



## **Ensuring risk-based remedial activities are sustainable: A case study at a former petroleum products terminal in Madeira**

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Sustainable remediation, as defined by the Sustainable Remediation Forum - United Kingdom (SURF:UK; [www.claire.co.uk/surfuk](http://www.claire.co.uk/surfuk)), is 'the practice of demonstrating, in terms of environmental, economic and social indicators, that the benefit of undertaking remediation is greater than its impact and that the optimum remediation solution is selected through the use of a balanced decision-making process'. This paper presents a case study of a sustainable remediation assessment completed as part of an exit strategy for a former petroleum products terminal in Madeira ('the site').

The site operated as a petroleum products storage and distribution terminal between the 1960s and 2007. In 2007, environmental assessment works were carried out to determine if any risk management steps would be required to ensure no harm to present-day and future receptors. The report recommended the need for significant soil remediation works to manage the potential risks identified. In 2010, a project commenced with the goal to ensure that the remedial technology selected and the approach to remediation was carried out in a manner that is in accordance with the aforementioned definition of sustainable remediation, whilst ensuring that both external and internal stakeholder objectives are achieved.

The SURF:UK framework was used to design the project and it incorporated a number of steps including: Identification of relevant stakeholders (both internal and external); definition of project boundaries (e.g., financial / time constraints, etc); identification of feasible soil remediation techniques; determination of relevant sustainability indicators (out of the 18 identified in the SURF:UK framework); semi-quantitative assessment of the social-economic-environmental impacts and / or benefits of feasible soil remediation techniques; and, completion of a sensitivity analysis.

This paper will present the results of the sustainable remediation assessment and highlight difficulties encountered during the lifecycle of the project and how they were overcome. A summary of some of the difficulties encountered is given below.

- Stakeholder management: Ten major stakeholders (6 internal) were identified. As such, managing stakeholder expectations and gaining agreement on the project objectives and boundaries were difficult.
- Lack of waste management expertise/facilities in Madeira: A number of the feasible remedial technologies identified required plant and / or labour to be transported to Madeira from mainland Europe.
- Sustainability indicators: Defining how the indicators were to be measured, quantified, and compared with each and whether any weighting to each indicator should be applied.
- The scope of the assessment (e.g., include the air emission impacts from the production of reagents used?, etc).