MANUFACTURE & WASTE ABATEMENT IN AROCLOR PRODUCTION

I. Chlorination:

The first step in the manufacture of Aroclor compounds is the chlorination of biphenyl to the desired level (i.e. 1242 - 42% Cl_2, 1254 - 54% Cl_2 etc.).

Biphenyl is charged into a cylindrical tower (chlorinator) and chlorine is fed to the reaction mass until the desired chlorine content is reached. During this chlorination step, HCl gas is evolved and passes through a Brink mist-eliminator to knock out initial entrainment before cooling in which Aroclor vapors are condensed and removed in a collection tank for recharging to the chlorinators. As the HCl gas exits the collection tank, it again passes through a Brink mist eliminator for a second stage of entrainment removal.

The HCl gas then passes to a knock-out tank which is packed with coke as a third stage of Aroclor removal and then passes through a third mist-eliminator at the outlet of the knockout tank. (Knockout tank, coke and third mist eliminator installed on Phase I).

HCl gas is then piped to an acid absorber where it is absorbed in water. The resulting acid solution then passes through a coalescing unit (liquid-liquid seperator installed on Phase I) which reduces level of organics which has condensed out after absorption. The acid stream then is passed through carbon towers which adsorb solubilized organics in the product acid. The acid is then passed through filters to remove any carbon fimes which are picked up in the carbon towers. The product acid is then pumped to storage from which it is sold. Occasionally, due to tank car shortage, storage tanks are full and acid must be sewered. Any gas which makes its way through the absorber is drowned by a water jet and sent to the process sewer. This sewered acid then passes through the process sewer where it is directed to one of the two limestone pits (second pit installed on Phase I) for neutralization.

After neutralization of all the HCl, the material passes through a settling chamber (settling chambers installed on Phase I) where suspended solids (inerts from limestone pit) are separated and carries adsorbed Aroclor out of solution with it. The clear water stream is then sent to Snow Creek. Phase II will improve coalescing and carbon tower removal with installation of an improved coalescer and will reduce flow of Aroclor containing water. Phase III will provide tertiary treatment of the water stream discharged to Snow Creek.

II. Air Blowing to remove residual Cl_2 and HCl gas:

After completion of the chlorination step, the material is pumped to a horizontal tank where it is air blown to remove Cl_2 and residual HCl. These gases are drowned using a water jet and are routed to the process sewer. This water passes through the Aroclor department sump (installed - Phase I) prior to going to the limestone pit for neutralization. Any Aroclor which is entrained in this water or any Aroclor second phase is trapped in the Aroclor department sump. Phase II includes plans to recirculate this water to reduce net outflow to sump, neutralization and final treatment.

III. Distillation:

After air-blowing the chlorinated mass is transferred to the still, where any HCl is neutralized with lime. This material is then distilled using heat and vacuum. Vacuum for the distillation step is provided by multi-stage steam jets. The steam from these jets is condensed and sent to the Aroclor department sump. Phase II includes plans for indirect rather than direct condensers on these jets to reduce net water outflow from the department.

Product Aroclor is transferred to storage tanks for later loading out in tank cars, tank trucks, or drums. Phase II includes plans to pave and curb all

areas subject to Aroclor spills so that any spilled material is contained. Phase I has already provided curbing in the drumming area and pump drains, and drip pans to collect any small leaks from piping systems.