

Including contaminant budget principles in the monitoring program for sediment remediation efforts in Oslo harbour, Norway

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A system for documenting environmental cost and benefit has been developed for sediment remediation and management. This method is currently being utilised as part of the monitoring program for the remediation of contaminated marine sediments in Oslo harbour. Sediments are dredged and subsequently placed in a deep water confined aquatic disposal (CAD) facility in the inner Oslofjord. The environmental budget tool is based on accounting principles where contaminant loads are quantified (i) prior to, (ii) during and (iii) after remediation.

A contaminant budget was established in the design phase of the Oslo harbour remediation project. This was accomplished by initially defining the most important contaminant transport pathways and thereafter quantifying current and expected contaminant loads using in situ measurements, literature values as well as results from experimental laboratory work. The contaminant budget was included in the remediation project permit application to the Norwegian Pollution Control Authorities (SFT) and has subsequently become an important aspect of the monitoring program for the project, especially with regard to monitoring potential contaminant transport from the deep water CAD facility.

Since the project start-up in February 2005, accounting of the contaminant loads or "expenditures" from the deep water CAD facility has been conducted using monitoring results from periodic sampling and analysis of water and suspended solid samples. Actual contaminant loads are compared with the established contaminant budget and reported biannually to SFT. As of June 30th 2007, placement of dredged material in the deep water CAD facility had resulted in the following contaminant load consumption relative to the budget: 52 % for mercury, 3 % for cadmium, 59 % for lead, 32 % for PAH₁₆ and 13 % for PCB₇. Contaminant load predictions have also been carried out to identify which aspects of the remediation project are sensitive to exceedance of the contaminant

budget. Experience thus far has shown that incorporating contaminant budget principles has been advantageous in communicating the progress and status of remediation activities in the Oslofjord to the environmental authorities and other interested stakeholders.