

ORGANIC  
CHEMICALS DIVISION  
RESEARCH

*Report*

REPORT NO. P-1620

JOB NO. 2-21-760.01-1754059

TENTATIVE PROCESS  
FOR  
THE PREPARATION OF AROCLOR 1105

DATE - June 18, 1971

WRITTEN BY Q. E. Thompson

**Monsanto**

ST. LOUIS, MISSOURI

NEV 025028

PLAINTIFF'S  
EXHIBIT

1469

738283

## TOXICITY AND HAZARDS

Safety of operations in the Aroclor plant depends on the individual operator. Materials being handled and operations must be observed closely to guard against the following:

### Cause

### Action to Prevent

#### Chlorine Gas

Chlorine gas is a very toxic corrosive gas. Leaks or high pressure can occur to liberate it.

Report chlorine gas exposure immediately for treatment with antidote. Milk may be used in mild cases to relieve throat irritation. Oxygen from the resuscitator in the Dispensary is available.

Keep gas mask in good condition. Keep a good canister in the mask. Use these type masks only in chlorine concentrations to 2-3% chlorine in air.

Use a Scott Air Pak in concentrations of chlorine gas above 3% in air. One unit is available outside the west well of the drumming shed.

If caught in chlorine gas without mask, hold your breath and go cross wind until you are out of range of the gas. Place a handkerchief over your nose in small quantities of chlorine.

Report all chlorine leaks for repair immediately. Make temporary repairs with tape, if possible.

In case of a major chlorine leak, the source of chlorine gas must be stopped.

Notify the chlorine plant immediately if the pressure on the chlorine manifold exceeds 30 psig.

| <u>Cause</u>                                                                                                                                                                                                                                    | <u>Action to Prevent</u>                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Thermal Burns</u>                                                                                                                                                                                                                            |                                                                                                                                                                                       |
| Contact with hot uninsulated product lines at the chlorinators and still areas.                                                                                                                                                                 | Know that contact with equipment and product will cause a thermal burn due to the high temperatures. Make changes in operations with this hazard in mind.                             |
| Contact with uninsulated steam lines and open steam.                                                                                                                                                                                            | Know the first aid treatment for burns.                                                                                                                                               |
| Contact with hot Aroclors from broken lines or leaks.                                                                                                                                                                                           | Wear gloves and long sleeve shirts with the sleeves rolled down when operating. Gloves and clothing can make the difference between first and second degree burns.                    |
| Contact with open flames at Therminol furnace or from heating lines in the department.                                                                                                                                                          | Report uninsulated lines for repair of insulation.                                                                                                                                    |
|                                                                                                                                                                                                                                                 | Use only steam lines with hose and hose clamps in good condition. Use the cotter pin provided at the hose station to hold hose in place.                                              |
|                                                                                                                                                                                                                                                 | The following operations are hazardous and should be done with care:                                                                                                                  |
|                                                                                                                                                                                                                                                 | 1) Catching samples at the chlorinator sampling points.                                                                                                                               |
|                                                                                                                                                                                                                                                 | 2) Drawing bottoms at stills.                                                                                                                                                         |
| <u>Explosion</u>                                                                                                                                                                                                                                |                                                                                                                                                                                       |
| An explosion could occur in the chlorinators by slugging liquid chlorine to the distributor. Slugs of liquid chlorine could react fast enough to cause excessive pressure in the vessel. A rupture of the chlorinator rupture disc could occur. | Observe operation of the chlorine vaporizer. Pipe lines from the vaporizer will be frosted if liquid chlorine is present.                                                             |
|                                                                                                                                                                                                                                                 | In case chlorine feed lines are frosted, close chlorine feed valve to the vaporizer. Check steam addition to the vaporizer. Do not start up until source of trouble has been located. |
|                                                                                                                                                                                                                                                 | Observe temperature of the chlorinator periodically and be sure it is not too hot. A high temperature alarm and shutdown is provided.                                                 |

| <u>Cause</u>                                                                                                                                                                       | <u>Action to Prevent</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Falls</u>                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Slipping on cement floors, stairs, Aroclor on floor, ice conditions; tripping over objects (hose, pipe, valve handles, etc.); or losing footing on ladders, etc., can cause falls. | <p>The majority of minor, serious, and near-miss injuries in the Aroclor Department are the result of falls. Prevention is always within the ability of the operator by use of expert operating practices.</p> <p>The following items should be done:</p> <ol style="list-style-type: none"><li>1) Return hose to rack after using.</li><li>2) Keep operating areas clean of all foreign objects.</li><li>3) Return ladders to racks when not in use.</li><li>4) Keep gloves on and hands out of pockets, especially going up stairs.</li><li>5) Place guards around any area that presents a hazard that should be guarded.</li></ol> <p>Poor lighting due to burned out bulbs should be corrected at once. Poor lighting due to inadequate facilities should be reported.</p> <p>Spills must be cleaned up immediately following their occurrence. Spills are to be reported on the log sheets.</p> |
| <u>Fires</u>                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Biphenyl ignition.                                                                                                                                                                 | Area must be clear of trash or flammable materials. Use trash skips and cans.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Chlorine problems in the vaporizer allowing reaction with steam to release hydrogen.                                                                                               | Smoke only in areas so designated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Therminol furnace and still burner backfire.                                                                                                                                       | Use spark producing equipment only with a fire permit and proper inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| <u>Cause</u>                                  | <u>Action to Prevent</u>                                             |
|-----------------------------------------------|----------------------------------------------------------------------|
| <u>Fires (continued)</u>                      |                                                                      |
| Wood, rags, or paper on hot lines.            | Use care in lighting gas torch or the still furnaces.                |
| Sparks from welding apparatus or open flames. | Observe visitors in the plant and be sure they observe safety rules. |

#### Chemical Handling

##### Chlorine Gas

This is a corrosive gas which is toxic. Leaks or back pressure can occur and liberate chlorine gas in the area. Operators should have their cartridge type respirators handy at all times while in the area. Use of gas masks is explained in Section 1 - Chlorine Gas.

If you are caught without a gas mask, and large amounts of chlorine gas are liberated, hold your breath and go cross wind until you are out of range of the gas. Once out of the area, obtain an emergency gas mask and return to the area and correct the trouble.

A victim of chlorine gas fumes must be removed as quickly as possible from the gaseous area. Place patient on his back with head and back elevated. Milk may be used in mild cases as a relief from throat irritation. If the patient has stopped breathing, start artificial respiration immediately.

##### Biphenyl

Biphenyl is a flammable material which will burn. Burning should not be done in the presence of biphenyl or biphenyl vapors. The melting point is 68.7°C., and the auto ignition temperature is 258°C. Inhalation of biphenyl fumes is not recommended, since it can cause a drugged effect on the person.

##### Ferric Chloride

Ferric chloride is a black-brown solid. It causes only slightly irritating effects on the skin or mucous membranes. When heated, it will decompose and release toxic fumes of chlorine. It will react with water to produce toxic and corrosive HCl fumes.