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**Case study; removal of metal scrap from a refinery/chemical
plant site**

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Case Study: Removal of Metal Scrap from a Refinery/Chemical Plant Site

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Because of economic and environmental reasons, recycling of metal scrap is an integral part of metal production. In recent years the metal recycling industry has become increasingly aware of unwanted components in metal scrap, *i.c.* radioactive material. World-wide over thirty documented cases have been reported, where radioactive sources (≥ 1 GBq) were unintentionally smelted in the course of recycling scrap. Consequently gate monitoring of external radiation levels on containers with metal scrap is being performed increasingly by scrap processors. This very sensitive monitoring device lead to the unexpected discovery that some scrap is contaminated with Naturally Occurring Radionuclides (NOR's). This type of contamination occurs at relatively low radioactivity levels and is generally a surface, rather than a volumetric contaminant of the metal; thus presenting significant smaller radiation hazards when compared to smelting radioactive sources. This discovery presents a vexing problem to the scrap recycling industry. Consequently, steel mills are reluctant to smelt such scrap.

A case study of one container of scrap from a decommissioned chemical plant will be presented. According to the scrap processor this container was not to their specification as their gate monitor indicated an enhanced external radiation level (about fifteen percent above the natural background). Visual inspection of the returned batch of scrap did not show any peculiarities on the metal surface. However, inspection with a surface contamination monitor did show a level of twice the background. Only in a stop-valve a layer of about 1 cm of 'chalk' was discovered, of which the activity concentration was analysed to be about 15 Bq(total) per gram by means of gamma-spectrometry. Currently similar scrap is accumulating (about 10,000 tonnes) on-site and no satisfactory solution for disposal *c.g.* recycling has been found yet.