MONSANTO COMPANY

ORGANIC CHEMICALS DIVISION

ANNISTON PLANT

TRIP REPORT

LOCATION VISITED: Minerals & Chemicals Philipp Corporation
Menlo Park, New Jersey

DATE: June 15, 1966

DISTRIBUTION: This Copy For

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Persons Contacted: Mr. H. B. Fyffe
Technical Services Personnel
Research Directors
Laboratory Personnel

Purpose of Trip: To discuss column refinement of liquid Aroclors.

Background: The contact refinement system presently used for Aroclor improvement has been recognized for some time as fast approaching obsolescence. The system is slow and prone to considerable contamination.

The two approaches considered for improving the refining system were the addition of a filter aid and a packed column of adsorbent. The filter aid would speed up filtration, but, would certainly not improve and most likely would dilute the improvement efforts. The packed column refinement showed most promise towards faster filtration and improved refinement. The column has proven successfull in refining petroleum oils for color removal, treating of jet fuels for micro particle and ionic contamination removal, and refinement of petroleum fluids for transformer oils. In addition, the column system is believed to be the method for meeting present South American quality demands and to improve the refinement of all liquid Aroclors.

From information gathered in our laboratory and liaison with Minerals & Chemicals Philipp Corp. (MCP), a pilot design for a column system was proposed. The design involved a considerable number of variables such as bed height, flow rates, operating temperatures, pressure drops, type and mesh of adsorbents and other adsorbent handling problems. In order to better evaluate these variables, a review was held with the technical people at MCP.

Summary:

General agreement was reached that MCP could supply us with activated Attapulgus clay for pilot testing and commercial usage. Present plant practice requires reactivation of clay in the plant prior to usage. Coarser clays can be used as a bed support but the heart of the column should be either 30/60 or 60/90 mesh material. The flow should be down through the column. The effective column height should be a minimum of eighteen feet and preferably twenty-two feet. The column temperature should be operated as low as possible without getting into viscosity problems.

The initial testing should be a one pass system to evaluate both the adsorbent life and the effectiveness. Continuous quality monitoring is necessary to evaluate the effectiveness of the column. (This is being developed).

Porocel (activated bauxite) was believed to offer some possibilities as an adsorbent. MCP is presently compiling a book on the various adsorbents, their properties, and composition. This may be of benefit to us at some future date.

The Fulmont XX Clay (English) was believed to be less effective and more expensive than the Attapulgus clay.

In conclusion, MCP has offered to assist us in analysis or any other manner to get this column treatment moving.

Details:

The packed column refining system offers faster filtration, improved refinement and greater clay efficiencies than the present contact system. The most important considerations are the proper adsorbent size and the activeness of the clay (dryness). MCP can supply the proper size clay in the activated state. The 30/60 mesh clay is to be tested initially and if improved performance is needed the 60/90 mesh may have to be used.

The bed height of the column refiner should be a minimum of eighteen feet and preferably twenty two feet. The bed support can be built using coarse clay 8/10 mesh with the treatment section being the 30/60 or 60/90 mesh material. After the adsorbent has been charged, the refined fluid should be back flowed to soak the bed and remove air bubbles. Once the bed has been soaked, the forward flow should be carefully determined to measure adsorbent life. The bed should be operated on a one pass system to obtain an accurate balance. The temperature of the column should be as low as possible to obtain the best treatment. Once the flows, bed life, etc., have reached optimum, the regeneration of spent adsorbent probably cannot be justified. Everyone agreed that continuous monitoring of the electrical properties was desirable, if not mandatory.

Another adsorbent believed to be applicable may be porocel (activated bauxite). There are current plans to test the porocel in the laboratory along with other clays. The Attapulgus clay does not constitute a major change and may be more applicable for initial column treatment.

The Fulmont XX Clay analyzed by X-ray diffraction was found to be 54% montmorillonite. It was generally felt by MCP personnel that the Fulmont XX clay would be less effective and more expensive than the Attapulgus clay.

The usage of an Attapulgus clay cartridge was discussed. These units may be applicable as a final filter prior to loading. (Could be a sales gimmick - final clay treatment prior to loading) and possibly could be used on the storage tanks to hold electrical properties. The cartridge assembly cost $400 to $500 with the replacement element costing $5-10. These units would not be of any benefit as a replacement for the refining system, but possibly could find applicability in final treatment.

As a side note, they mentioned that Velsicol installed a percolation column on their effluent after the "fish kill" on the Mississippi River. This may find application in the affluent from our waste disposal system.

In general, the visit was informative. The personal acquaintances at MCP should prove very beneficial in future evaluations of the column treatment system. Liaison with their Technical Service will continue until the pilot column unit is operable.

J. G. Bryant

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