

CHICAGO AREA CDF SYNTHETIC LINER AND SAND BLANKET EXPERIENCE

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The Chicago area Confined Disposal Facility (CDF) was constructed by the U.S. Army Corps of Engineers (USACE), Chicago District in 1982-84 to receive maintenance dredgings from the Calumet River and Harbor and Chicago River and Harbor. The CDF is located in Calumet Harbor, Chicago, Illinois. It is a triangular facility of 43 acres, extending out from the existing shoreline. The CDF is constructed of a rubblemound dike, with a core of prepared limestone, and a crest elevation of +12 feet LWD. The dike was constructed with a synthetic membrane liner along the entire interior face. A plastic, flexible liner (30 miles) with polyester fabric reinforcement was installed in 200 foot-long sections, heat welded in the field. The liner was placed against the prepared limestone, with additional stone placed on top. It is believed this was one of the first installations of a synthetic liner underwater.

During and after construction of the dike, observations suggested that the liner was not intact. The best evidence of this was the record of water levels within the CDF relative to lake levels fluctuations. The water level of the CDF directly followed the lake with no appreciable lag. A dye study of a portion of the CDF indicated that the liner was perforated randomly, rather than in a few specific areas. Measures to correct the situation were examined, including grouting and slurry walls.

The Chicago District decided to construct a blanket of silty-sand along the interior face of the CDF dike. It was hoped this material would act in two ways. The silty-sand blanket could be a barrier of low permeability, and sand could move through perforations in the liner and promote clogging of the prepared limestone. The silty-sand was excavated from the lake bottom within the CDF and placed mechanically against the dike on a 3:1 slope. Water level records within the CDF following placement of the "sand blanket" indicate that it has greatly retarded the interchange between the harbor and CDF. The CDF is no longer responsive to short-term lake level fluctuations, but does follow long-term fluctuations with a lag.

The Chicago District plans to manage the operation of the CDF in a manner which will further reduce the exchange of water between the harbor and the CDF. The next two maintenance dredging operations will include placement of dredged materials along the sand blanket to help its stabilization. The use of local lake sand at this CDF has been so successful that it is being incorporated into a future CDF design as an integral portion of the dike.