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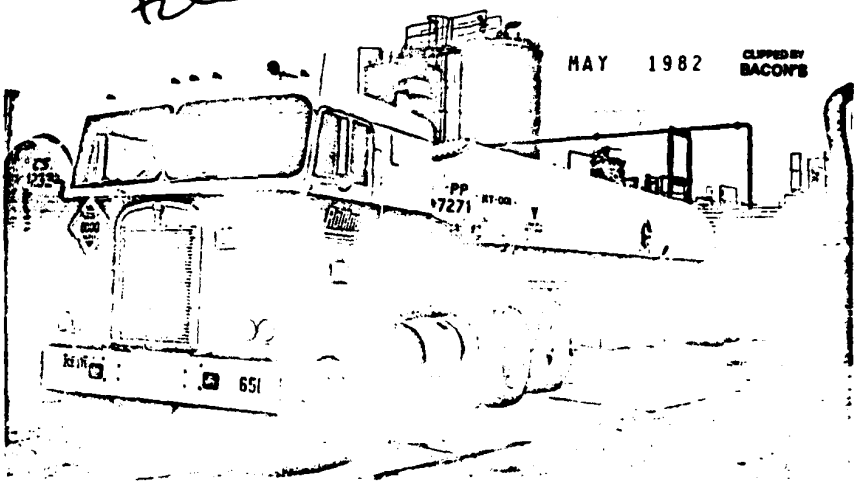
File PCBs

40-27 MODERN BULK TRANSPORTER
MONTHLY 11,700

MAY 1982 CLIPPED BY BACON'S



Dedicated Rollins PCB trailer unloads at Rollins Environmental Services facility in Deer Park, Texas, the first site to receive EPA approval for PCB incineration. Specially trained crews unload the PCBs into tanks shown in background. Rollins safeguards on safe handling of PCBs include requirement that only the company's own fleet may bring PCBs to the disposal site.

RES Shows the Way

MONS 011499

Transporting PCBs Safely

IN March 1981, the Rollins Environmental Services (TX) Inc facility in Deer Park, Texas became the first site in the country approved by the Environmental Protection Agency to destroy polychlorinated biphenyls (PCBs) through incineration. During the first year of operation, the Rollins PCB dedicated fleet safely transported over 1.1 million gallons of bulk liquids containing PCBs to Deer Park.

Of all the forms of waste transportation, few are watched as closely by government agencies and the public as PCB transport. Congress banned the manufacture of PCBs in 1976. Since then, an estimated 20,000,000 pounds of oil containing high concentrations of PCBs have been placed into storage, awaiting development of proper disposal methods. While no new manufacture of PCBs is allowed, the law does not require removal of PCBs and PCB items from service earlier than would normally be the case. Consequently, the use of PCBs and the need for proper transportation and disposal will continue for several more years.

PCB Uses

Most of the PCBs produced in this country since 1971 have been used in electrical capacitors (70%) and transformers (30%). About 95% of the 100 million capacitors produced annually in the U S contain PCBs. Capacitors are generally classified into two categories for disposal purposes. "Small" capacitors contain less than three pounds of PCBs, and have service lives of 15 to 20 years. "Large" capacitors may contain about 25 liters of PCBs, and have a service life of 15 to 20 years.

Transformers that contain PCBs are used mainly in or near inhabited buildings where fire hazards from cheaper oil-filled transformers are greatest. The estimated 135,000 PCB-containing transformers represent about five percent of all transformers in the U S. Much of the PCB-containing waste oils generated are from flushing transformers. Other uses of PCBs include hydraulic systems, vacuum pumps, gas transmission compressors, electromagnets, microscopy mountings, and research.

PCB Controls

Rollins operates a Class I waste treatment facility at Deer Park. The site can handle all but radioactive and explosive wastes. Waste treatment and disposal methods include incineration, thermal oxidation, chemical, biochemical, and landfill. A deep well injection service is pro-

1800+

vided at the company's Bayou Sorel, Louisiana plant; other treatment facilities are located at Baton Rouge, Louisiana, and Logan Township, New Jersey.

Following 24-hours notice, customers can bring wastes to Deer Park in their own vehicles for disposal. The pre-notification is required to allow plant personnel to make sure treatment capacity is available. Rollins also will pick up the customer's waste with its own diversified trucking fleet, which includes tank trucks and trailers, vans flatbeds, Ram-e-jec dump trucks, and roll-off bin trucks.

The only wastes that customers cannot bring to Deer Park with their own equipment are those containing liquid PCBs. Only the Rollins PCB dedicated fleet may bring liquid PCBs to Deer Park.

The restriction on outside vehicles provides the company complete control of all liquid PCB movements into the facility. Deer Park Plant Manager Don Matter explains that Deer Park residents have been fully briefed on Rollins PCB transportation capabilities and procedures, and told that only Rollins equipment would be used to transport the materials. "We have made a major commitment to the training of our PCB drivers and the maintenance of our dedicated equipment," says Matter. "We believe we have the best PCB transportation operation in the country, and it is the only equipment we want to bring PCBs into our plant."

The Rollins PCB service agreement states the company takes title to the PCB waste material immediately following loading and departure from the customer plant. Rollins is responsible for negligent actions resulting in any loss, damage or injury to persons or property during transit. Rollins PCB fleet is not used to transport materials to any site other than the company plant. Tank truck loads are picked up from only one customer company at a time.

As a private carrier, Rollins is not subject to Interstate Commerce Commission regulation, but the waste transportation operations do come under federal and a variety of state government controls. Transportation Supervisor Charles Rogers has two people on his staff who work fulltime to ensure the carrier is in compliance with the various permits and manifest requirements across the country. Since products are picked up in all parts of the nation, the carrier must stay abreast of all state regulatory requirements and changes.

The PCB dedicated portion of the Rollins fleet includes seven trailers and five tractors. The type of waste material containing the PCBs determines which trailer will be used to haul the product. Dedicated trailers include two 5,000 gallon MC-312 units, one 5,000 gallon vacuum tank with DOT exemption, two 6,600 gallon MC331 VCM (vinyl chloride monomer) trailers, and two specially outfitted vans for transporting drummed PCB materials. The vans have a continuous weld aluminum



Rollins field operations trailer can be taken to cleanup sites anywhere in the country. Trailer contains a complete laboratory, safety materials, recovery equipment and office space. Workers can live out of trailer, if necessary.

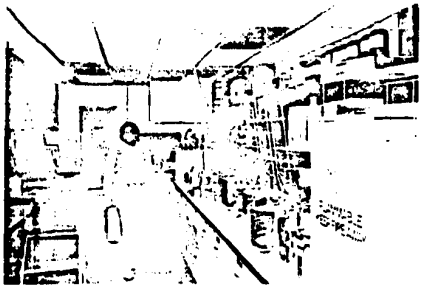


A nitrogen blanket is pumped into trailer as PCB containing liquid is removed. Containers on the platform beneath trailer hold gloves, rags, or other solids which might come in contact with PCBs at loading site. The cylinder at right contains nitrogen to blow hoses clean at loading site.

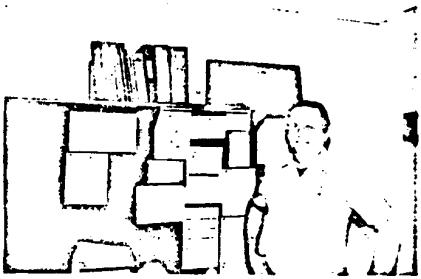


A six-inch continuous-weld aluminum pan is built into dedicated PCB van trailer. All vehicles transporting materials containing PCBs must be clearly marked as shown.

MONS 011500



All loads of waste are analyzed at the laboratory at Deer Park before being allowed to proceed for treatment. A special lab section handles PCB waste analysis. Complete waste safety sheets are prepared for all loads of wastes transported by the Rollins fleet.



Deer Park Transportation Supervisor Charles Rogers manages a fleet that includes 17 tractors and a variety of specialized trailers. Rogers and his staff spend considerable time ensuring compliance with the many different state and federal regulations covering hazardous waste transportation.

Transporting PCBs Safely . . .

pan surrounding the van floor.

The full Deer Park fleet includes 17 tractors and a variety of trailers, including several 5,000 gallon vacuum trailers and two 2,000 gallon vacuum trucks. Three tractors are leased, and the rest of the equipment is owned by Rollins Environmental Services (TX) Inc. Should additional equipment be needed, the company has access to trailers based at Matlack's Deer Park facility. Matlack, the nation's largest bulk commodities common carrier, is like Rollins, a subsidiary of RLC Corp, Wilmington, Delaware.

Rollins PCB transportation activity requires close contact between the transportation and sales departments. Bill Stephens, the main sales representative for the PCB service, is notified whenever a unit is to be dispatched to pick up a PCB load. He is told the exact trailer that will be used so there will be no possibility of sending the wrong trailer type. Stephens is advised in the event of any delay or change in plans so he may keep the customer informed.

A team of drivers is used for any trip that will take more than eight hours to complete. All PCB dedicated tractors are sleepers. Transportation Manager Rogers explains he wants the equipment to go to the customer facility, load the product, and return to Deer Park with the minimum number of stops. Ideally, the only stops should be for food and fuel.

Each unit is fully equipped for PCB operations. A special detailed PCB check list is filled out by the driver and signed by a supervisor before the equipment leaves Deer Park. The list includes safety, loading and emergency equipment. Additionally, the driver certifies he has received instruction on the company spill prevention and call-in procedures. Drivers are required to call in twice each day, and must call dispatch in the event of any unexpected delay caused by equipment or weather problems.

Except when the vacuum trailer is used, the customer is required to provide for pumping the liquid PCB bulk shipments in to the tanker. The customer must provide access for a tractor and 40-foot trailer to within 20 feet of the load point. Each tanker carries one two-inch by 20-foot stainless steel venting hose. The customer must have two-inch vent line connection within 20 feet of the load point. Following loading, the hoses are blown clean by nitrogen from a nitrogen bottle carried on the trailer. Any gloves, rags or other solids which may have come into contact with the PCB material are placed in sealed containers on the trailer.

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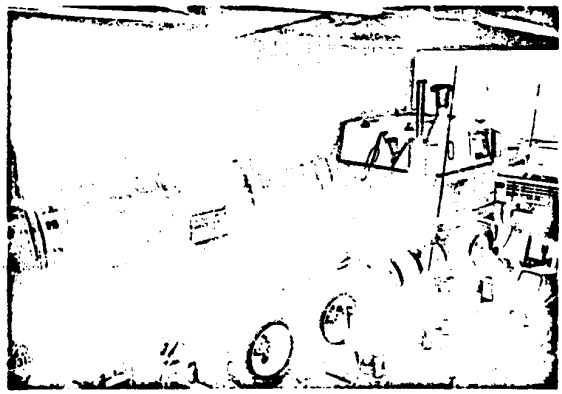


Tractor and MC-312 trailer dedicated to PCB service receive regular preventive maintenance inspection at Deer Park maintenance shop. To reduce inventory requirements, facility is standardizing on Macks and Internationals. All tractors are equipped with Jake Brakes and Michelin radials on steering axles.

MONS 011501

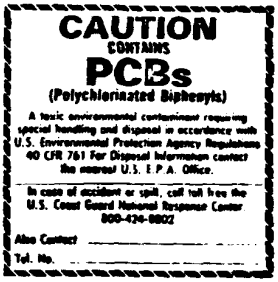
Transporting PCBs Safely . . .

For liquid PCB drum shipments, access must be provided for a tractor and 40-foot van trailer. All drums are inspected by the Rollins driver prior to loading. He has the authority to reject a drum he deems unsafe for transport. The customer loads the drum under the driver's supervision. The same requirements hold for solid PCB shipments.

The Rollins driver is required to inspect the drums containing PCBs every 100 miles during the trip to Deer Park. A manual pump and extra drums are carried in case a leak develops. A row of Hazorb pads is placed across the back of the trailer.

Safety Sheets

Detailed waste safety sheets are prepared for all loads of hazardous



PCB Profile

(The Rollins Environmental Services facility staff at Deer Park, Texas has developed an extensive PCB Safety Manual. The following information is taken from the manual. For additional information on Rollins PCB service, call Bill Stephens in Houston, 713-479-6001.)

Biphenyl ($C_{12}H_{10}$) can be chlorinated by replacing any or all of its hydrogen atoms with chlorine. In the commercial synthesis of chlorobiphenyls, biphenyl is catalytically chlorinated with anhydrous chlorine; either iron filings or ferric chloride may be used as the catalyst. The commercial preparations, commonly referred to as PCBs, are isomeric mixtures. The weight-percent chlorine in commercial mixtures has generally varied between 21 percent and 68 percent and has been used to designate the grades of commercial products. Commercial PCB products manufactured in the U S, Great Britain, and Japan have been marketed under the trade name of "Arocior".

A broad class of nonflammable synthetic chlorinated hydrocarbon insulating liquids used in electrical capacitors, transformers, nuclear reactors, and accessory equipment is designated by the generic term "askarel". PCBs have been major components of most askarels used in the U S since 1932.

Health Effects

The National Institute for Occupational Safety and Health (NIOSH) has conducted extensive study of PCBs which included reports on people who were exposed to PCBs in the course of their work or by accident. It also reports on laboratory tests involving the experimental exposure of animals to PCBs. After its study, NIOSH recommended that any worker whose job may involve exposure to PCBs be warned and protected against the possible adverse health effects of PCBs.

It has been proven that long-term (several months) exposure to PCBs can injure the human skin and liver. High exposures to PCBs can cause strong irritation of the eyes, skin, and mucous membranes (linings of the nose, mouth and throat). Workers' skin exposed repeatedly to PCBs, has developed chloracne, characterized by pimples, discoloration, and blackheads.

Because PCBs have been proven to be teratogenic and to cause tumors in some species of animals, although not in humans, NIOSH concluded that workers should be counseled about the possibility of such effects in humans.

Methods recommended by NIOSH to control worker exposure include: use of signs and labels to identify PCBs, personal protective equipment (gloves, boots, aprons, goggles), ventilation of PCB work areas, and strictly enforced procedures for employee access, medical surveillance, sanitation, and monitoring.

Environmental Effects

From an environmental standpoint, the major concern about PCBs arises from two characteristics: First, PCBs are resistant to degradation by weathering or metabolic processes. Second, PCBs, have a tendency to be retained in fatty tissues (as are certain other chlorinated aromatics.)

The net effect of these two characteristics is that PCBs persist in the environment. It can be assumed that almost all PCBs released to the air, water, or soil since the material was first manufactured still remain in the environment. The fat retention of PCBs, together with their resistance to animal metabolism, produce an accumulation of PCBs in the lipid tissues of animals. The accumulation of PCBs can climb the carnivore food chain up through man.

At present, there are no gross environmental changes apparent from the presence and accumulation of PCBs. No significant effects on vegetation have been observed. Demonstrative acute effects have not occurred with any animals or humans in the environment. There is evidence of chronic toxicity and fatality of accumulation among some fish and aquatic invertebrates. PCBs manifest moderate toxicity to birds and animals only after long term accumulation.

In summary, major environmental effects of PCBs have not yet been observed; however, the lack of degradation mechanisms in nature poses a continuing concern that any effect over the long term will be enhanced by PCBs' persistence. □

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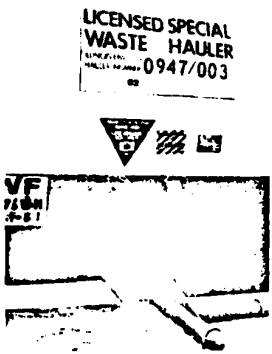


The private fleet picks up waste materials from all across the country for transporting to the Texas treatment and disposal facility. Company must deal with a variety of state permit requirements.

wastes Rollins hauls to the Deer Park plant. The sheets are designed to provide essential information for the safe transportation and disposal of the wastes, as well as emergency information.

The sheet begins with waste designation by name and, if applicable, by Rollins, EPA or state identification numbers. Chemical composition information includes component name, formula, range of the component in the waste, and flash point for each component in the waste. Physical properties to be described include physical character, color, odor, and flash point. A color hazard code information graphic is provided. Space for treatment method/process notes and a checklist of required personal protective equipment is included.

Under health protection, information on the effects of exposure must be detailed. Emergency first aid for eyes or skin exposure, inhalation or ingestion is described.

In the fire protection section, space is provided to detail the explosion or fire hazard of the wastes, as well as fire fighting procedures. Reactivity information required includes conditions to avoid, incompatibility with other products, and hazardous products that could result under certain circumstances.

The waste safety sheet includes space to describe spill response procedures, such as containment with booms, use of absorbent materials, and emergency equipment which workers handling the spill must wear. The transportation information section provides for listing of hazardous materials and substances in the waste and placarding instructions. All tanks or drums used to transport PCBs must be marked with PCB labels as defined in 40 CFR 761.44. Tank trailers and trucks must be placarded and display HI numbers for the PCB containing materials they transport.

PCB Transfer

Before the decision is made to handle a customer's waste of any kind, a waste data sheet must be completed by the customer and a sample of the waste analyzed by Rollins to determine an acceptable treatment/disposal method. Every load of waste brought to the Deer Park facility, whether by Rollins or a customer's equipment, must be sampled as soon as it arrives at the plant. Rollins technicians use the plant's laboratories, which have sophisticated analytical instruments to ensure the waste is actually what the shipping paper describes.

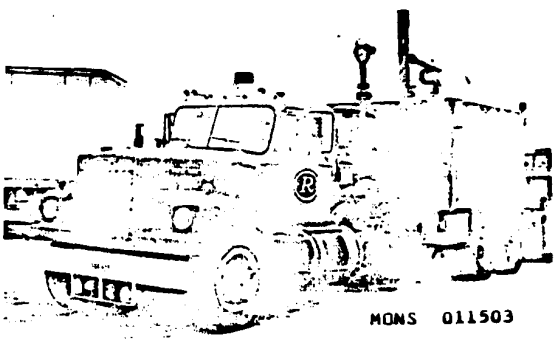
Wastes containing PCBs are immediately transferred to storage tanks for incineration. They are not left in the vehicles. Crews specially trained in handling PCBs unload the materials. The basic approach in controlling the risks involved in the transfer operation is to totally enclose the flow of materials and the possibility of static electricity. To the greatest extent possible, PCB liquids should be moved from one container to another by pressure or vacuum, using an inert gas (air pressure is never used). According to Rollins procedures, one aspect that must be considered in all materials transfer is gas displacement. A vapor return line or nitrogen blanketing line should be used to replace the space left by liquids removed from containers or tanks. When vessels are being filled, the displaced gas should either be captured in a vapor return line, or vented into some other closed system.

Bond and Ground

Rollins requires all transfer operations involving PCB liquids and solvents to be bonded and grounded. The flow of liquids can generate charges of static electricity. Bonding is accomplished by electrically interconnecting both vessels to or from which material is transferred. Grounding is done by electrically connecting each vessel to ground.

Drums used to haul PCB materials are immediately crushed and loaded into drum overpacks for transport, along with other PCB solids, to a landfill.

The Rollins industrial waste incinerator used to destroy PCBs at Deer Park operates at combustion temperatures in excess of 2,135 degrees F with a retention time be-



The Deer Park plant designed and operates its own fire truck and emergency response equipment. Much time is spent in training drivers and plant personnel to respond to hazardous materials incidents. Container pictured contains safety and recovery equipment.

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Transporting PCBs Safely . . .

tween two and three seconds. During the peak of PCB destruction, temperatures actually reach 2,600 degrees F. All combustion gases are quenched and scrubbed by a venturi, flexitary scrubber. The incinerator is equipped with automatic shutoffs which close down the system should temperature or oxygen levels drop below required amounts. Carbon monoxide is also monitored. If CO levels exceed 80 ppm, the system is automatically shut down.

An engineering firm retained by Rollins conducts five unannounced inspections a month of the Deer Park facility. The firm makes its reports directly to the Environmental Protection Agency.

PCB Training

As in any truck transportation activity, the key to a safe operation is the driver. All Rollins drivers are experienced hazardous waste handlers before being selected for extra training to work in PCB service. Special emphasis is placed on training the driver to recognize potential problems at shipper locations. The driver has authority to prevent loading until all safety requirements are met.

The PCB drivers must meet PCB service eligibility requirements. Those requirements include special physical examinations. All Rollins employees at the treatment facility, including office personnel, must undergo extensive yearly physicals.

Training includes films and presentations on the nature and handling of PCBs. The company has developed a comprehensive PCB Safety Manual which addresses all aspects of PCB handling. The drivers are taught proper use of waste safety sheets, vehicular accident response procedures, and the use of emergency equipment on the trucks. The company has detailed emergency response programs for incidents which may occur on the road or at the plant.

Through proper employee training and equipment outfitting and maintenance, and strict enforcement of company control measures, Rollins Environmental Services has proven PCB transportation can be safe and effective. □

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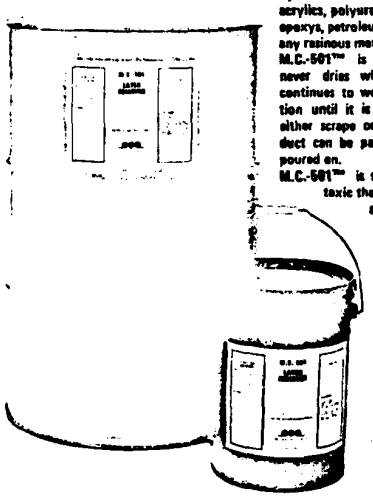

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MONS 011504

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