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MONSANTO CHEMICAL COMPANY

Texas City, Texas

MINUTES OF VCM COORDINATING COMMITTEE MEETING

Number 76

January 24, 1958

Present:

Members	Visitors
J. H. Browne	B. H. Hartzog (Part Time)
J. B. Cook	G. L. Wofford
G. T. Ryan	
W. F. Yates	

HIGHLIGHTS

1. In view of decreased sales demand for VCM, the cracking expansion project to 90 MM pounds VCM/year from cracking is cancelled.

2. Plans continue to raise cracking pressures to eliminate the need for an HCl feed compressor for oxidative chlorination. Tests will be made by Production as soon as needed revisions for higher pressure are complete.

3. Construction of oxidative chlorination pilot plant should be well under way by March 1 with completion still expected July 1.

4. Preliminary design is complete, and Engineering is estimating capital requirements for recovery of chlorinated tar.

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When these are done, sale proposals will be made to Dixie Chemical Company in Houston.

5. Research studies continue on cleanup of reactor feeds to improve catalyst life. A chromatographic analyzer is being used to determine components in HCl. Other ideas for improving catalyst life were suggested for future evaluation.

6. Production will write a memo expressing effects on Department 23 yields of a proposal to decrease ethylene purity to 90%.

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DETAILED MINUTES

VCM Requirements and General Operating Plans for 1958

VCM requirements for 1958 have decreased from estimates made in 1957, so it now appears that the present plant has sufficient capacity to meet VCM sales for all of 1958 (estimated sales are 100 MM pounds). The unit is currently operating at about 70% of rated capacity and product inventory is building.

Current plans are to operate the unit with reaction and cracking in balance except for sufficient time with cracking at higher rates than reaction to produce in-plant HCl needs. AN still has priority on acetylene, but it appears that there will be sufficient C_2H_2 (including Carbide acetylene) to allow in balance VCM operation and still meet both AN and VCM requirements.

Cracking Expansion to 90 MM lbs/year VCM

This project is cancelled in view of decreased sales.

Oxidative Chlorination Pilot Plant

Engineering reviewed the status of this project which is still planned as a possible method for future VCM expansion. Much

of the engineering is complete and pile driving is expected to be started next week. Major construction work is expected to start March 1 with completion still scheduled for July 1, 1958.

Increased Pressure on Crackers

It is still planned to increase pressure on the EDC crackers. If successful, this will eliminate the need for an HCl compressor to feed oxidative chlorination. Also this step was planned to increase cracking throughput for future VCM expansion.

Plans are to test cracker performance at higher pressures as soon as modifications are complete to allow higher pressure operation (e.g., increased relief valve and rupture disc settings strengthening of some equipment). The crackers alone up to 22D5 will be tested first, and if this is successful, pressure on the whole system (through 22D6) will be raised. The test will consist mainly of Production operating the crackers for a month or so at the higher pressures to determine how often crackers must be decoked with the lower initial pressure drop (cracker supply pressures will not be changed). Overall cracking conversions will be determined from normal plant data and special individual cracker analysis if needed will be provided by Research.

Chlorinated Tar Recovery

Engineering presented a preliminary Engineering flow diagram for steam stripping to remove heavy ends from the EDC column, 22D9, bottoms stream. As previously discussed, this step is being considered to make the chlorinated tar stream salable to Dixie Chemical Company in Houston. The Committee was generally in agreement with the proposed flow diagram except for plans to ship the recovered material by tank car. Production feels that shipment by tank truck would give more flexibility and require less storage. The main possible objection to this is that due to the high gravity of the material, truck road weight limits might be exceeded. This, however, would not appear to be a problem since heavier materials are being shipped in tank trucks (e.g., Department 20 catalyst). Engineering will review this.

The next steps on this project will be (1) Engineering will complete cost estimates; (2) when this is done, a sales proposal can be made to Dixie, and (3) justifications for equipment installation can be made.

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Cleanup of Reactor HCl Feed

Research Tests to determine effectiveness of carbon beds for cleanup of reactor feeds to improve catalyst life continue.

One of the most significant accomplishments of this study is the development of a gas chromatograph for analysis of components in the feed HCl. While not yet adaptable to a plant installation due to short chormatograph column life (three days), this instrument is being used to determine what components are in the HCl and which of these are removed by the carbon bed.

So far, it appears that impurities in the C_2H_2 feed do not shorten catalyst life, and there is no need for an adsorbent in the acetylene line. Chlorinated organics in the HCl do reduce catalyst life, and the carbon bed is effective in completely removing most of these. Two of the components which show peaks on the chromatograph have not yet been identified, and it is not yet known if these affect catalyst life.

These tests will continue to (1) identify all components in the HCl, (2) determine the life of the carbon bed for removal of impurities, (3) determine if the carbon can be regenerated, and (4) investigate adsorbents other than carbon if necessary.

This work will also be helpful in HCl quality control for oxidative chlorination and Departments 2 and 3 usage. Research has distilled Arochlor solution from the HCl compressor and found very heavy tarry material which is apparently absorbed from the HCl to Departments 2 and 3.

Catalyst Life

It has been reported that the Japanese obtain in the order of 1,000-1,200 pounds VCM/lb of catalyst. This plant is running at the rate of only about 325-350 pounds VCM/lb of catalyst. The work associated with cleanup of the HCl should help improve catalyst life. In addition there are other possibilities for future studies to investigate effects of different methods used by the Japanese compared with this plant. Chief among these is the use of small reactors in series downstream of the large reactors.

Product Quality

Recently there was considerable difficulty with high acetylene in the product VCM. This is not normally a serious problem,

but it crops up when reactor conversion is low due to inactive (or spent) catalyst which was the case recently with two reactors. Acetylene specs are very tight (2 ppm). The work on improving catalyst life above should help this situation. Also future studies of the recovery (stripping) system may be needed if this continues to be a problem. So far it has always been possible to meet shipments by blending off the high acetylene VCM.

Department 23 Yields

Production outlined a proposal by Lion Oil Division to reduce ethylene purity to 90% in order to increase ethylene capacity. The purpose of this discussion was to obtain the Committee's opinion on the effects of this change on Department 23 operation.

Historically, ethylene purity before start-up of Department 10 averaged about 97% C_2H_4. With this purity and rates before Department 10 start-up, Department 23 yields averaged about 98%. Department 10 started up and ethylene purity dropped to about 94% where it has remained since about July, 1957. Since that time, Department 23 yields are down to about 96% on ethylene and chlorine. At about the same time that ethylene purity dropped, EDC production rates increased from about 80 MM lbs/year to 110 MM lbs/year, and this also may affect yields.

It was the Committee's opinion that the major part of the yield loss was due to ethylene purity drop rather than rates. This conclusion was reached from the type of reaction in Department 23. It is pointed out that this is a one pass reactor in which chlorine can react with impurities leaving unreacted C_2H_4. Also reaction rates are less with lower concentration of reactants.

Production is writing a memo to present effects of ethylene purity cuts on Department 23.

J. H. Browne

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1/29/58

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