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CEWES-EE-R (200-1c)

28 October 1992

MEMORANDUM FOR CENED-PD-L/MR. MARK OTIS

SUBJECT: New Bedford Harbor Superfund Site, Confined Disposal Facility (CDF) Leachate Losses

1. In accordance with your request, I have reviewed the estimates of contaminant losses via leachate from the CDFs planned for containment of New Bedford Harbor sediment. You will recall that during our Engineering Feasibility Study (EFS) for this site we estimated losses by this pathway and reported our results in EFS Report No. 11.

2. The analysis provided with this memorandum uses the same approach as presented in Report No. 11. I used data from the batch leaching tests conducted here at the Waterways Experiment Station as an worst case estimate of contaminant concentrations, and I used the Hydrologic Evaluation of Landfill Performance (HELP) model to estimate the volume of leachate flowing through the bottom of the dredged material placed in the CDF. Important parameters and conditions used in the HELP Model analysis are as follows:

CDF surface area at dredged material surface	900,000 sq ft — 20 ac
Depth of dredged material	10 ft
* Dredged material hydraulic conductivity (based on consolidation tests of composite sediment)	3.3E-07 cm/sec
Foundation hydrualic conductivity	3.3E-07 cm/sec
CDF not capped -- dredged material surface layer	
Runoff from site actively collected from site	

3. Results of the HELP analysis and estimated losses of PCBs and lead are presented in Table 1 for a 20-year period following filling of the site. The percolation rates are broken into two sections: the interior of the site and the perimeter area where the dredged material is underlain by a sandy material of higher permeability, as opposed to the organic clay assumed for the foundation of the interior. The analysis shows that the relatively low hydraulic conductivity of the dredged material controlled the percolation rate for the site even when underlain by the sandy material. The percolation rate maintains a relatively steady rate during the 20-year period, and the dredged material fill remains near saturation for all but the material near the surface, which is typical of what has been observed for CDFs confining fine-grained material.

4. Adding a well-designed and carefully-installed cap to the dredged material should reduce the percolation rate through the

bottom of the CDF. Based on the laboratory evaluations conducted by the EFS, it is important to prevent fresh water washout of the salinity of the dredged material because of the increased mobility of the contaminants in fresh water. Based on the percolation rates presented in Table 1, this would take several decades.

5. Monitoring leachate from the CDFs will require installation of wells similar to those used for the pilot CDF. Several points around the perimeter of each CDF should have a cluster of wells designed to sample several depths, from just below the estuary water line down to bedrock or a layer of low permeability.

6. I hope this analysis will help you to answer questions concerning CDF leachate losses. I will mail you copies the HELP model output. We could followup this analysis with a sensitivity evaluation of key model parameters, with an analysis of a capped site, and with an evaluation of other CDF geometries. If you have any questions concerning this information, please call me at 601-634-3959.

Encl

DANIEL E. AVERETT
Environmental Engineer
Environmental Restoration Branch

Table 1. Estimated Leachate Losses from CDF No. 1, New Bedford Harbor Superfund Site

Years after filling	Percolation Interior cu ft/yr	Percolation Perimeter cu ft/yr	Percolation Total cu ft/yr	PCB Conc. Leachate µg/ℓ	PCB Flux Leachate kg/yr	Lead Conc. Leachate µg/ℓ	Lead Flux Leachate kg/yr
1	198204	2889	201093	266	1.5	9	0.051
2	142579	16553	159132	266	1.2	9	0.041
3	145537	34776	180313	266	1.4	9	0.046
4	124586	31399	155985	266	1.2	9	0.040
5	119773	31431	151204	266	1.1	9	0.039
6	113345	29849	143194	266	1.1	9	0.036
7	114444	30834	145278	266	1.1	9	0.037
8	120957	33198	154155	266	1.2	9	0.039
9	114221	30108	144329	266	1.1	9	0.037
10	113933	30645	144578	266	1.1	9	0.037
11	128500	35859	164359	266	1.2	9	0.042
12	121151	32186	153337	266	1.2	9	0.039
13	114105	29997	144102	266	1.1	9	0.037
14	127744	35701	163445	266	1.2	9	0.042
15	136879	37715	174594	266	1.3	9	0.044
16	122020	31634	153654	266	1.2	9	0.039
17	105617	26714	132331	266	1.0	9	0.034
18	115192	31696	146888	266	1.1	9	0.037
19	123649	34148	157797	266	1.2	9	0.040
20	124855	33878	158733	266	1.2	9	0.040

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