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CONCRETE LINERS FOR HAZARDOUS WASTE TANK SYSTEMS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

MAR 16 1988

MEMORANDUM

SUBJECT: Concrete Liners for Hazardous Waste Tank Systems

FROM: Robert W. Dellinger
Chief, Waste Treatment Branch
Office of Solid Waste

TO: Stan Siegel
Chief, Hazardous Waste Facilities Branch
Region 2

This memorandum is in response to a February 24, 1988 memorandum from Clifford Ng of your staff to Bill Kline of my staff, requesting guidance on evaluating the acceptability of concrete liners.

Concrete structures are used widely as primary or secondary containment of hazardous wastes. Although these structures can be expected to perform well, we are concerned about several unique problems posed by the use of concrete, for example, settling, cracking, permeability, and detectability of cracks or leaks. In general, we believe that a concrete structure, if properly designed, installed, and maintained, is acceptable as either a primary storage/treatment unit or as a secondary containment structure. This memorandum focuses on the use of concrete as a liner for the purpose of secondary containment. Please not, so as not to cause future uncertainty, that concrete liners (structures), as discussed in the memorandum, refer to structures that are typically constructed of steel-reinforced concrete and are essentially self-supporting. Any endorsement of this type of concrete structure for secondary containment of tank systems should not be construed to mean similar approval of concrete liners that are non-steel-reinforced and of relatively small thickness such as have been used for lining of surface impoundments.

The purpose of secondary containment is to contain any releases

from the primary storage/treatment tank system until the released material is detected and removed. Hence, an objective of "no migration" is sought. The term "no migration" means that released material is prevented from entering the environment and preferably from entering into the secondary containment liner.

Many, it not most, above-grade tank systems use concrete on the floor and dikes as the means for providing a secondary containment liner or structure. Synthetic membrane liners also are used. We believe that most concrete, or itself, is relatively permeable. Also, most concrete structures are subject to cracking sooner or later. For these reasons, we believe that concrete liners/structures should be provided with a coating or lining, for example, an epoxy, to minimize these deleterious conditions. Such a coating/lining will not only make the concrete "impermeable" but will also enhance the drainage capability of the secondary containment system, enable easier and quicker clean-up of releases, and ultimately allow for easier clean-closure of the tank system. In 40 CFR 264.193(e) and 265.193(e), vaults constructed of concrete are required to be provided with an impermeable coating or lining that is compatible with the stored waste and that will prevent migration of waste into the concrete. We intended that other concrete structures likewise should meet this requirement. A Federal Register notice of clarifications is now being prepared that, among these subjects, will provide a discussion regarding impermeable coating/lining for concrete structures.

Although a permeability of 10-7 cm/sec has been traditionally required of liners used in the management of hazardous waste, we have deliberately avoided quantifying a permeability for concrete liners/structures. We are not aware of a standard method by which to determine the permeability of concrete. In any event, permeability measurements would likely be difficult to interpret given that the permeability of the concrete may substantially vary from location to location within the structure, depending upon, for example, the number of pours of concrete, and the manner in which any individual pour is placed. As such, the degree of permeability afforded a concrete structure, with or without a lining, must be subjectively and qualitatively determined by a visual inspection of the structure. That is, one must ensure that the coating/lining entirely and uniformly covers the surface of the concrete structure that could come in contact with a released material. Obviously, regular inspections will play an important role in ensuring that the integrity of the concrete structure is properly maintained.

The lining/coating, as well as the concrete structure, must be inspected for wear, cracks, etc. Any cracking of the concrete structure/lining/coating must be promptly repaired. Similarly, abnormal or uneven wear of a lining/coating should be repaired.

Concrete is an acceptable material of construction for secondary containment structures and, in fact, may be preferable in many situations. We believe that these structures, if built in accordance with the standards of 40 CFR Parts 264 and 265, will provide containment of releases from primary tank systems thus ensuring protection of the environment.

If you have any further questions on the issue, please call Bob April, Bill Kline, or me at FTS 382-7917.

cc: EPA Regional Branch Chiefs
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