

7. Newcastle Harbour Sediment Trial (2006) - TPH, PAH

Newcastle Steelworks closure area, Newcastle (NSW)

INNOVA SOIL TECHNOLOGY was commissioned to treat the 250 Tonnes of “as dredged” Newcastle Harbour sediment as a pilot trial looking at the effectiveness of **INNOVA’s DFTD** treatment method in dealing with PAH and TPH impacted sediments. Contaminated sediment was dredged from the south arm of the Hunter River, whilst treatment operations were performed at **INNOVA’s DFTD** facility located on the adjacent former Newcastle steelworks closure area.

The main objectives of the sediment trial were to:

- Determine the effectiveness of the Thermal Desorption process to remove PAH and TPH contamination to levels below 100 mg/kg and 1000 mg/kg respectively
- Determine the ability of the Thermal Desorption process to allow beneficial reuse of the treated sediment
- Develop and assess process operating parameters
- Develop logistical procedures for handling and treating up to 250,000m³ of Newcastle Harbour sediment



As received sediment



Feed stockpiles



Air drying



CaO mixing

The trial began with five days of dredging operations on Monday 13th March 2006 with dredged sediment stored temporarily in an environmentally safe concrete bunded, plastic lined containment area. Representative samples of the dredged material were collected and sent to Australian Laboratory Services (ALS) for chemical analysis while geotechnical assessment was performed by Douglas Partners. Following dredging and initial sampling and analysis, treatability studies were carried out in **INNOVA’s ASCTM** lab on a bench scale desorption apparatus to determine operating parameters for full scale processing. Dredged sediment was split into four batches and either air dried or combined with the drying agent CaO producing a matrix of varying moisture and contaminant concentrations. The nature of the “as dredged” sediment posed a number of processing difficulties which in turn were overcome by Innova following treatability studies and development of procedures to optimise the process for and deal with traditionally ‘difficult’ contaminated material.

Thermal desorption operations for the four sediment batches were undertaken on four days in April and May 2006. Independent stack emissions sampling and analysis was performed by HLA Envirosiences.

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Plant operations

Over the course of the four day sediment trial operation an extensive sampling and analysis regime was undertaken, including; both independent and in-house feed and product sediment sampling and analysis, process temperature recording, continuous stack emission monitoring, and independent stack emissions testing. Although the key processing attributes (TPH, fines and moisture content) of the sediment were outside typical thermal desorption processing range, **INNOVA** was able to successfully treat all sediment batches, with results confirmed through independent analysis of the product soil. Sediment was treated at or above 490°C with a residence time of ~ 20 minutes. In all cases sediment was treated to comply with industrial land use criteria with residential cleanup criteria met in most cases. Stack emission testing performed by HLA Envirosciences showed total compliance with **INNOVA**'s license limit conditions. Geotechnical analysis undertaken by Douglas Partners indicates suitable reuse of treated sediment as engineered fill.

Soil results summary	FEED SOIL RANGE (mg/kg)	TREATED SOIL RANGE (mg/kg)
BTEX	nd – 15.9	Nd – 1.35
TPH	7,452 – 108,250	Nd – 29.5
PAH	3,441 – 80,956	< 20*
BaP	34.8 - 110	Nd – 1.4

