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Chemical Decontamination, at Field, after ^{137}Cs Accident at Goiania, Brazil

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In 1987 to 1988, we were in charge of chemical decontamination of different materials, from soils, roads, hospitals, schools, houses indoor, house-wares and roofs to people, and their urines and feces, and water, highly contaminated with ^{137}Cs from a radiotherapy device (1300 Ci or 48,1 TBq), robbed from a deactivated hospital in demolition, in Goiania. The source structure we decontaminate weighed 304 Kg, the complete device weighed about 800 Kg, and could not have been put in a hand car, by 3 people, as was published. People dismounted the device in a junkyard, contaminated a lot of areas and materials in three junkyards, and took most of the $^{137}\text{CsCl}$ source to their homes, fascinated with the phos-phorescent blue light. When people were sick and burnt, they washed out the materials of original source, to the garden. After 25 years it is important to present and discuss the accident and the chemical solutions to the problem of sprayed CsCl from the original source, by common people, water and dust, due to high water solubility and chemical interactions with clay minerals and K-containing materials. Some information about the chemical decontamination work was published in the CNEN-IAEA Goiania Report, based in our internal report (1988). In NRC 7 we intended to present our work, but it was not possible to participate of the conference. In the present work we present and discuss chemical decontamination of different materials at field. Very often it is necessary to attack chemically the materials to let Cs^+ available. The best ion exchange material for Cs^+ is $\text{FeKFe}(\text{CN})_6$ (K Prussian Blue, or KPB) and not $\text{K}_4\text{Fe}(\text{CN})_6$ (PB) used in "Radiogardase" capsules. Al^{3+} ions coagulate colloidal materials, H^+ attack oxides and carbonates, K^+ substitute Cs^+ and KPB exchanges K^+ by Cs^+ . To liberate Cs^+ from dust, soils, cements, the best solutions are $\text{KAl}(\text{SO}_4)_2$ solutions, acidified with HCl . For granites it is better to use HF solutions, to remove Cs from fluorspat. Urine and feces were decontaminated with Resin/KPB. Resin/KPB is effective to decontaminate Cs^+ hands and feet, instead of ingesting Radiogardase capsules, waiting Cs^+ to go in the blood stream to be exchanged at the intestines. We produce KPB at field, in suspensions or supported in cation exchange resins, in wool towels, is EPU foams and in t-shirts. Published reports with decontamination methods to decontaminate materials and a city (Harshaw Report), with NH_4Cl or NH_4NO_3 were too light and slow. Process had to be much faster and effective, and had to take in account the chemical composition of every material and provide ion exchange to remove Cs^+ ions.

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