

CELANESE CHEMICAL COMPANY
Chemcel Plant
Bishop, Texas

To: C. W. Harrison

From: W. H. Meyer

WHM-81-77

August 9, 1977

Laboratory Department Summary
July, 1977

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003069

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CELANESE CHEMICAL COMPANY
Chemcel Plant
Bishop, Texas

To: C. W. Harrison

From: W. H. Meyer

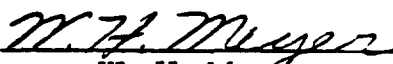
WHM-81-77

August 9, 1977

Laboratory Department Summary

July, 1977

The Bishop Plant Laboratory activities during July are attached. Section I contains a summary of the Analytical Group activities with a table of analytical statistics. Section II contains a Quality Assurance Summary and a table listing shipments, quality waivers, quality complaints and sample shipping statistics. Section III describes the status of Special Problems Group projects by Unit Chemist assignment. A table listing the priorities, justifications and estimated completion dates of current Special Problems projects is also included in Section III:


W. H. Meyer

WHM/jm
Attached Report

003070

I. ANALYTICAL GROUP

Competitive Evaluation

n-BuH - Two samples of n-BuH were received from Oxochem, Ponce, Puerto Rico. Analysis evaluation is covered in the Quality Assurance section of this report.

Polyol

TMP - Extra analytical support was provided for the monitoring of water content of the TMP product. The finishing column, molten inventory and flaked TMP were all closely followed. A method check-out was completed with no discrepancies found and no changes made. The moisture level of the system has returned to normal.

1,3-BG - Analytical support continued for the study of the elimination of T-227 sidestream draw-off (feeding T-227 residue directly to T-218), a steam savings project.

Samples of BG product and a prepared G.C. column were sent to the CCCTC for impurity verification via G.C. - Mass Spec.

Paraform

Paraform - The Analytical section is monitoring formaldehyde feed for the Lab Bench Scale operation in support of the trace impurities study.

Methyl Formcel - Support for the production of caustic treated product is continuing. Each batch is being analyzed for sodium, methylal and pH.

Oxo - BuOH

n-PrOH - Samples of crude n-PrOH were analyzed and forwarded to the Bay City Plant for development of laboratory methods.

MS Units

MS - Analytical support was provided for two material balance studies around the MS finishing columns. Ethanol level was the parameter being evaluated.

003071

MO Units

The two G.C. instruments dedicated to MO vent analysis were moved from the Instrument section to the Special Problems Laboratory. Special Problems personnel have agreed to accept the required three analyses per week, and expect to have better access to the equipment for bench scale and micro unit projects.

Utilities

Drinking water and chlorination of plant distribution drinking water commenced this month. Monitoring of the chlorine levels is continuing.

General

A. G. McGehee attended the Company-sponsored seminar on Group Leader and Unit Supervisor development.

S. H. Gonzalez will be at National Guard summer training for the first two weeks of August.

See page 4 for Analytical Statistics.

003072

Analytical Statistics

<u>Sample Count</u>	<u>July</u>	<u>July Y-T-D</u>	<u>Previous Y-T-D</u>
Chemical Section Samples	5,369	35,207	28,611
Instrument Section Samples	<u>2,676</u>	<u>16,343</u>	<u>14,971</u>
Total	8,045	51,550*	43,582

* 16% Increase

Technician Overtime:

Chemical	76	535	464
Instrument	<u>40</u>	<u>494</u>	<u>360</u>
Total	116	1,029*	824

* 25% Increase

003073

August 9, 1977

II. QUALITY ASSURANCE

DAA - A run was completed on July 26, 1977, producing 97,000 gallons of spec product. This included rerunning two cars containing off-color DAA. A tank car of DAA (20M gallons) is scheduled for Argo, August 3, 1977. New York Quality Control reports two tank cars enroute to Chemcel are off-color (spec 25), and will be reprocessed.

Isobutyl Acetate - The production run for isobutyl acetate ended July 25, 1977, with 152,000 gallons produced. The purity was a problem at the beginning of the run due to n-butyl acetate content. This was blended off during the course of the run. This product meets all sales specifications.

TMP - For approximately 10 days, the water content of TMP ranged from 0.052-0.081 (spec is 0.05). Most of this production was bagged into export bags and shipped under quality waiver to export markets.

The corrective measures that were taken will be documented by Production operating personnel.

Pampa Methanol/Pipeline Grade - An evaluation was completed on a 5-gallon sample of Pampa pipeline grade methanol. The following analyses were obtained: Assay = 99.5 wt. %; Color = 10; Acid = 0.01 wt. %; Water = 0.2 wt. %. Internal Specs: EtOH = 0.05 wt. %, Acetone = 0.05%; MEK = 0.10%; Methyl Acetate = 0.10%. The objective was to determine if this quality methanol is suitable for MO Units at Chemcel.

Butyraldehyde - Two competitive samples of n-butyraldehyde were received from Oxochem Enterprises, Ponce, Puerto Rico. The two samples were evaluated and found to be of lower quality than Chemcel n-butyraldehyde. The results are being reported separately.

PE Tech - Reichhold Chemical Company, with whom we recently had a sample exchange for hot and cold sulfuric color, has been ordering PE tech weekly. The hot and cold sulfuric color values have been 6-7 and 1-2, respectively, which are well within the guide lines of 9 and 3 for hot and cold sulfuric Gardner color units. This is an internal analysis on shipments to Reichhold, and is not reported to the customer

Argo Complaint - Celx 3265 loaded June 11, 1977, with 37% formaldehyde-7% methanol arrived at Argo with a 50 color. Original analyses reported a color of 7. However, the retain color was 5. The problem was discussed

003074

August 9, 1977

with J. E. Sanborn, and after considering alternative, the decision was made to send the car back to Bishop for product recovery and car liner inspection.

Paraform Fine Powder - Loctite - J. C. Scott reported that Loctite (Puerto Rico) had "reactivity problems" with Paraform fine powder, Lots 2420 (January 18, 1977), 2424 (February 4, 1977), and 2427 (February 15, 1977). They also reported that Lots 2390 (May 21, 1976) and 2398 (July 27, 1976) were OK. The production times for these lots as noted after each lot number was given to Mr. Scott as requested. No follow-up information regarding this complaint is available at this time.

See Sample Shipping and Quality Assurance Statistics on Page 7.

003075

Sample Shipping and Quality Assurance Statistics

<u>Sample Shipping</u>	<u>July</u>	<u>July Y-T-D</u>	<u>Previous Y-T-D</u>
Domestic	49	724	728
Export	1	69	121
Plastics	2	55	96
Other	6	692	150
Total	58	1,540	1,095
Shipments (Number of Orders)	749	6,019	5,240
Delayed Due to Quality	1	22	22
Quality Waivers	7	29	11
Quality Complaints	4	38	13
Quality Complaints Accepted	2	12	9

Note: See attached copies of Quality Complaints and Delayed Shipments due to quality or quality waiver.

003076

August 9, 1977

Quality Waivers and Shipments Delayed Due to Quality
July, 1977

<u>Date</u>	<u>Product</u>	<u>Customer</u>	<u>Destination</u>	<u>Tank Car</u>		<u>Delay or Waiver</u>	<u>Comments</u>
				<u>Tank Trailer</u>	<u>Solids</u>		
7/07/77	TMP Lot 77 07 DT	C. ITOH and Co.	Foreign Export	1200 x 55		Waiver	Water content range from 0.042-0.082 throughout the Lot. Approved for export by J. C. Scott
7/14/77	PE - Pure Lot 194-1P	C. ITOH and Co.	Corpus Christi, TX (Foreign)	900 x 50		Waiver	Ash content 0.012-0.013 Spec is 0.010. Shipped export. NYQC approved.
7/15/77 7/18/77 (Shipped)	TMP Lot 77 07 GT	Traylek	Chicago, Ill.	3200 x 50		Waiver	High Water at 0.054. Approved by J. C. Scott.
7/20/77	TMP Lot 77 07 ET Lot 77 07 FT Lot 77 07 HT	Amcel Europe, S.A.	Corpus Christi, TX (Foreign Export)	3200 x 55		Waiver	Water content above spec. (Range, .052 - .075) Approved for export by NYQC.
7/20/77	Isobutyl Acetate	Celanese, c/o Gatz	San Pedro, CA	Celx 16243 20M		Delayed	Assay too low (98.5). Min. spec 99.0. The unit is just starting up. Spec product delayed two days.

(Continued on next page)

003077

August 9, 1977

Quality Waivers and Shipments Delayed Due to Quality
July, 1977 (Continued from page 8)

<u>Date</u>	<u>Product</u>	<u>Customer</u>	<u>Destination</u>	<u>Tank Car</u>		<u>Delay or Waiver</u>	<u>Comments</u>
				<u>Tank Trailer</u>	<u>Solids</u>		
7/27/77	PE Lot 206 T ₃	Reichhold Chemical Co.	Tuscaloosa, Ala.		650 x 50	Waiver	Mono PE content 90.6. Spec is 90.0. Approved by J. C. Trebellas.
7/28/77	TMP Lot 77 07 FT Lot 77 07 HT	Amcel Europe, S.A. Port of Houston	Houston, TX Houston, TX		4000 x 55 1200 x 55	Waiver Waiver	Water content range 0.056-0.059. Spec is 0.05. Approved by J. C. Scott

003078

August 9, 1977

Customer Complaints Due to Quality
July, 1977

<u>Date</u>	<u>Customer/Plant</u>	<u>Product</u>	<u>Tank Car</u> <u>Tank Trailer</u> <u>Solids</u>	<u>Complaint</u>	<u>Comments</u>
7/01/77	Eneco, Inc. Memphis, Tenn.	55% Methyl Formcel	Recent Receipts (Last 2 months)	Noticed fibers floating in customer storage plugging rotameters.	Customer reported to J. C. Scott that fibers were plugging rotameters. Was asked to send sample of fibers for evaluation. Customer is filtering.
7/07/77	Celanese Newark Terminal	50% Uninhibited HCHO	Celx 13211	Low Assay - 49.70 High Color - 35	Original analysis does not show this quality. Retain OK. A special sample will be returned for check- out. Color may suggest liner failure in tank car.
7/28/77	Celanese c/o Gatz Argo, Ill.	37% HCHO - 7% MeOH	Celx 3265 Shipped 6/11/77	High Color - 50	Original analysis 7 color. Retain analysis 5 color. Car will be returned. Suspect liner failure.
7/01/77	Loctite Puerto Rico	Paraform Fine Powder	Amount Unknown Lots: 2420 2424 2427	Reactivity Problems	Customer reported re- activity problems with 3 lots herein numbered. Lot 2390 and 2398 were acceptable. No further in- formation at this time.

003079

III. SPECIAL PROBLEMS GROUP

Methanol Oxidation, Formaldehyde Blending
A.J. Branecky, J.D. Presley

MO Efficiency Increase with

Trace Amounts of Halogenated Hydrocarbons - Plant testing of methylene chloride addition in MO-III was performed this month. Significant shifts in reaction equilibriums were observed, but as seen earlier with methylene bromide plant testing, the effects on overall reaction efficiency were negligible.

Accountability of the halogen across the reactor was much better for the chloride compound. When the methylene chloride was first introduced to the test reactors, only a small fraction of the amount fed could be determined analytically in the reactor product. As the test progressed, however, more chloride was found in the individual reactor products. The amount found was not the same in all test reactor outlets, although the feed to each was approximately the same (determined analytically). The average amount found in the outlets still only represented approximately 30% of the average amount fed. Further analysis downstream of the test reactors on the scrubber residue and distillation column, residues did show chloride concentration that would account for the total amount fed to the four test reactors.

The data from the methylene bromide and chloride plant tests is being collected and analyzed, and a report is being written.

MO Catalyst Reuse - The catalyst bed that had been washed in place in MO-IV and had shown promising initial results, experienced a shutdown during unit problems and lost significant efficiency (efficiency lost in this reactor was approximately equal to that lost by other reactors shut down). Further monitoring was not performed.

Work will continue as time permits.

MS-II Crude to MO - Piping modifications continue for plant testing in several weeks.

Water Injection to MO - No progress due to priorities.

003080

August 9, 1977

Pampa, Pipeline Grade Methanol to MO - The bench scale MO unit was successfully operated using Pampa pipeline grade methanol. The test was conducted by starting the bench scale MO unit on methanol normally used in the commercial MO units. After the unit lined out, it was allowed to operate for 5 hours before the feed methanol was charged. Pipeline grade methanol was used for the next 12 hours. Standard efficiencies (89.5%) and conversions (64.5%) were obtained for the entire 17 hour run.

Prior to the testing, some concern was expressed about possible high acid formation with Pampa methanol. None was observed in the actual run. Analysis of feed and vent gas impurities are still pending. A report will be issued in August.

MO New Catalyst Screening - Work with the spun silver fiber has shown promising results. A technique was developed whereby the silver fiber was pressed into place in the reactor (bench scale). Packing to a bed depth of 1.5 cm with a catalyst density of 1.60 g/cm³ held the reaction, but allowed a slight oxygen passage across the reaction zone. Compressing the bed depth to 1.0 cm and 2.40 g/cm³ eliminated the oxygen passage, and the fiber performed at standard efficiencies (89.5%), but at low conversions (standard 64.4%, performed at 58-60%).

It was determined that the silver fiber manufacturer was not responsible for the high copper impurity (350 ppm) in the fiber used in bench scale testing. A sample of their silver starting material (supplied by us) was analyzed and found to contain high copper concentrations (350-400 ppm).

Work continues. An attempt will be made to obtain silver fiber with <50 ppm copper.

Eliminate Methylal Formation

In the MO Distillation Columns - A letter has been submitted proposing a study of caustic addition to MO distillation columns. Hopefully, the procedure will lower or eliminate the formation of the by-product methylal. Significant yearly savings could be realized by the success of this project.

Pentaerythritol, Weak Formaldehyde
H. H. Thigpen, G. R. Stasney

PE Efficiency - No progress.

PE Color - The carbon charged on June 25 continues to perform well through August 4. There is no detectable color in the PE product or the "B" filtrate.

003081

August 9, 1977

Color shows up in the 'B' filtrate long before it becomes detectable in the PE product. We will continue to monitor the performance of this charge.

Lower Sulfate in PE 'A' Mother Liquor (AMC) - The unit ran the digester temperature at 230-235°F during tech production and demonstrated that a digester pH of about 2.5 at this temperature will result in spec PE and meet the Virginia Chemical request for 0.5 or less sodium sulfate in the AML sodium formate (dry basis). A higher temperature (and pressure) will be required to satisfy the Virginia Chemical request during Pure PE runs. A plant trial indicated that 245-250°F will be required during Pure runs. There is some question whether this can be accomplished because of possible equipment limitations related to the higher pressures required.

PE Fines - The final status report was issued (HHT-15-77, DLS-40-77). No more lab work is planned. This topic will be dropped from future monthly reports.

Methanol Synthesis F. R. Dow

Fuel Gas Quality - Fuel gas samples were analyzed on July 6 and 19. Each sample contained approximately 96.8 vol. % methane.

No progress was made for monitoring sulfur, due to other priorities.

CCCTC has borrowed the Tracor Sulfur Analyzer until September 1, 1977.

MS-II Analytical Support - A report has been submitted detailing an ethanol balance for the A and B purification areas. The investigation shows that 99+% of the ethanol is removed at the sidestream.

A series of samples from V-2357 and V-2358 Lurgi converter outlets were analyzed for MeOH, DME and CH₄. All sets of samples showed V-2358 outlet contained about 1% more MeOH than V-2357 outlet. Analysis of the combined outlet stream shows the MeOH concentration to be about the average of the two outlets.

A calculation of the MeOH make from the CO and CO₂ conversion (MS-II computer data) indicated equal MeOH production from the two converters.

Another set of converter samples were analyzed by Mass Spec at CCCTC and showed the combined outlet had a 2+% more MeOH than the converters.

003082

August 9, 1977

This data is unexplainable at this time. Investigations are underway to improve the converter sampling and analysis.

Esters, Methylal, Paraform, Formcels
R. G. Hilbrich, K. B. Benkendorfer

Paraform, Formcels, Unit Support - Methyl Formcel Unit plant trials were begun to determine the minimum amount of sodium hydroxide addition required to meet the 0.1-0.2% methylal special requirement for shipments to American Cyanamid. The sodium hydroxide added to the reactor was successfully cut in half with no increase in the methylal production. It also appears that excellent stability was still obtained with the shortened cook time (1 hour versus 4 hours). The sodium content of the product was reduced from about 350 ppm to ~175 ppm. These studies will continue. Each step reduction will be carefully evaluated before another is taken.

Feed Contaminants and Liquid Paraform Stability - The effects of sodium formate, sodium sulfate, sodium chloride, sodium hydroxide, hydrochloric acid, and sulfuric acid on the stability of liquid Paraform have been tested and analyzed. With the exception of sodium chloride, all of the above contaminants cause a significant decrease in the stability of liquid Paraform at concentrations in the 0.5-3.0 ppm range. Further work will investigate the effects of new impurities and attempts will be made to identify any harmful contaminant(s) in MO-III feed (i.e. feed made from demineralized water that has not been through ion-exchange beds). Results will be reported in detail when the study is complete.

Paraform Material Balance - Delayed, pending full-time Process Engineering coverage on the Paraform Unit.

Alternate n-Butyl Acetate Process - No progress.

Paraform, Formcel and Ester Unit Analytical Manual - No progress due to priorities.

Oxo, Butanol, Propanol
A. J. Bacon

Oxo Reactor Accountability - Stability - Discussion continued with Witco Chemical Corporation (Mr. K. W. Reed) concerning use of their antifoams for our problem. Our lack of success with other antifoams was described but Mr. Reed was still optimistic and requested that we send a sample to their Houston lab. We will follow-up on this and send them a gallon after the

003083

August 9, 1977

August dump. Jim Corley in Houston will coordinate this and see to details such as a secrecy agreement.

The Lab has essentially completed work-up of routine samples for rhodium accountability for run number 3. A memo was issued listing samples required during and prior to catalyst drumming. A report will be issued when analytical work is complete.

Lab work with foaming/accountability was continued. It was found that excesses of hydrocarbon (i.e. heptane) solvents precipitated a layer of apparently polar heavy ends. This layer constituted about 10% of the total catalyst treated. It contained:

- a) essentially all of the color bodies giving the catalyst its black, opaque appearance
- b) - 90% phosphorus as TPP
- c) - 1% rhodium, by weight
- d) essentially all of the TPPO found in the original sample
- e) only about 30% components detected by G.C.

Preliminary kinetic data demonstrated that the upper ('clear') portion of the treated sample retained the activity of the original sample. What was puzzling, however, was that the black portion, when diluted with the appropriate amount of TPP, BuH and Dowtherm showed at least equally as high an activity as the original sample.

Other tests showed that liquid propylene may also be effective in making this separation. This all suggests the possibility of designing a catalyst blowdown system that would be effective during continuous operation. It would have the advantage of concentrating rhodium for recovery and removing TPPO, and perhaps foaming agents, from the system. More careful kinetic work is planned for the first half of August. Application ideas and economic incentives will be discussed with Process.

n-BuH, n-BuOH, n-PrOH Support - A meeting with Lab, Process and Bay City personnel was held to discuss caustic addition in PrOH, analytical methods and various Engineering aspects of the new Bay City PrOH unit.

Reports were issued with Process on PrOH daily accountability and BuOH energy conservation (use of T-133 overhead to BuAc).

003084

August 9, 1977

1,3-Butylene Glycol
J. W. Hermann

1,3-BG Daily Carbon Accountability - A report was issued describing a plant trial and estimated costs of the procedures (DL-08-77, JWH-09-77). No more work is planned, and this topic will be dropped from future monthly reports.

1,3-BG Cost Reduction - Data was collected to indicate the feasibility of eliminating the 1,3-BG finishing column (T-227) vapor sidestream. A liquid sidestream or residue stream may be possible. About \$50M per year in steam savings could be realized. Data to date are promising. Final conclusions and recommendations will be published soon.

1,3-BG Unit Support - A report was written describing recent studies of T-135 foaming and upsets. It includes recommendations which should minimize T-135 problems. The report should issue in August.

1,3-BG Unit Efficiency - No progress.

1,3-BG Unit Analytical Manual - No progress.

Alternate TMP Purification System - A gas chromatograph ordered for this work was received. The program will still be delayed because of a manpower shortage.

Utilities, Raw Materials, BOD
M. F. Brady

Purchase Specification Update - No progress due to priorities.

BOD Unit Analytical Methods Manual - No progress due to priorities.

Anaerobic Pilot Testing of Chemcel Waste Streams - Construction of the Lab pilot unit is underway.

Elimination of Lamella Underflow - No progress due to priorities.

OSHA Monitoring
J. M. Jackson

A plant-wide survey to determine the number of Celanese employees exposed to formaldehyde is complete. This information will be used by the writer and C.D. Barrett (Company Industrial Hygienist) to determine the extent, cost and manpower for Bishop Plant formaldehyde monitoring.

003085

August 9, 1977

A letter of justification for additional OSHA monitoring equipment has been issued and approved. Equipment will be purchased as soon as possible.

A carbon monoxide leak in the MS analyzer-house was pinpointed using the Ecolyzer 6000 "Hipster" CO monitor. Repairs were made, and the build-up of carbon monoxide eliminated.

The Laboratory monitored Celanese employee exposure to formaldehyde resulting from the collision of a Missouri Pacific freight train and a Service Transportation truck loaded with Methyl Formcel. At the request of Bishop Plant Safety, the Lab assisted the clean-up and decontamination of the resulting spill.

Samples of formaldehyde in the air have been received from Ms. M. R. Blankenship (E. I. duPont) for analysis. This data is being obtained for the Test Method Sub-Committee of the SOCMA Task Force. They are critically evaluating the NIOSH formaldehyde sampling and analytical method.

Samples of airborne formaldehyde are being obtained for Mr. C. E. Laubly (Corporate Industrial Hygienist) for evaluation of the dimedone-formaldehyde method versus chromotropic acid method.

Diacetone Alcohol Unit

A. R. Hancock

DAA Unit Support - The DAA Unit started up in late June. 60,000 gallons of high color (20 PtCo units) DAA was rerun. There were no serious problems in the Unit. A mesityl oxide balance around T-284 residue was made to determine if the high mesityl oxide (5-7 wt. %) in T-284 residue was real. It was determined that the high mesityl oxide values were the result of using an improper G.C. standard. A new standard was obtained. The total carbon in T-295 residue is now being analyzed each shift in the Unit lab. The total carbon analysis can be used to help control T-295. A letter describing the recommended procedures has issued.

DAA Laboratory Reactor Study - The reactor was charged with Davison catalyst. Base case data (DAA conversion and mesityl oxide make) was collected on several runs. Water was then added to the acetone feed to check the effects on mesityl oxide make. 1 wt. % H₂O in acetone drastically reduced the mesityl oxide make (.35-.07 wt. %). The DAA conversion also fell (7.06-4.18 wt. %). 0.8 wt. % H₂O in the acetone feed also caused the

003086

mesityl oxide make to decrease (.95-.22 wt. %). DAA conversion fell from 8.99 to 7.38 wt. %. Because there are some limiting factors in the lab reactor, exact duplication of the plant DAA reactors cannot be made. It is suspected that H₂O in the feed to the plant reactors will greatly reduce the mesityl oxide make without greatly lowering the DAA conversion. Unit lab data and laboratory reactor data are being compiled. A letter will be published.

Process Technology
B. C. Kerr

Technical Report Abstracting - Preparation of technical report abstracts is current. Typing and Xeroxing of abstract cards covering data abstracts for the period May through July, is in progress.

Raw Material Feed for Ester Unit - Chemcel has been asked to investigate the use of Bay City acetic acid in the Ester Unit. Previous work has shown (BCK-18-77) that the acid can be used to produce spec grade esters; however, impurities in the acid are expected to have a negative effect on Unit efficiency. In particular, the ten-fold increase in formic acid (-0.4%) will increase light ends losses. Calculations have been made showing the changes in light ends. For example, butyl acetate production feeding 14 gpm of acetic acid would show an increase in light ends (butyl formate-water azeotrope) of 236 gallons per day. These data will be used in the project evaluation.

Production Initiated Process Technology - A simplified reporting form has been submitted to Production for comments.

Company-wide Process Technology Support - The Chemcel Ester Unit Process Technology Abstract Card set has been sent to the Pampa Plant to serve as an example of the Chemcel Maintenance of Technology program.

General

Mr. D. W. Harris transferred to Operations, effective July 1, as an Operations Engineer.

Messrs. Mike Brady and Jim Hermann resigned.

003087

Current Special Problems Projects

Project	Chemist	Priority	Justification	Estimated Completion Date
MO Efficiency Improvement with Trace Amounts of Halogenated Hydrocarbons	Branecky, Presley	1	Raw Material Savings	Plant Testing Complete by September 1, 1977
MO New Catalyst Screening		2	To Establish Alternate Suppliers and Improve Catalyst Quality	Continuing
MO Catalyst Reuse		2	Reduce Ag Inventory	September 1, 1977
MS-II Crude to MO		1	Steam Savings	Plant Testing Complete by October 1, 1977
Water Injection to MO		2	Steam Savings	September 1, 1977
Pampa Pipeline Grade MeOH to MO		1	Raw Material Savings	Lab Tests Complete by August 1, 1977
Eliminate Methylal Formation in In the MO Distillation Columns	↘	1	Raw Material Savings	Plant Test by January 1, 1978
PE Efficiency	Thigpen	1	Raw Material Savings Plus Increased Capacity 4-8% Potential Increase	October, 1977
PE Unit Support		1	Maintenance of Business	Continuing
Lower Sulfate in PE AML		1	Comply with Virginia Chemical Company Request	August 1, 1977
PE Color (Evaluate Carbon Bed Performance)	↘	1	Maintenance of Business	Continuing

003088

Current Special Problems Projects

Project	Chemist	Priority	Justification	Estimated Completion Date
Fuel Gas Quality	Dow	2	Improve Fuel Gas Accountability	Continuing
MS-II Analytical Support	↘	1	Maintenance of Business	Continuing
Paraform Material Balance	Hilbrich	2	Possible Raw Material Savings	November 1, 1977
Paraform - Formcel Support		1	Maintenance of Business	Continuing
Alternate n-BuAc Process		2	Steam Savings	January 1, 1978
Paraform, Formcels, Esters Unit Analytical Methods		1	Maintenance of Business	October 1, 1977
Feed Contaminants and Liquid Paraformaldehyde Stability		1	Maintenance of Business/ Cost Savings	September 15, 1977
TMP Unit Support	↘	1	Maintenance of Business	Continuing
Oxo Reactor Accountability/Stability	Bacon	1	Improved Reactor Control and Analytical Balance	Continuing
Oxo, Butanol, Propanol Support	↘	1	Maintenance of Business	Continuing
1, 3-BG Unit Analytical Manual	Not Assigned	2	Maintenance of Business	October 1, 1977

003089

Current Special Problems Projects

Project	Chemist	Priority	Justification	Estimated Completion Date
Alternate TMP Purification System	Not Assigned	1	Raw Material Savings	January 1, 1978
BOD Analytical Methods Manual	Not Assigned	2	Maintenance of Business	December 31, 1977
Anaerobic Pilot Testing of Chemcel Waste Streams	Not Assigned	1	To Test Anaerobic Process as Alternate BOD Expansion	December 31, 1977
Purchase Specification Update	Not Assigned	1	Maintenance of Business	August 31, 1977
Elimination of Lamella Underflow	Not Assigned	1	WTTF Objective	January 1, 1978
OSHA Monitoring	Jackson	1	Ensure Employee Health and Safety, OSHA Compliance	Continuing
1, 3-BG Efficiency	Hancock	1	Raw Material Savings	December 1, 1977
1, 3-BG Unit Support		1	Maintenance of Business	Continuing
1, 3-BG Cost Reduction		1	Cost Reduction	October 1, 1977
DAA Unit Support		1	Maintenance of Business	Continuing
DAA Laboratory Reactor Study		1	Increase Unit Capacity and Steam Savings	November 1, 1977

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