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CEL-391

CELANESE CHEMICAL COMPANY
Chemcel Plant
Bishop, Texas

Laboratory Department Summary
- March 1973 -

RGB 9-73

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CELANESE CHEMICAL COMPANY
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To: Mr. L. L. Schweers

From: R. G. Brandt RGB 28-73 April 6, 1973

Laboratory Department Summary
- March 1973 -

Status of Laboratory Department projects active during March are described below. Current priorities and department statistics are attached.

MO Support - Becker, Harris, Hunter

Analytical support confirmed iron poisoning of MO IV catalyst at 350-430 ppm level (Reactors 4 and 7). Unusually high levels of nickel (75-90 ppm) were also observed. New catalyst is being installed to increase efficiencies and reduce heavy carbon make.

Unstable reaction in MO III was observed after introduction of methanol from the weak formaldehyde recovery process (T-185 OH). The problems were believed to be caused by organic chlorides (10-190 ppm) and high methylal (10-15%) present in T-185 OH. The stream has been switched to feed the absorber (T-314) and this appears to have solved the problems allowing the undesirable impurities to vent prior to recycle of the methanol. The organic chlorides are believed to be introduced in the acetaldehyde feed to the PE Unit. Analysis of MO III and IIIA spent catalyst confirmed the chloride contamination and showed unusually high levels of nickel (50-500 ppm), and copper (20-950 ppm). Iron levels were high in some reactors (500 ppm).

Analytical support is being provided to the MO Task Force. Work is continuing in an effort to trace iron migration throughout the MS and MO systems. Preliminary results indicate that iron in the MS methanol can be reduced from about 26 ppb to about 13 ppb by reducing the water recycle from MS T-280 to T-279 by 57%.

Increasing the blowdown from MO III vaporizer from 2 to 5 gpm resulted in a significant decrease in entrained iron (reduced from 14 ppb to 4 ppb). This appears to be a significant change which should improve catalyst life.

002581

Formalin Quality - Harris

An improved test method has been developed for measuring methocel (stabilizer) content of formalin. The method is now being used for routine verification of stabilizer levels throughout the plant.

Analytical data show that the new Dow XFS-4048 ion exchange resin (used for formaldehyde deacidification) does not affect methocel levels of finished formalin. A report will be issued.

Paraform Production Problems - Kerr, Prinz, Harris, Hunter

Paraform production was disrupted for about a week due to premature polymerization in the second and third stage evaporators. The problems appeared to be associated with the pH of the evaporators. A pH range of 3.5-3.7 appears to be satisfactory for smooth operations. Acetic acid is being added to the unit feed to maintain this pH range which corresponds to a third stage acidity of 0.018-0.025% as HFo. In addition, both methanol and methocel have been added to the feed to duplicate VPO product. Methanol and methocel levels are slowly being reduced to establish minimum levels for optimum quality and cost.

Formcel Quality - Harris

Color problems are being experienced in the Formcel Unit. Analytical work is in progress to define the cause.

Propanol Unit Start-up - Kerr

Support was provided during the start-up of the new propanol system. With the possible exception of the concentrated residual odor, the quality of the finished propanol is good. Purity exceeds 99.9% with total organic impurities below 100 ppm. Concentrated residual odor is superior to Carbide's "Ink Grade" but inferior to Eastman's and VPO propanol. Material balance studies are planned to pin point losses so that unit efficiency may be improved.

Quality - Kerr

Considerable color bodies are formed as part of the neutralization of the reactor product. The color is a function of the final pH of the neutralization. Neutralization with a stronger acid (formic) and a weaker acid (ethyl acetate) than the acetic acid normally used did not improve the color. The best color appears to

be obtained by neutralizing to pH's below 5.0. Due to the buffering effects in the stream, acetic acid is too weak to obtain pH's below 5.0 economically. Work is continuing on this project.

Butyraldehyde Competitive Product Evaluation - Ducote

Competitive product analyses of Carbide and Monsanto n-butyraldehyde show that Celanese quality is superior.

Sodium Formate for Virginia Chemical Co. - Prinz

Lab studies are continuing in an effort to remove sodium sulfate from PE "AML" by substitution of SO_2 hydrolysis for sulfuric hydrolysis. Current studies indicate that the process may not achieve desired sulfate levels in the recovered sodium formate.

Wyandotte TMP Complaint - Brandt

The returned sample of TMP from Wyandotte (Lot 7302 ET) turned out to be fairly typical quality although on the low end of our purity range (98.7%). Selection of higher purity material may be necessary to satisfy this account.

TMP Debottlenecking - Castoro

Laboratory studies are complete. Support will be provided when the unit attempts to implement recommendations published in report of March 29, 1973 (CC 2-73, EGZ 107-73, RHP 3-73).

Acetaldol Storage Stability - Hunter

Storage stability studies of crude aldol (T-219 residue) is in progress. Various temperatures and materials of construction are being evaluated.

Molybdenum Promoted Nickel Catalyst - Jackson

Molybdenum promoted nickel catalyst ordered for a plant trial run in 1,3 BG Unit has been evaluated. The spot samples checked were acceptable for use. A letter will be issued.

The Lab will continue to monitor the hydrogenation system in 1,3 BG during the trial run. Future studies will include propionaldehyde hydrogenation.

002583

Low Ethanol Methanol - Jackson

Analytical support was given to the Low Ethanol Methanol Unit startup. Initial quality problems were encountered from purging the system with very crude methanol on start-up. The system is now lined out producing good quality product with about 1 ppm ethanol.

Waste Treatment Studies - Mc Reynolds

Foaming and flocculation problems continued to plague the BOD Unit during the month with outfall quality running 150-300 ppm BOD and 150-800 ppm volatile suspended solids. The BOD content of the feed increased from 6,000 ppm to 12,000 ppm as a result of numerous paraform boil outs during the month. The system has been flushed with river water and feed is now restricted to Celcon pressure column residue in an effort to achieve improved operations.

Lab studies are in progress evaluating various plant streams which will be added back to the BOD system one at a time once good operation is achieved.

Lab studies using an anaerobic filter for pretreatment of Celcon sumps is in progress. These streams have been difficult to treat in bench scale aerobic oxidation alone. Anaerobic pretreatment of a PE acrylate carbonate wash stream was discontinued after the anaerobic activity declined to essentially zero. No further work is planned on this stream.

R. G. Brandt

RGB/bb
Attachments: 2

CURRENT PROJECT PRIORITIES

	Priority	Chemist
Waste Treatment	1	Mc Reynolds
PE "AML" Sodium Formate Recovery	1	Prinz
TMP Debottlenecking	1	Castoro
Pentaerythritol Quality (Color)	1	Kerr
Pentaerythritol Debottlenecking and Efficiency	2	Castoro, Prinz
Propanol Support	1	Kerr
Post Aldol T-135 Res. Recovery	2	Kerr
Molybdenum Promoted Nickel Catalyst	1	Jackson
Celcon Support	1	Gary
Weak Formaldehyde Recovery	2	Gary
Air Emissions	2	Jackson
MO Optimization	1	Becker, Harris, Hunter
MS Steam Savings	2	Becker
New Silver Catalyst Supplier	3	Hunter
Formalin Quality	1	Harris
Sodium Formate lbs/gal Table	3	Harris
Propyl Acetate Quality	1	Lease, Kerr
Aldol Storage Stability	2	Hunter
T-275 Residue Reuse	2	Unassigned

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STATISTICS

	March	YTD	Prev. YTD
Chemical Section Samples	4,515	13,170	13,867
Instrument Section Samples	1,928	6,349	6,216
Celcon Section Samples	1,684	4,464	5,654
Total	8,127	23,983	25,737
Sample Shipping - Domestic	191	502	500
- Export	1	15	13
- Celcon	8	52	12
- Other	25	78	41
Total	225	647	566
Technicians Overtime - Hours			
Chemical	77	197	239
Instrument	31	57	116
Celcon	227	402	144
Special Problems	8	10	100
Total	343	666	599
Shipments (No. of orders)	675	2,249	2,157
Delayed Shipments	4	8	4
Quality Waivers	0	0	13
Customer Complaints	2	4	7
Customer Complaints Accepted	2*	3	7

* Diamond Shamrock Para Lump Complaint. See Ray Ory's REO 73-57 of March 12-73.
Inmont Corp., Clifton, N. J. - Propyl Acetate - Conc. Residual Odor.