and also using instrumental techniques. Three sample sites were selected (Sample point 1: Surface drain; Sample Point 2: Effluent Water Treated; Sample point 3: Sewage Disposal) with in the Explosive Factory of POF. The samples were collected in three different bottles and temperature was measured at the same time. Numerous experiments and tests were carried out to find and calculate different parameters such as PH, TDS, TSS, sulphides, chlorides, BOD, COD, heavy metals and sulphates. The findings and results of the tests exhibited that most of the parameters were detected in the samples but their values were within the permissible limits and required no further treatment. Effluent water constitutes different chemicals a slightest change in their values, especially heavy metals, can have detrimental effects on different environmental sectors. The effluent samples for May, June and July 2011 shows that all the parameters are lying with in the permissible limits of NEQS. Since all the parameters of effluents are within the limits, therefore; the variations in the result are not of much concerned. Some parameters like sulphide, chlorine, ammonia, chromium, and cadmium didn't show any of their signs in the effluent samples, while oil and grease (3.6 ppm – 7.7 ppm), lead (0.1 ppm – 0.14 ppm) and temperature 31.1C – 33.9C) are somewhat near to their permissible limits of NEQS i.e. 10ppm, 0.5ppm and 40C respectively. TSS (1 ppm – 42 ppm) showed large variation at the site 3 but still it is far below its permissible limit of NEQS i.e. 200ppm. Thus, it is recommended that proper testing and treatment of the effluents is required before the final disposal, to check if the values of all the parameters are within the threshold limits of the international standards. Dilution of the effluents should be done at every possible step, alternate testing methods with improved technology and higher accuracy should be introduced. Testing should be done in controlled laboratory environment with proper exhaust and ventilation system and optimum room temperature and pressure should be maintained. Even after the treatment, care must be taken that it might not get mixed with the drinking water or other fresh water resources. Testing of effluents is recommended prior to dilution or treatment, in order to determine the efficiency of treatment being done.

Key words: Effluents, POF, Parameters, Testing, Conventional methods, Threshold limit, International standards.

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Acronyms

BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
EPA	Environmental Protection Agency
ISO	International Standard Organization
NEQS	National Environmental Quality Standards
OHSAS	Occupational Health Safety Assessment System
PEPA	Pakistan Environmental Protection Act
PNEC	Predicted No Effect Concentration
POF	Pakistan Ordnance Factory
QHSE	Quality Health Safety and Environment
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
WHO	World Health Organization

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