Factsheet on Confined Disposal Facility

**Definition and Introduction to CDF:**
A Confined disposal facility (CDF) is an engineered structure for containment of dredged material. The confinement dikes or structures in a CDF enclose the disposal area above any adjacent water surface, isolating the dredged material from adjacent waters during placement.

The appropriate disposal of material dredged from navigation projects is a nationwide issue but has important implications for the use, management and protection of waters. Confinement of contaminated dredged material, determined to pose an unacceptable risk to the environment, is a federal policy and is recognized as necessary by state and local governments. Concern over environmental effects of dredging and disposal of dredged material, the increasing unavailability of suitable disposal sites and role of dredging in supporting waterborne commerce are the key issues.

**Why CDF’s??**
The use of confined disposal facilities continues to be necessary. Originally, the main CDF program envisioned use of such facilities for a 10-year period. It was believed that progress in pollution control particularly from municipal and industrial point sources would sufficiently reduce the contamination of sediments and thereby eliminate (or reduce) the need to use CDFs. However, the extensive accumulation of contaminated bottom sediments particularly in industrial harbor areas and tributary river reaches and continuing land use practices that create erosion, sedimentation and related pollution require on-going confinement of large quantities of polluted dredged material. Remediation or clean up of polluted material from a CDF or elsewhere has been demonstrated to be technologically feasible through various means, but is relatively expensive compared to placement/storage in a CDF. However, as long as contaminated sediments are removed to maintain safe navigation channels or for environmental remediation, there will be a continued need for CDFs.

**Design of a CDF:**
The size and design of each CDF is site-specific, depending on the location, the nature and potential amount of sediments and how it will be used or function once it is full and/or no longer receiving dredged material. Dikes for in-water CDFs are usually constructed in layers with heavy, protective stone on the outside and progressively smaller stones to sand on the inside. Some CDFs incorporate liners or steel sheet pile in the dike walls. As dredged material is pumped or placed in a CDF, the sediments settle out and the accompanying water evaporates or percolates through the walls or into the ground. When permeability is reduced over time because of sediment sealing, a variety of water release mechanisms including overflow weirs and filter cells are used.
Effectiveness of a CDF:
A major concern relates to how effective CDFs are in keeping the material from recontamination of the surrounding environment. Contaminants often bind with fine sediments such as silt and clay. To the extent that this form of pollution is confined to the CDF and bioaccumulation of pollutants by plants and animals in or near CDFs is not significant, then CDFs are presumed to be relatively efficient. Volatilization of contaminants is another potential problem but it varies from site to site.

There is no systemwide, continual monitoring program for CDFs. However, CDF water quality monitoring generally occurs during dredging and disposal operations and 12 CDFs do have monitoring wells in dike walls. The effectiveness of these monitoring wells has been questioned and may have limited value. A 1993 CDF report prepared by the Corps' North Central division summarized the overall environmental status of CDFs as reported in studies to date by stating, "The results of water quality monitoring has confirmed that CDFs are highly efficient at retaining the sediment solids and attached contaminants". CDF influent typically has suspended solids levels around 100 mg/l whereas effluents are normally around 1 mg/l. With respect to contaminant losses from in-water CDFs, detailed studies at several facilities show a high level of efficiency at keeping pollution within the CDF itself.

Even though CDFs appear to be efficient regarding retention of the contaminants, more research is needed to describe the potential contaminant exposure pathways associated with CDFs and test mitigation strategies such as capping or otherwise eliminating or neutralizing sediment exposure.

Future of CDF (Transition from Storage to Treatment facility):
Many CDF’s are nearing or exceeding design capacity. Acquisition of land for a new CDF is difficult because choice land areas located near dredging projects are already in use and undeveloped lands near dredging projects are wetlands whose ecological functions make them too valuable for use as CDF’s. The combination of these factors has produced the following impacts:

- Continued demand for CDFs to manage contaminated dredged material for navigation
- Increased demand for CDFs to manage contaminated sediments dredged for remediation
- More stringent environmental requirements for new CDFs
- Costs of new CDFs are increased beyond that due to inflation
- Fewer ports and local governments are capable of sponsoring a new CDF

Design of CDF’s as treatment structures, groundwater and surface water protection, and overall contaminant retention is being emphasized. There is an ongoing research for developing bioremediation, electrochemical remediation and other such technologies for treatment of contaminated dredged material.
For more information:

