APPENDIX B

"Safety and Toxicity Data"

Taken in part from the Standard Manufacturing Process for the Manufacture of Aroclors, in Dept. 246, W. G. Krummrich Plant. New material has been added, and some changes were made in the old material.

Safety Equipment

The following is a list of safety equipment (personal and departmental) required in department 246.

1. Fire extinguishers:

   A. Dry Chemical (3) - Southwest corner Bldg. OR - Main Floor

   - West wall at top of stairs of Second Floor.

   B. Carbon Dioxide Snow - Southwest corner of Bldg. OR - ground level.

2. Chlorine Gas Masks (4) - Southwest corner, second floor

   - Control room, second floor

   - East side, outside control room

   - Wall, Southwest corner of sprinkler house, main floor.

3. Scott Air Masks - West of Lean-To

4. Safety Showers (2) - Southeast corner of Bldg. OR - ground level.

   - Southeast corner of Bldg. OR - 2nd Floor.

5. Davis Vapotester

6. Eye Baths

7. Sprinkler System

Safety Precautions

The following are safety precautions followed in the operation of department 246.

1. Safety Equipment of Employee

   Each employee has the following safety equipment: (1) Hard hat, (2) Safety glasses, (3) Goggles, (4) Rubber and canvas gloves, (5) Rubber overshoes. Special equipment may be issued as necessary for performing a particular job in a safe manner.

2. Sampling of Crude Aroclor

   The samples of Aroclor taken during the chlorination reaction are hot (150° C.). Precaution must be taken to avoid skin contact of samples and inhalation of Hydrogen Chloride, Chlorine and Aroclor vapors.

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3. Fires

Fires may result from the ignition of leaking gas, Xylene, Diphenyl, rags, paper, wood, etc. Automatic fire extinguishers and sprinklers have been installed to combat fires.

4. Explosions

Explosions may be caused from accumulated pockets of natural gas or a rapid burning of Diphenyl in a closed container such as a Chlorinator. Chlorinators are equipped with a 10" diameter pressure relief line with a rupture disc made to burst at 22 psi in case Diphenyl within the Chlorinator ignites.

5. Toxicity

Toxicity does not present a serious problem. However, a complete daily change of clean clothes is supplied to each person and time is allotted at the end of each shift to take a bath. Instructions are also issued to avoid actual skin contact with Biphenyl and Aroclor as much as possible and to wash hands and face before eating.

6. Miscellaneous

There are many accidents that can occur that may be classified as health and safety hazards. These accidents may result from such things as broken process lines, acid leaks, steam leaks, etc.

The worst inherent hazards are as follows:

a. Free Chlorine from ruptured line or major leak.
b. HCl Gas from ruptured line or major leak.
c. Dropping bottoms from stills.
d. Hot Aroclor and Diphenyl.

CRUDE AROCLOR 1111

Toxicity: This material has a crystallizing point of 31.7° C. Since it is an Aroclor, it should have a medium toxicity range for liquid ingestion and high toxicity for vapor inhalation. The maximum allowable concentration (M.A.C.) is 1 mg/cubic meter.

Fire Hazard: Since this material contains high concentrations of biphenyl, it is very flammable and will burn when exposed to heat or flame or oxidizing materials. It has a flash point of 121° C.

Other Hazards: This material can cause dermatitis, systemic poisoning from the fumes, and yellow atrophy of the liver. There are skin, mucous membranes and eye hazards encountered in handling this material.

Treatment and Antidotes: Call a physician and remove patient from fumes.

Storage and Handling: Protect the skin, lungs, and eyes by wearing approved protective clothing, respirator, and goggles. People who handle this material at elevated temperatures should have medical supervision, and the air should be sampled to insure compliance with M.A.C. There are no special storage restrictions under normal conditions except store in a ventilated area.

Shipping: There are no special shipping restrictions.

FERRIC CHLORIDE ($FeCl_3$)

Toxicity: This material is a solid under normal conditions and is nontoxic or has a rating as low.

Fire Hazard: There is no fire hazard under normal conditions, but it will emit toxic fumes at high temperatures.

Other Hazards: Some people are allergic to this material and may develop skin rash, and there is an eye hazard.

Treatment and Antidotes: Call a physician.

Storage and Handling: Protect the skin with approved protective clothing, avoid the breathing of $FeCl_3$ dust, wear approved respirator with adequate cartridge, and protect the eyes with approved goggles. There are no storage regulations.

Shipping: There are no shipping restrictions.

DIPHENYL ($C_6H_5C_6H_5$)

Toxicity: This material is a solid at normal conditions and is medium toxic. The M.A.C. of vapor is 2 mg/cubic meter of air. If ingested the lethal dose is 2.4 g/Kg of body weight. The fumes are not dangerously deadly, but they are poisonous over a prolonged time.

Fire Hazard: Diphenyl is very flammable and will burn when exposed to heat or flame or oxidizing materials.

Other Hazards: Diphenyl is not too corrosive to skin, but it will affect the eyes.

Treatment and Antidotes: Wash eyes with water and get the patient to fresh air. Try to get patient to vomit, and call a physician.

Storage and Handling: This material can be stored in steel containers away from fire hazards and oxidizing agents. Wear suitable clothes and approved goggles when handling diphenyl.

Shipping: Ship in cars or other suitable containers with a red warning label of flammability.

LIME $Ca(OH)_2$

Toxicity: Lime is not dangerously toxic, and it is regarded as more of a nuisance. This material is a solid or slurry.

Fire Hazard: This material is not flammable.

Other Hazards: Lime is very hazardous to the eyes. It will burn the skin also, and the dust will affect the mucous membrane.

Treatment and Antidotes: Flood eyes and skin with large quantities of water. If lime is ingested, get patient to vomit and call physician.

Storage and Handling: Lime can be stored in steel containers, and people should wear protective clothing, respirators, and rubber or chemical safe goggles when handling lime.

Shipping: There are no special restrictions for shipping, but the containers should have a white label, a caustic warning.

HYDROGEN CHLORIDE (HCl)

Toxicity: This material is a gas under normal conditions and is very toxic. The M.A.C. is 5-10 ppm and a concentration of 1500-2000 ppm would be fatal to humans in a few minutes.

Fire Hazard: There is no fire hazard under normal conditions, but wet gas reacts with some metals to form hazardous hydrogen.

Other Hazards: This material is hazardous to teeth, skin, eyes, and mucous membranes.

Treatment and Antidotes: Wash profusely with water, if injested, eat chalk, magnesium hydroxide, egg whites, and milk, and also administer oxygen. Call a physician.

Storage and Handling: This material should be stored in a cool, well ventilated area away from oxidizing agents. This material can be stored in rubber lined, glass, or tantalum vessels. People handling this material should wear suitable clothing like rubber goggles or chemical safe grades and approved pack or canister gas masks.

Shipping: Shipping containers must have a white warning label and a non-flammable label. Ship in appropriate containers such as rail car or carboy.

CHLORINE (Cl_2)

Toxicity: This material is a gas under normal conditions and is very toxic. The M.A.C. is 0.35 to 2 ppm. A concentration of 1000 ppm would be rapidly fatal. Least concentration with detectable odor is 3.5 ppm.

Fire Hazard: There is no fire hazard under normal conditions, but there is an explosion hazard if chlorine is mixed with a strong reducing agent such as hydrogen or hydrocarbons at high temperature.

Other Hazards: This material causes eye, skin, and mucous membrane irritation.

Treatment and Antidotes: The patient should be given oxygen immediately and treated for shock. Call a physician.

Storage and Handling: This material should be stored in a ventilated and cool place away from fire hazards. When handling, wear a gas mask or approved respirator, clothing and rubber or chemical safe goggles. In strong chlorine concentrations, wear canister gas masks, Scott air pack, or oxygen breathing apparatus.

Shipping: The shipping containers must have a green gas label and a non-flammable label on. Ship in steel cars or cylinders.

~~[illegible]~~ Monochlorobiphenyl 17

Toxicity: This material is a liquid under normal conditions. It is an Aroclor and so should have a medium toxicity range for liquid ingestion and high toxicity for vapor inhalation. The maximum allowable concentration is 1 mg/cubic meter.

Fire Hazard: This material has some flammability. It has a flash Point (open cup) of ~~[illegible]~~ 174° C.

Other Hazards: This material can cause dermatitis, systemic poisoning from the fumes, and yellow atrophy of the liver. There are skin, mucous membranes and eye hazards encountered in handling this material.

Treatment and Antidotes: Call a physician and remove patient from fumes.

Storage and Handling: Protect the skin, lungs, and eyes by wearing approved protective clothing, respirator, and goggles. People who handle this material at elevated temperatures should have medical supervision, and the air should be sampled to insure compliance with M.A.C. There are no special storage restrictions under normal conditions except store in a ventilated area.

Shipping: There are no special shipping restrictions.

AROCLORS 1242, ~~and~~ 1254, 1142, and 1154

Toxicity: This material is a liquid under normal conditions and has a medium toxicity range for liquid ingestion and high toxicity for vapor inhalation. The maximum allowable concentration (M.A.C.) is 1 mg/cubic meter.

Fire Hazard: There is no fire hazard under normal conditions. Aroclor mixes (Xylene, Toluene, Butyl Acetate, etc.) may burn and explose at high temperatures when exposed to flames.