The study for the realization, based also on economic considerations and environment protection, led to a preference for the Technical Center method, namely the one using H_2O_2, in fact the destruction by nitric acid involved the formation, during the process, of a great quantity of vapours and gases (nitrogen oxides), another problem was the difficult control of the reaction temperature.

2. Destruction plant of the mixture Y/PhDA

2.1. Process characteristics

The process is based on a liquid phase oxidation of the mixture by hydrogen peroxide (130 vol.), followed by a neutralization by lime and then cementation of the reaction products and preservation in safety of the concrete thus obtained.

The mixture is emulsified with a surface active compound and then reacts with the concentrated solution of hydrogen peroxide.

The addition of hydrogen peroxide causes a rapid raise in temperature.

Through a cooling system the temperature is then stabilized at 95° C, which seems to be the right compromise value to allow the following:

- a rapid reaction rate, on the one hand;

- operative conditions in safety, on the other.

The control of the reaction temperature is obtained by a feedback mechanism which affects the quantity of hydrogen peroxide added and the water cooling system.

The analytical controls showed that both the mustard and the PhDA were transformed, after the oxidation reaction, into products with a lower toxicity, mainly by the presence of arsenic.

During the reaction a great quantity of hydrochloric acid is generated in the reactor, making a subsequent neutralization treatment necessary, for this treatment a solution of lime is used.

At the end of the neutralization the reaction products do not contain mustard and PhDA but they still contain, of course, arsenical products.

This presence does not allow the treatment of the residual products as normal industrial waste.

For this reason these products are mixed with cement and sand forming a concrete and stored in special containers of vibrated concrete. This conservation method guarantees against the release of the residual products into the environment, in fact a number of factors seem to indicate that chemical bonds are formed between the cement and the molecules of the residual products.