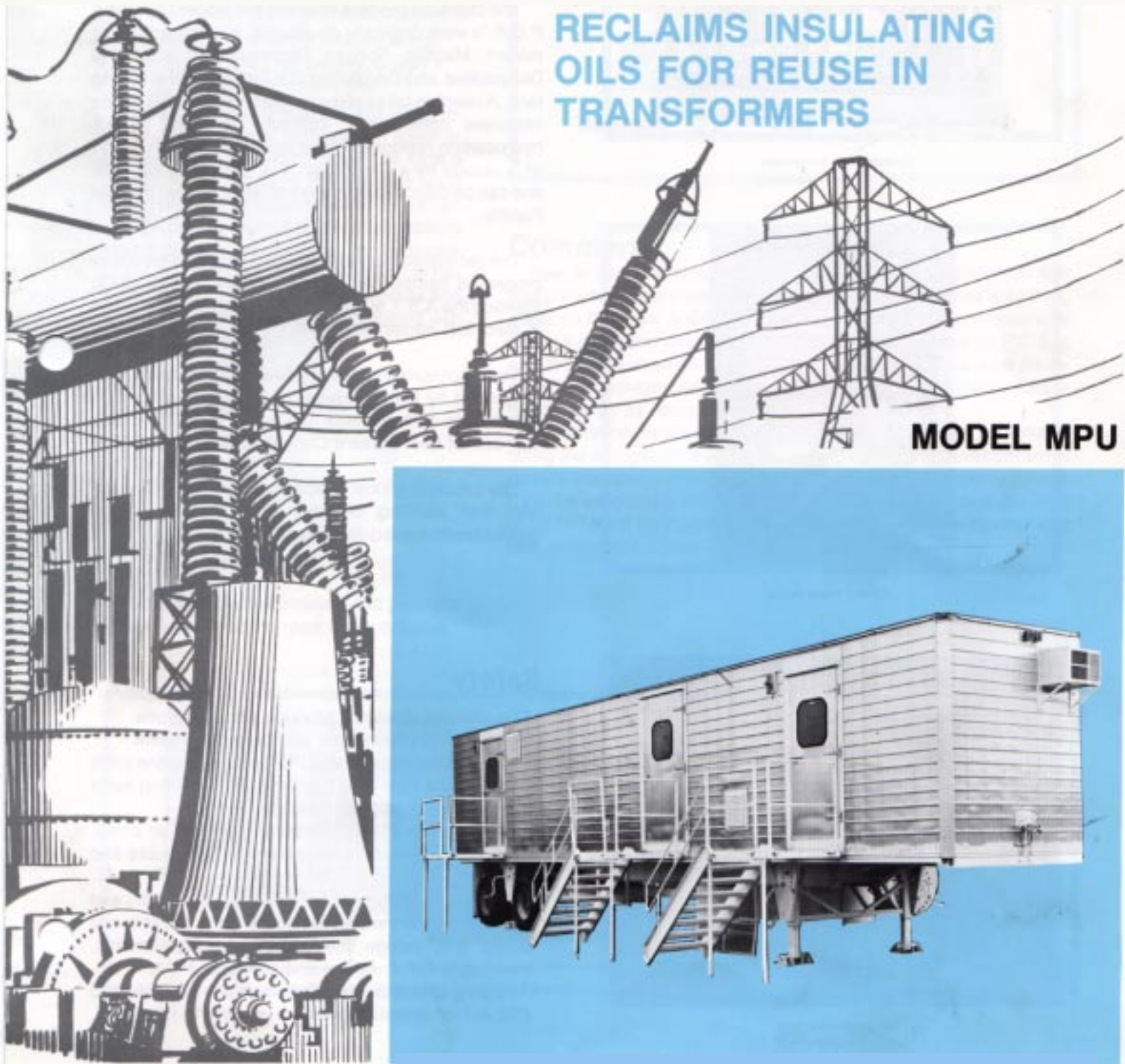


# ENERVAC

CORPORATION

## PCB Decontamination Unit

RECLAIMS INSULATING  
OILS FOR REUSE IN  
TRANSFORMERS



MODEL MPU

# RESTORES TRANSFORMERS TO NON-PCB STATUS



Dehydrator & Degasser



Control Panel in Lab



Air Conditioned Lab

## Abstract

The equipment is designed for the Decontamination of Electrical Insulating Oils that have been contaminated with low levels of Polychlorinated Biphenyls (P.C.B.'s). Oil containing up to 7000 PPM of P.C.B.'s can be processed lowering the P.C.B. level to below the detectable level (2 PPM).

The chemical process reverses the process by which P.C.B.'s were originally developed. A small amount of molten Metallic Sodium Dispersion is added to Dehydrated and Degasified Insulating Oil in a mixing tank. A reaction takes place converting the P.C.B.'s into harmless compounds, common salt and a few hydrocarbon residues. These are removed from the oil as a sludge by a Centrifuge. The sludge is non-PCB and can be disposed of in any Industrial Waste Disposal Facility.

The reclaimed Insulating Oil has excellent electrical properties comparable to that of new Insulating Oil meeting the A.S.T.M. standard and can be used again in electrical equipment.

The technology used in Enervac's system was developed by Ontario Hydro in 1982. The process is patented in both Canada and in the U.S.A. and has approval of Environment Canada and the U.S. E.P.A.

The process is cost efficient, costing substantially less than Burning or other Disposal means and eliminates the need for transporting.

## Safety

- The process does not produce any emissions. There are no discharges into the environment.
- The one piece Steel Trailer Floor extends up the sides 8" to form a rigid spill tray capable of holding more than the systems total capacity.
- The process is P.L.C. controlled from the air conditioned lab area where temperatures, pressures and flows are continuously monitored.
- Two separate automatic fire systems, Halon 1301 and Argon, will shut the process down, close all vents and doors and deluge the individual compartments, meeting N.F.P.A. codes and standard #12A.
- All piping is carbon steel Schedule 80 rated for 1000 PSI. Actual operating pressure is in the 15 PSI range.

## The Process

The dechlorination of electrical insulating oils contaminated with low levels of Polychlorinated Biphenyls (P.C.B.'s) depends on the reaction of active Sodium with Chlorine in the P.C.B. molecule under carefully controlled conditions, to form Sodium Chloride and Hydrocarbon residue. The principal reaction in the process is the direct removal of Chlorine Atoms from the P.C.B molecule by Sodium:



where: RCl is a P.C.B. molecule containing 1 to 10 atoms of chlorine

: Na<sup>°</sup> is a reactive sodium atom

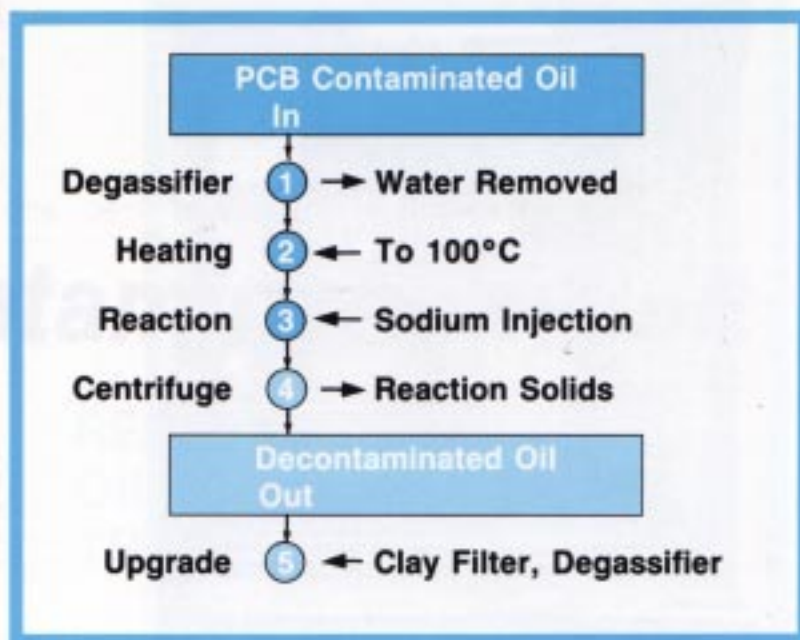
: R<sup>°</sup> is a P.C.B. molecule with 1 chlorine removed

R<sup>°</sup> is reactive and combines with H<sup>°</sup> formed by the reaction of Sodium with water or H<sup>°</sup> from the surrounding solvent to form a neutral RH molecule. If RH contains additional chlorine it is again attacked by sodium and the process is repeated until all chlorine atoms have been replaced by hydrogen atoms. At this point, the P.C.B molecule has been converted to a Biphenyl molecule and all chlorine atoms have been combined with sodium to form salt.

## Advantages

- Cost Effective
- Destroys P.C.B.'s
- Restores Oil for reuse
- Reclassifies Transformers
- Preserves valuable Naphthenic base oils
- Totally enclosed system
- No emissions
- Operates at low temperature and pressure
- Eliminates over-the-road transportation of P.C.B.'s

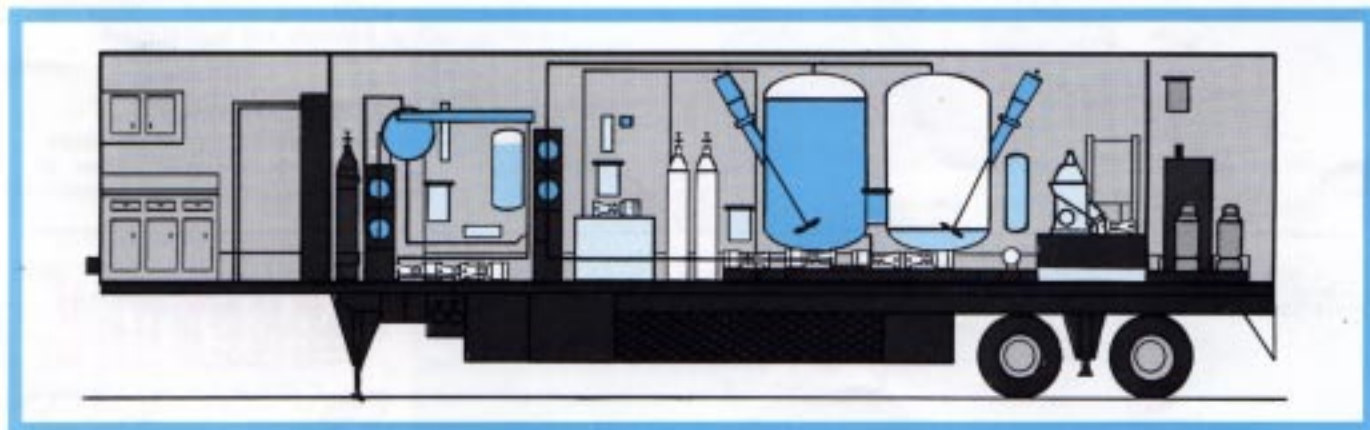
## PROCESS OIL FLOW



## Comments

New or Decontaminated Oils introduced into a Transformer that was previously contaminated with P.C.B.'s will experience a leaching effect on the Core & Coil that was impregnated with contaminated oil; as a result the new or decontaminated oils will take on P.C.B.'s and the contamination level will increase. Having your own equipment for decontamination gives you the advantage of being able to reprocess oil as required.

The Environmental Authorities arbitrarily established 50 PPM as being the acceptable level of contamination prior to development of today's technology which can lower the P.C.B. levels to below 2 PPM. It can be expected with this new technology that the acceptable level of 50 PPM will be lowered at some future date. Again having your own equipment allows reprocessing as required.





Sodium Compartment



Centrifuge & Storage Tank

# ENERVAC

produces a wide

range of specialty products and systems, most of which are based on a high order of technology.

## Solving Tomorrow's Problems TODAY

### HIGH VACUUM DEGASIFICATION

For upgrading of new and used electrical insulating liquids, transformer oil, polybutenes and silicones – the removal of free and soluble water, free and dissolved air and gases and particulate matter. Mobile and stationary units in sizes to fit every need.

### SEAL-OIL PURIFIERS

Seal oil purifiers offer proper treatment and upgrading of compressor sealing oils in a completely enclosed system, removal of free and soluble water, free and dissolved air and gases, light hydrocarbons and particulate matter.

### LUBE SYSTEMS

Oil circulating lubrication systems including pumps, tanks, filters, coolers, indicators and other accessory equipment in either packaged or component systems are available.

### AIR AND GAS DRYERS AND FILTERS

Enervac dryers and filters are designed for removal of moisture from process air and gases, eliminating condensation and freezeup, moisture corrosion, protecting pneumatic instruments and extending the life of pneumatic tools.

### VACUUM DEHYDRATORS

Low vacuum units are available from Enervac Corporation for the continuous maintenance of the original chemical and physical qualities of lubricating, insulating, cooling, hydraulic and synthetic oils.

### INDUSTRIAL FILTERS

Industrial filtration equipment utilizing pleated paper, and other media to provide the exact degree of filtration and flow rate for virtually any application.

Representative tive

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