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THE ANALYSIS AND ASSESSMENT OF CONTAMINATED SOIL IN THE FORMER NAVAL AIR STATION OF KEFLAVIK (NASKEF), REYKJANESBÆR

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ABSTRACT

Chemical washing is a method used to remove mixed pollutants from contaminated soils. In this report, a laboratory experiment was conducted to test the level of heavy metals removal from soil samples (brown andosols) collected in the former Naval Air Station in Keflavik (Iceland). First, an overview of distinct types of contaminated soil remediation methods and their previous applications were given, then the process of selecting heavy metals as the main contaminants to be remediated was explained. Heavy metals considered for the remediation experiment in this report were: lead (Pb), chromium (Cr), cadmium (Cd), copper (Cu), nickel (Ni) and zinc (Zn) and the washing solution are hydrochloric acid (HCl), sulfuric acid (H₂SO₄) and sulfuric acid plus isopropyl alcohol (H₂SO₄+C₃H₈O). The chemical washing process and the laboratory experiment was then described. The first experiment was Aqua Regia (ISO 11466) Ref 890 test, to determine the initial soil contamination level, followed by the US EPA SW-846 Method 3550 experiment used to determine the soil decontamination level. The Aqua Regia (ISO 11466) Ref 890 experiment results showed that the soil was contaminated with Pb, Cr, Cu, and Ni, which values were above European Union threshold values. After chemical washing, the results showed that all the three solutions are effective in removing heavy metals, but a combination of 2.5N sulfuric acid and isopropyl alcohol in a 4:9 ratio with a dilution of 5:1 to the soil is the most effective washing solution with a desired removal percentage ranking between 95.92 and 99.98 %.

Keywords: soil, heavy metals, c; Chemical washing; Remediation.