

Prefabricated transformer vault solves problem of

Providing Temporary Storage for PCB Transformer Fluid

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The Toxic Substances Control Act (TSCA) enacted by Congress in 1976 imposes rigid restrictions on the handling, packaging, transportation, use, storage, and disposal of any material containing, or having come in contact with, polychlorinated biphenyl (PCB); PCB has been determined to be highly toxic to humans and other forms of animal life. The initial TSCA regulations regarding PCB appeared in the *Federal Register* February 17, 1978, and were revised in 1979; this revision notably supplemented the original regulations with more stringent requirements.*

A major use of PCB has been as a coolant and dielectric insulating medium for liquid-cooled transformers installed indoors and in other locations where only a high-fire-point coolant can be used in conformity with the *National Electrical Code*. PCB transformer fluid

has been manufactured under a variety of brand names, but has come to be referred to generically as askarel.

TSCA regulations classify transformers containing PCB into two categories: compliance requirements and the owner's potential liability vary with the particular category:

- PCB transformer—any transformer that contains PCB in a concentration of 500 ppm or more
- PCB-contaminated transformer—any transformer that contains 50 ppm or more, but less than 500 ppm, of PCB. Transformers containing PCB in concentrations below 50 ppm are considered to be non-PCB items exempt from TSCA regulations.

TSCA regulations prohibit rebuilding a PCB transformer; PCB transformers in need of rebuild must be scrapped. If the transformer has been retrofitted with a non-PCB fluid, and documented to be a PCB-contaminated transformer at least 90 days following retrofit,

then rebuilding is permitted. Liquid removed from PCB transformers must be taken immediately to an Environmental Protection Agency (EPA)-approved incineration disposal facility for ultimate disposition; storage and reuse of the PCB is not permitted.

TSCA regulations notwithstanding, there are no EPA-approved liquid PCB disposal facilities in existence, although three facilities have been constructed and are awaiting EPA approval and licensing. Even as these disposal facilities are gradually brought on stream, they will not be able to immediately dispose of all of the PCB that is now awaiting final disposition. Temporary storage while awaiting disposal is therefore permitted, provided that such storage is in an EPA-approved storage facility. To qualify as an EPA-approved storage facility, the facility must meet the requirements given in the section, "EPA PCB Storage Requirements."

Electro-Test Inc. is an independent company offering engineering,

*See "How TSCA Changes Affect the Owners of Liquid-Cooled Electrical Equipment," PE 8/9/79, p 85, file #0510.

EPA PCB STORAGE REQUIREMENTS

Storage facilities shall conform to the following:

- The storage site must be above the elevation of the 100 year flood level.
- The storage facility must have walls and roof capable of keeping out rain.
- The floor must be strong enough to hold the load without cracking.
- The containment area must be provided with a continuous curb at least 6 in. high.
- The floor and containment curb shall be continuous, have no flaws or cracks, and be otherwise impervious to liquid penetration.
- Volume of the containment area shall be at least twice the volume of the largest container stored therein, or 25 percent of the aggregate volume of the stored containers, whichever is greater.

Containers shall conform to the following:

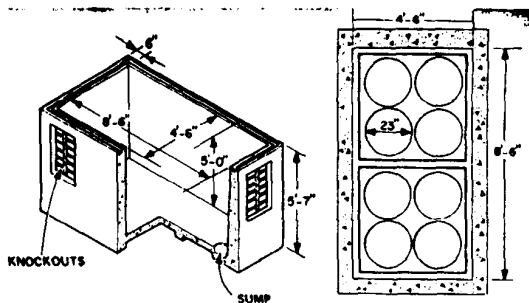
- PCB containers stored within the facility must comply with Department of Transportation (DOT) specification

17E for liquid PCB, and DOT 17C for PCB nonliquids.

- Containers must be labeled in accordance with Title 40 781.44 Annex VI (*Federal Register*, February 17, 1978, Part V) and identified as to the date they were placed in storage.

The following record-keeping requirements must be observed:

- Records are required for any facility that contains 45 kilograms (99.4 lb) or more of PCB chemical substances. These records must be kept for 5 years after the facility has ceased to contain 45 kg of PCB materials.
- Records must be updated annually and be current at calendar-year end, giving dates when PCBs were removed from service and weight (in kilograms) of such PCBs, name of owner or operator of facility from which the PCB was removed, and total quantity of PCB remaining in use.
- Other:
 - PCB material stored for disposal before January 1, 1983, must be removed from storage and disposed of by January 1, 1984.



Precast transformer vaults can be obtained in a variety of sizes on short notice. They are offered with or without cover and can be extended with optional extension rings if additional height is needed. They can be easily relocated with the proper handling equipment and have resale value when there is no longer a need for temporary PCB storage. Unit shown was purchased for \$500, including delivery and unloading. DOT/EPA-approved drums containing PCB are loaded four to a pallet and stacked two pallets high; sixteen 55 gal drums can be accommodated easily. Because the vault is located indoors, it could legally accommodate far more stacks of drums, if the vault is interpreted to be a 5 ft high indoor concrete dike, and still meet EPA requirements for minimum permissible containment volume. Loaded pallets are lowered into the vault by a fork lift truck equipped with appropriate attachments.

COMPARISON OF PROPOSED STORAGE FACILITY ALTERNATIVES

	Precast Vault	Block Masonry or Concrete Dike
Cost	\$500	\$1500-\$2500
Installation		
Craft Requirements	None	Mason or form carpenter and trowel trade
Portability	Yes	No—requires demolition
Reuse Capability	Yes	None
Salvage Value	\$500	None—must be demolished at additional expense

laboratory, and field services on major electrical equipment to industrial, utility, and commercial clients in the western United States. At the time the TSCA regulations went into effect, Electro-Test had on hand at its San Francisco facility several hundred gallons of PCB. The PCB had been accumulated from residual left over from samples sent in for laboratory analysis and from transformers that had been retrofilled with non-PCB fluid. There was an immediate need for a storage facility that would meet EPA requirements quickly and at reasonable cost.

Because indoor floor space was available, a decision was made to locate the storage facility inside, thereby simplifying construction and reducing the cost. This decision also minimized installation time and potential liability under the TSCA regulations.

Three approaches were considered. One proposal involved con-

structing a concrete-wall dike on the existing concrete floor. This approach would involve saw-cut-notching the existing slab, roughing and sealing the wall-floor interface, constructing a form, placing reinforcing steel, pouring the concrete, and stripping forms after curing. Following stripping of the forms, a sealant would have to be applied to the inner surfaces.

An alternative approach involved erecting a concrete block dike; this method would also require notching and roughening the existing slab. Steel reinforcing dowels would have to be placed in the block cells, the cells would have to be filled with mortar, and a sealant would have to be applied to the inner walls of the dike.

The third option, the solution that was applied, was to use a precast concrete transformer vault. Such vaults come in a variety of sizes, are portable and readily relocatable with the proper material

handling equipment, are relatively inexpensive, and can be obtained on short notice. They are offered with or without cover, making them suitable for outdoor use if desired. Extension rings that permit the height to be extended in 12 or 18 in. increments are offered for the vault that was chosen.

In addition to providing the quickest solution and thereby minimizing the company's potential liability in the event of a leaking container—the transformer vault proved to be the most economical solution. A comparison of costs and benefits for the three options are given in the section, "Comparison of Proposed Storage Facility Alternatives."

Because the vault was to be located indoors, and the basic unit was sufficient for the company's needs, it was purchased without cover or extension rings. The vault weighs 12,000 lb. With sixteen 55 gallon drums of askarel, weight of the loaded vault is about 20,000 lb. It was determined that the plant's 6 in. thick concrete floor could easily withstand the loading. Cost of the vault, including delivery and unloading at the site, was \$500.

The askarel liquid to be placed in storage is packaged in Department of Transportation/EPA-approved 55 gal DOT 55E drums. PCB-contaminated solid materials (wiping cloths, adsorbents, etc.) are packaged in open-top 30 gal DOT 30C drums. All storage containers and the exterior of the storage facility are labeled as required by TSCA regulations, and records are kept in accordance with TSCA.

EPA approval of the storage facility was quick in coming; in fact, the vault was installed and approval was obtained in less time than it would have taken to install either form of dike and have it ready for inspection by TSCA authorities. The EPA compliance officers who inspected the facility satisfied themselves that no PCB could enter the environment and that records were in order. They also took photographs of the storage facility for documentation. A letter of compliance was received from EPA 2 weeks after the inspection.

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