CELANESE CHEMICAL COMPANY
Chemcel Plant
Bishop, Texas

To: C. W. Harrison

From: W. H. Meyer BI WHM-53-77 May 16, 1977

Laboratory Department Summary
April, 1977

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Laboratory Department Summary
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The Bishop Plant Laboratory activities during April 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

003019

I. ANALYTICAL GROUP

Competitive Evaluations

None this month.

Polyol

DAA - The study begun in March of the reactor temperature and residence time, was completed. A report will be issued by the Special Problems Group.

TMP - Unsaturates and carbonyls were determined on several samples of TMP in an attempt to correlate these tests with the Sartomer Color Test, a sulfuric acid wash.

Paraform

Formcels - Monitoring of methylal in Methyl Formcel production continues. Reactor and blend tank levels range from 0.5-1.1%, and inventory and shipping remain at 0.7-1.1%. Analysis of retains from February confirm past "normal" methylal levels of 0.3-0.4 wt.%.

Utilities - BOD

The Instrument Section is providing analytical support for a special study piloted in the Lab on bug growth in the equalization basin of the BOD Unit.

An Environmental Protection Agency visit was made to the Chemcel Plant on April 5 and 6, 1977. Twenty-four-hour composite samples were taken of Plant outfalls (Permit numbers 001 and 101), with the samples being split for our and EPA's laboratory analysis. All permit parameters were analyzed and found to be well within limits. A letter detailing results has been issued (JHH-04-77).

Chloride carry-over in the demineralizer product water continues to require operation of the Laboratory still for solutions preparation. Analytical support continues to be provided to maximize quality and quantity of demineralizer operation.

MS Unit

Analyses were provided for material balance studies around T-280 and T-288 (MS finishing towers).

General

Analytical Section Supervisors attended a Plant seminar entitled "Preventative Labor Relations". The revised Plant Policy Manual was reviewed and discussed at this same workshop.

Short-term rotational training assignments between analytical sections have been started this month. Goals are: increased versatility, job enrichment and decreased "specialized" overtime costs.

A Fisher Scientific (laboratory suppliers) exhibit was visited by A. G. McGehee on April 27, 1977. Special interest items included electronic top-loading balances, automatic Karl Fisher Titrimeters and expanded scale pH meters.

Arrangements have been finalized for temporary vacation relief help this summer. Two temporary employees for the Analytical Section and one for the Special Problems Area are expected to be on board by the end of May.

See Attached Analytical Statistics

Analytical Statistics

Sample Count	April	April Y-T-D	Previous Y-T-D
Chemical Section Samples	6,333	20,569	16,167
Instrument Section Samples	2,804	9,386	9,146
Total	9,137	29,955*	25,313

* 18.3% Increase

Technician Overtime:			
Chemical	161	363	207
Instrument	13	313	221
Total	174	676	428

II. QUALITY ASSURANCE

Formcels - Methyl Formcel production has been improved since mid-April. The product has been stable and clear. Storage tank inventory of Methyl Formcel has a range of 0.85-1.1% methylal. American Cyanamid shipments have ranged from 0.7-0.8% methylal on loadings made from the blend tanks. A firm specification has not been imposed by American Cyanamid yet, and special efforts are being made by Production to load shipments to them at the lowest possible levels of methylal.

Butyl Formcel production has been good except for occasional higher colors. All loadings have been at specification.

PE - One pure PE lot produced April 12 was borderline on mono PE content (98.0% min.), as well as high formals (above 1.0% max.).

The PE tech produced since April 21 has continually been borderline to off-spec water content (max. = 0.30). Production and Laboratory personnel are studying the problem.

1,3-BG - The purity of 1,3-BG has improved during the last week of April. Minimum specification is 99.5 wt.% by G.C. During the month, some blending of storage tanks 901 and 902 was necessary to meet the minimum spec.

Formaldehyde - On April 4, 1977, Mr. Frank Hoover, National Casein, confirmed by telephone that they would require a special customer specification of 44% formaldehyde-6% methanol, with the formic acid adjusted to a range of 0.014-0.020 wt.%. This was confirmed by letter from New York Quality Assurance. The acid level is required for their end-use of this blend at their Tyler, Texas, location.

In-line blending unit operations were fair during the month: five 37% uninhibited blends, one 37%-12-15% methanol blend, two 44% formaldehyde blends and one 45% uninhibited blend were missed, for a total of nine blends that had to be adjusted. Blending unit operation was extremely high during the month.

Isobutyraldehyde - Color problems developed in loading isobutyraldehyde in tank cars. The problem was brief, however, one tank car was diverted

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from Mexico to Bay City with a color of approximately 350 PtCo. Gene Koudelka at Bay City approved shipment. The loading personnel have been advised to check the loading lines to prevent loading highly colored isobutyraldehyde for either Bay City or Mexico. To date, color problem has improved to 10 PtCo or less.

Paraform Fine Powder - Weyerhauser (Seattle, Washington) has requested that we provide Paraform fine powder, which has been aged for a minimum of 30 days. New York Quality Assurance is studying the request and will make recommendations.

See Attached Sample Shipping and Quality Assurance Statistics

Sample Shipping and Quality Assurance Statistics

Sample Shipping	April	April Y-T-D	Previous Y-T-D
Domestic	93	443	428
Export	5	35	74
Plastics	7	33	53
Other	126	608	90
Total	231	1,119	645
Shipments (Number of Orders)	1,021	3,486	2,947
Delayed Due to Quality	5	11	9
Quality Waivers	4	10	7
Quality Complaints	5	20	4
Quality Complaints Accepted	1(1)	9	4

(1) PE Pure - DuPont - Lot 77-82P3 - Shipped to Louviers, Colorado - Fines and Dust - Customer accepted material

III. SPECIAL PROBLEMS GROUP

Methanol Oxidation, Formaldehyde Blending
A. J. Branecky

MO Efficiency Improvement with Trace Amounts of Halogenated Hydrocarbons - Injection system modifications have eliminated problems with delivery of the methylene bromide (CH_2Br_2) to the reactors in plant testing in MO-III. Good distribution of the CH_2Br_2 was demonstrated analytically. No dropping-off line of reactors has been experienced since the modifications.

To date, the plant trial has proceeded as follows: approximately 10 days of feeding 10ppm CH_2Br_2, followed by 3 days of feeding 15ppm, followed by 7 days with no CH_2Br_2 fed.

Scatter in the data has prevented definite conclusions concerning efficiency increases, so far. Increases varying from 0-1.6% have been observed in the four test reactors. Plans are to increase CH_2Br_2 concentration in further testing. A status report will be issued shortly.

MO Catalyst Reuse - A hydrochloric acid (HCl)-washed bed did not perform well when placed in service in MO-IV. The poor performance was traced to large amounts of copper support screen that had been ground up with the used catalyst. The copper screen partially dissolved in the HCl and deposited large amounts of copper on the silver surface.

A demineralized water-washed bed is still performing well in MO-IV.

Plans are to attempt washing the catalyst beds in place, both with demineralized water and with HCl.

A status report will be issued.

MS-II Crude to MO - A report describing the Laboratory work has been issued. Recommendations for plant testing are made in the report. A meeting to discuss the plant trial will be held in the near future.

MO-New Catalyst Screening - The status of this project is essentially unchanged from the summary presented in the March Laboratory Summary.

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Water Injection to MO - No progress due to priorities.

MO-I Startup Support - MO-I was started up on April 21. Problems with high formic acid concentration (0.1 wt.%), and color in the product were experienced for one week before coming "on-spec".

Before actual startup of reactors, the air-to-methanol ration (AMR) was determined analytically. Results of the analysis revealed an AMR of approximately 2.5, although the Unit instruments indicated an AMR of 1.0. Checking the instrumentation showed an open bleeder on the air transmitter which, when corrected, confirmed that the 2.5 AMR had actually existed. This re-emphasizes the importance of analytically checking the AMR before startup of any MO Unit to avoid equipment damage and extremely unsafe conditions.

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

PE Efficiency - The Laboratory study of the effect of "A" evaporatory gravity and "A" crystallizer drop temperature was completed in March. Results have not yet been published in detail. A summary of results was published (HHT-08-77, DLS-33-77) for transmittal to Edmonton prior to the PE Technology Exchange meeting there April 26 and 27. Detailed documentation with final recommendations should be completed in May.

Data collected from the Unit indicate that an evaporator gravity of 1.190-1.195 (as routinely determined in the Unit) combined with an "A" crystallizer final temperature of 70°F will result in a reasonably close approach to the maximum efficiency attainable by manipulation of these variables. We will continue our attempts to "fine-tune" the control of these variables in the Unit to maximize efficiency.

Examination of yield accounting data for December 28, 1976 through April 27, 1977, revealed that the PE efficiency based on formaldehyde (HCHO) is about 6% lower than the efficiency based on acetaldehyde (AcH) during pure runs, and only about 1% lower during tech runs. Thus, our HCHO losses are much greater during pure runs than during tech runs. The data will be published as time permits. Probable causes of the high HCHO losses during pure runs are less efficient stripping of excess HCHO from the product stream (T-286) and too much caustic in the reaction system during pure runs.

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Attempts will be made to improve HCHO stripping during pure runs after the carbon bed is in use (the carbon bed was put on-line May 3). Improved stripping was not previously feasible because it resulted in increased color. Improved stripping of HCHO during pure runs should increase efficiency based on HCHO by 2-4%, and may also increase efficiency based on AcH by 1-2%.

Methanol balances will be made across the reaction system during pure runs when time permits. This will indicate whether modification of the reaction system would result in decreased HCHO losses. No recommendato modify the reaction system conditions will be made until this data is available.

Essentially no progress on the study of the linear formal hydrolysis step was made this month due to priorities. The potential efficiency increase available if cyclic formal can be minimized during the hydrolysis step, may be equivalent to 4-6% during pure runs and 1-3% during tech runs. The studies will be resumed as time permits.

PE Unit Support - There were problems with "off-spec" and borderline PE in respect to water content during April 21-May 2.

We have begun to collect data from the Unit to correlate the performance of the dryer with production rates and water content of the "B" filter cake (dryer feed). Our goal is to establish a data base which will indicate the limitations of the dryer, evaluate "B" filter cloths and allow us to determine whether future high water contents of PE product result from variations in dryer performance, increased water in the dryer feed, or both.

PE Color - The carbon bed in the Unit was charged with carbon on May 2, and put on-line on May 3. Color in the PE product was reduced below our detectable limit, as expected. Even the filtrate (BML) color is <5 PtCo units of color. We will continue to monitor the performance of the carbon bed. The remaining question is bed life (carbon costs) and can be accurately determined only from experience in the Unit. The best prediction based on lab data is a bed life of about four months. A two-month life will be economically satisfactory.

Lower Sulfate in PE AML - No lab work. Now that the carbon bed is in the Unit, we will schedule another plant test of higher digestor temperature (reduces sulfuric acid requirements) when priorities permit. An earlier plant test was successful, but may have increased color.

PE Fines - There have been several recent complaints of "fines" in our pure PE. "Fines" is defined as the per cent of a 100g sample which passes through a 200 mesh screen in our standard screen analysis.

The amount of fines produced in the dryer was measured and found to be greater than our earlier estimates (about 4%, rather than 1-3%). The dryer now appears to be the major source of fines. An additional 1-4% appears to result from transfer to the bulk hoppers.

The PE fines status report (mentioned last month) has been delayed due to priorities. We now expect to issue it in late May. It will include a list of action options based on our current understanding of the problem. No additional lab work is currently planned.

Methanol Synthesis
F. R. Dow

Fuel Gas Quality - The component composition of natural gas feed was determined twice during April. No significant change was detected (methane content approximately 96.7 vol.%).

The process analyzer monitoring natural gas has shown total sulfur values as high as 7ppm. Frequent swings to 5ppm are not uncommon. This concentration is not detected by the Unit analyzers.

MS-II Analytical Support - Samples of DPG, Selas and combined reformer gas were analyzed again for sulfur compounds. The same pattern was found as previously reported. H_2S is present in the DPG (15ppb) and combined outlet (12ppb), but none is detected in the Selas outlet.

New sulfur compound standards were used to determine the values reported above.

Tower profile samples were obtained from T-280 and T-288 twice per week during April to determine the fusel oil bands and permanganate times. The permanganate times of samples from the lower trays are excellent indicators of potential problems before tray temperatures or off-spec product are seen.

003029

Esters, Methylal, Paraform, Formcels
R. G. Hilbrich

Methylal Build in Methyl Formcel - The study to determine if Aluminum 6061-T6 for Methyl Formcels storage causes increased methylal formation has been terminated. A report will be issued.

Paraform Material Balance - Progress on this project is delayed, due to lack of full-time Process Engineering coverage on Paraform.

Paraform, Formcels and
Ester Unit Analytical Manual - No progress was made due to priorities.

Alternate n-Butyl Acetate Process - No progress was made due to priorities.

Paraform, Formcels Unit Support - During April, MO-IV and MO-I used condensate instead of demineralized water for absorber operation to make feed for the Paraform Unit. The Paraform Unit ran for a month (April 4 to May 3) without a shutdown, and product quality was good throughout the month.

With MO-IV and MO-I using condensate instead of deionized water, Formcel quality has also improved considerably since March. Methyl Formcel cloud point decreased to 42°F from the 79°F of March material. Butyl Formcel cloud point decreased to 39°F from 52°F. Methylal concentration in Methyl Formcel ranged from .6 to .9%.

This is below the March range of 1.0-1.8%, but is above the .3-.6% range considered to be typical. Possible causes of apparent higher-than-typical methylal concentrations are being investigated by the Laboratory.

In response to a quality question from Weyerhauser Co. of Seattle, Washington, retains of Paraformaldehyde fine powder (Lots 2419 and 2424) were analyzed. The question concerned the reactivity of the two lots. Resorcinol reaction times and melting point corves were obtained. The lots in question (2419 and 2424) were comparable to material considered to be good quality.

Further work is awaiting arrival of samples from Weyerhauser.

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Oxo, 1-Butanol, 1-Propanol
A. J. Bacon

Oxo Reactor Accountability/Stability - The major work in this area concentrated on foam cause and elimination. Through a series of experiments, it was found that a light end or a component including a light end (H_2, CO, C_3^s, etc.) contributed to the foam. Thus, stripping with N_2 or CO_2 at superficial velocities of approximately 0.02-0.1 ft./sec. and 75°C at atmospheric pressure, reduced foam heights by >90% in a matter of minutes. So did stripping under vacuum over a steam bath. The effect was not attributable to anything in normal reactor product (i.e. T-163 residue). Contact with process recycle gas for short periods of time (a few hours to overnight), did not reform the foam. A series of stirred autoclave experiments showed that full catalyst activity was maintained, except in the case of vacuum stripping.

A plant trial was planned using N_2 as the stripping gas to see if lab work could be duplicated. It was decided not to use the recycle compressors due to possible damage. Unfortunately, optimum lab stripping rates of approximately 3 ft./hr.-liter could not be achieved at atmospheric pressure due to restriction of vents. The Unit pressure in this case was approximately 90 PSIG. After 1 to 2 hours under these conditions, no reduction of foam had occurred. Dropping to 1/10 these rates and 15-20 PSIG for approximately 45 minutes, showed no reduction. The run was stopped at this point.

The above rates in ft.^{3}/hr.-liter were simulated in the lab. (Superficial velocities were approximately 1/5 those in the Unit due to the size of the lab's pressure equipment.) Stripping for 2 hours in each case resulted in no foam reduction. It was apparent that low pressure is required to break the foam.

It is the hope of the Lab that some way may be found to test low pressure stripping in the Unit to see just how long the effect will last. We will lose a great opportunity if we have to drum the catalyst before such a test can be made.

In the meantime, the Lab recommends going on with water addition to the Plant reactor.

T-229 Aldol - No work due to priorities.

T-210 Residue Burning - Work as requested.

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Oxo, Butanol, Propanol Support - (1) Matthey-Bishop rhodium nitrate pre-shipment samples were received. Spec tests showed that all specs were met (borderline NH_3 on 2 of 4). Acids were all <1%, showing that Matthey-Bishop can meet our spec of <3%.
(2) A simple, safe condensor system was constructed and successfully tested on normal perchloric acid digestions. It will be used for all digestions in the future.

Trimethylolpropane

TMP Unit Support - Reactor feed and product samples were analyzed for methanol to determine the cause of low formaldehyde efficiency (70%). Methanol make via Cannizzaro reaction of formaldehyde accounted for only a 1.4% carbon loss. (Loss was 3% carbon at 77% formaldehyde efficiency during carbon accountability procedure plant trial.) High butyraldehyde efficiency (86%) and low methanol make indicates we have a formaldehyde accounting problem. The TMP carbon accountability procedure will be run this month to help determine the cause of the problem.

T. M. Powanda reported that PPG has found methanol in the vapor above TMP flake samples (TMP-77-56). A sampling procedure similar to PPG's was conducted on Lot 77-04-BT, and the samples submitted to J. Causey (CCCTC). I.R. analysis of the vapor samples showed methanol present. Methanol (approximately 50ppm) was also found in the air blanketing the TMP storage tank. Methanol is a known thermal degradation product of TMP, and is probably formed in the base of T-205. A G.C. method to determine methanol concentration in TMP is being developed (current specification method will not detect methanol).

TMP Unit Analytical Methods - NaFo concentration in T-204 residue is presently being determined by the Unit lab by perchloric acid titration. The method is not adequate for low levels of NaFo, thus, concentrations presently being reported (approximately 40-80ppm) are 1-2 orders of magnitude higher than actual (typically <1ppm). This analysis should be performed by a method incorporating the sodium specific ion electrode. The method will be included in the Unit analytical methods manual, which is currently being reviewed.

The perchloric acid titration method is valuable as an indicator of severe extractor upsets and should be continued until the specific ion electrode can be set up in the Unit lab.

V-747 Residue Hydrolysis - Past work on the hydrolysis of vacuum flasher residue has been reviewed to determine if the process may be viable, with some changes. A report recommending economic evaluation will be written as time permits.

Sartomer Color Problem - Work continues to improve the quality of our TMP for the manufacture of acrylate resins. Progress is summarized below:

1. Perstorp's ability to produce TMP with a Gardner color of 7 by Sartomer's analysis is probably due to an improved purification system. A Perstorp patent (U.S. 3,379,624) emphasizes low residence time and temperature. The process described therein consists of a wiped film evaporator (10-60 seconds residence time), and two packed distillation columns for light and heavy ends removal.

2. Temperatures and levels were lowered in the vacuum flasher and the finishing column to improve the Sartomer color of the finished product. Color of the sidestream remained at 12. Control of the finishing column was difficult at <400°F base temperature.

3. A straight line correlation was developed between Sartomer color of TMP and unsaturates (MW 84). This is another indication that our color problems are probably caused by the TMP cyclic acetal of 2-ethyl acrolein, or 2-ethyl acrolein itself.

4. Four samples of TMP have been analyzed for color in duplicate by Sartomer's method, and will be shipped to Sartomer for analysis the week of May 9, 1977. We hope to resolve analytical discrepancies with Sartomer.

5. Hydrogenation of TMP with Raney nickel catalyst at 600 PSIG and 175°C improved the color 3 Gardner units (14 to 11). Other hydrogenation tests are planned this month.

6. Analyses for unsaturates were conducted around the finishing column to determine make rate in purification. Results were inconclusive and will be repeated

1,3-Butylene Glycol
J. W. Hermann

1,3-BG Daily Carbon Accountability - A report on the plant trial and estimated cost of the program has been submitted for publication.

1,3-BG Efficiency - No progress was made due to time devoted to Demineralizer Unit back-up support.

1,3-BG Unit Analytical Manual - Initial work indicates that very few changes are needed in the existing methods manual (1969). A revised manual will be prepared to reflect changes in actual Unit methods. Also, no method was originally included for analyzing the acetaldehyde recovery column (T-135) distillate and residue. Since T-135 is located in the Oxo area, a method will be prepared and included in both the 1,3-BG and Propanol manuals. Improvements were made in the T-135 gas chromatographic analyses during April by developing stable standards which should also eliminate problems with peak identification.

1,3-BG Unit Support - Unknown causes during April resulted in operating problems with the acetaldehyde recovery column (T-135). The T-135 upset produced the "classic" 1,3-BG Unit upset. A full report will be issued.

Alternate TMP Purification System - Work is pending approval and receipt of additional needed equipment. A letter outlining equipment requirements has been issued.

Utilities, Raw Materials, BOD
M. F. Brady

Purchase Specifications Update - No progress due to priorities.

Demineralizer Support - The strong acid cation resin was removed from V-2408, and the acid distribution laterals were inspected. Several laterals were found to have plugged holes. Metal burrs left from drilling the holes had not been completely removed. These burrs had recovered the holes when liquid flowed through the laterals. Also, the acid inlet flange was missing a gasket. A new teflon gasket was placed on the flange and the laterals were mechanically cleaned to remove the metal burrs. The distribution header was pressurized to test for leaks, but no leaks were found. The laterals were replaced, and new cation resin was put into V-2408.

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The demineralizer continued to produce short runs and poor quality water. The Laboratory continued the sampling and analysis program. The strong acid cation bed continued to show higher than the 4% average design sodium leakage.

The Laboratory recommended using larger amounts of acid and caustic to regenerate the beds. Longer runs were achieved, but some short runs were also experienced.

Ion exchange columns were set up in the Laboratory to test the strong acid cation resin (IR-120). These columns were operated under the same conditions as in the Demineralizer Unit; upflow regeneration and displacement and downflow final rinse and service run. Treated water was used to feed the Laboratory columns. These columns showed less than one half of one per cent (<0.5%) sodium leakage.

Laboratory data indicates a distribution problem in the strong acid cation bed. Using large amounts of acid enhances regeneration, but does not alleviate the problem. All regeneration variables have been tested, except a greatly reduced acid regneration rate. Laboratory tests show that a very slow regeneration rate may help overcome poor distribution.

Waste Heat Recovery of T-205 Overhead - No progress due to priorities.

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

Anaerobic Pilot Testing of Chemcel Waste Streams - The three cases for the variability study (reported last month) were fed to the Anaerobic Pilot Unit. The Unit continued to perform without problems.

Effluent sample composites continued to be made in 55-gallon drums. The CCCTC began feeding nylon waste effluent to the Unit on April 18, 1977.

Testing continues.

Addition of Betz Neutrameen to the Plant Steam System - Base case data on pH, iron and total nitrogen has been accumulated. Further work has been delayed due to the demineralizer problems.

Elimination of Lamella Underflow - No progress due to priorities.

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Evaluation of IRA-94 and
Ionac AFP-329 for Formaldehyde Service - A request was made to evaluate Ionac AFP-329. No progress has been made on testing either resin due to priorities.

Water Treatment Analytical
Sampling and Testing Update - An analytical sampling and testing program has been initiated on the demineralizer-treated water feed. Work continues.

Identification of All Waste Streams - The Laboratory assisted Process Engineering and Operations for identification of all waste streams in the Utilities Unit. Work continues.

Utilities Support - Work continues.

OSHA Monitoring
J. M. Jackson

Paraform Area - Eight-hour time weighted average (8-hour TWA) personal sample for benzene was taken on the operator helpers reclaiming trioxane with high benzene content. Also, 8-hour TWA area samples for benzene were taken on the platform of V-5 to establish area exposure. Sample data will be published.

Shipping Service - Area samples (8-hour TWA) were taken for formaldehyde exposure at the tank car loading rack. Formaldehyde on the loading platform exceeded 50ppm peak concentration during loading of 37-52% formaldehyde . A recommendation was made to wear respirators at all times on the formaldehyde loading platform.

Monitoring at the Corpus Christi Terminal barge loading and unloading is planned during June and July.

Pentaerythritol - Planned sampling for particulates in the bagging area has been delayed due to priorities.

Main Laboratory - Breathing zone samples of Plastics Company technicians have been taken to establish peak exposure to benzene. Data will be reported when analyses results are received.

Plastics Company TO-I Area - An 8-hour TWA breathing zone sample for formaldehyde was taken on a Plastics Company operator helper. Analysis shows the helper's exposure to formaldehyde was 2ppm. The "front ends" of TO-I were down during sampling. Follow-up work will be done as priorities permit.

Eight-hour time weighted average samples for benzene were taken on the TO-I operator helper. Data will be reported as analytical results are received.

Miscellaneous - A continuous-reading, portable carbon monoxide monitor (The Ecolyzer Hipster) will be evaluated by the Laboratory. The instrument is scheduled to be received in May.

Diacetone Alcohol
A. R. Hancock

DAA Unit Support - No process problems were experienced during April. Several sets of samples were taken around HE-1681 (process to process heat exchanger for T-284 feed and T-284 overhead). It was suspected that DAA might be reverting to acetone across the heat exchanger, because of the increase in temperature. No sufficient change in DAA concentration could be detected.

DAA Reactor Temperature
And Residence Time Study - The plant trial to determine the effects of temperature and residence time on the DAA reactors was terminated on April 4, 1977. All analytical work has been completed and a joint report with Process Engineering will be issued.

DAA Laboratory Reactor Study - No progress due to priorities.

Bug Growth in Equilization Basin - As requested by Process Engineering, a series of "bug" tanks was set up to determine the bug growth in the equilization basin, and bug growth in a special blend of the surge pond and BOD outfall. All analytical results will be included in a report. Tests were conducted as part of a study on recycle of BOD outfall.

DAA Daily Carbon Accountability - A plant trial of the daily loss accountability procedure outlined in RML-15, JMJ-19-76 is planned for early May. A report on the results of the plant trial and estimated cost for implementation will be issued.

Current Special Problems Projects

Project	Chemist	Priority	Justification	Estimated Completion Date
MO Efficiency Improvements With Trace Amounts of Halogenated Hydrocarbon	Branecky	1	Raw Material Savings	Plant Test Complete by July 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	July 1, 1977
Water Injection to MO		2	Steam Savings	August 1, 1977
PE Efficiency	Thigpen	1	Raw Material Savings Plus Increased Capacity 4-8% Potential Increase	September, 1977
PE Unit Support		1	Maintenance of Business	Continuing
Lower Sulfate in PE AML		2	Comply With Virginia Chemical Company Request	July 1, 1977
PE Fines		1	Maintenance of Business	June 1, 1977
PE Color (Evaluate Carbon Bed Performance)		1	Maintenance of Business	Continuing
Fuel Gas Quality	Dow	1	Improve Fuel Gas Accountability	Continuing

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Current Special Problems Projects

Project	Chemist	Priority	Justification	Estimated Completion Date
MS-II Analytical Support	Dow	1	Maintenance of Business	Continuing
Methylal Build in Methyl Formcel	Hilbrich	2	To Determine Methyl Formcel Storage Stability in Aluminum	July 1, 1977
Paraform Material Balance	↓	2	Possible Raw Material Savings	September 1, 1977
Paraform - Formcel Support	↓	1	Maintenance of Business	Continuing
Alternate n-Butyl Acetate Process	↓	1	Steam Savings	August 1, 1977
Paraform, Formcels, Ester Unit Analytical Methods	↓	1	Maintenance of Business	July 1, 1977
Oxo Reactor Accountability	Bacon	1	Improved Reactor Control And Analytical Balance	Continuing
PrOH Material Balance	↓	2	Raw Material Savings	Waiting on Process and Operations
T-229 Residue Aldol	↓	2	Raw Material and Possible Steam Savings	June 1, 1977
T-210 Residue Burning	↓	2	>$100M/yr. Fuel Value	Work As Requested
Oxo, BuOH, PrOH Unit Support	↓	1	Maintenance of Business	Continuing

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Current Special Problems Projects

Project	Chemist	Priority	Justification	Estimated Completion Date
Sartomer Color Problem	Harris	1	Increased TMP Sales (Potential 500M lbs./yr.)	July 1, 1977
TMP Unit Support	↓	1	Maintenance of Business	Continuing
TMP Unit Analytical Methods Manual		2	Maintenance of Business	September 1, 1977
T-206 and V-759 Vent Emission		2	To Ensure TACB Compliance	Unknown - Work Pending Piping Modifications
V-747 Residue Hydrolysis		2	Raw Material Savings	Unknown
1,3-BG Efficiency	Hermann	1	Raw Material Savings	August 1, 1977
1,3-BG Unit Analytical Manual	↓	1	Maintenance of Business	June 1, 1977
1,3-BG Unit Support		1	Maintenance of Business	Continuing
Alternate TMP Purification System		1	Raw Material Savings	December 1, 1977
Demineralizer Support	Brady	1	Maintenance of Business	Continuing
Utilities Support	↓	1	Maintenance of Business	Continuing

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Current Special Problems Projects

Project	Chemist	Priority	Justification	Estimated Completion Date
Evaluation of Rohm and Haas IRA-94 and Ionac AFP-329 For Formaldehyde Service	Brady	2	Resin Cost Savings	August 1, 1977
BOD Analytical Methods Manual		2	Maintenance of Business	July 1, 1977
Anaerobic Pilot Testing of Chemcel Waste Streams		1	To Test Anaerobic Process as Alternate BOD Expansion	June 1, 1977
Addition of Betz Neutrameen to The Plant Steam System		1	Reduce Steam System Corrosion	August 1, 1977
Waste Heat Recovery of T-205 Overhead		2	Energy Savings	August 1, 1977
Purchase Specification Update		1	Maintenance of Business	August 31, 1977
Elimination of Lamella Underflow		1	WTTF Objective	January 1, 1978
Water Treatment Analytical Sampling and Testing Update		1	Maintenance of Business	July 1, 1977
Identification of all Waste Streams	↓	1	WTTF Objective	December 31, 1977
OSHA Monitoring	Jackson	1	Ensure Employee Health and Safety OSHA Compliance	Continuing
DAA Unit Support	Hancock	1	Maintenance of Business	Continuing

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Current Special Problems Projects

Project	Chemist	Priority	Justification	Estimated Completion Date
DAA Reactor Temperature and Residence Time Study	Hancock	1	Increase Unit Capacity and Steam Savings	June 1, 1977
DAA Laboratory Reactor Study	↓	1	Increase Unit Capacity and Steam Savings	September 1, 1977
DAA Daily Carbon Accountability		1	Possible Raw Material Savings	July 1, 1977

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