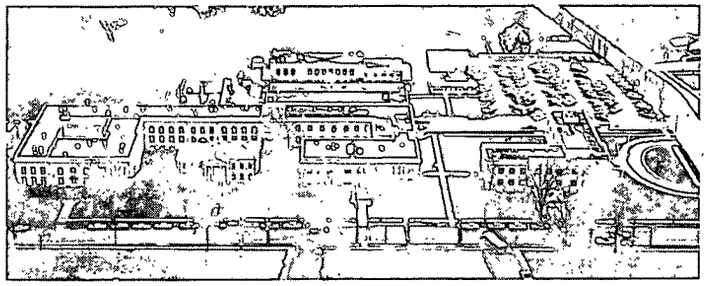

THE INSTITUTE OF PAPER CHEMISTRY, APPLETON, WISCONSIN

# PULPING PROCESSES

## PROJECT ADVISORY COMMITTEE MEETING

October 18-19, 1988

The Institute of Paper Chemistry

Appleton, Wisconsin

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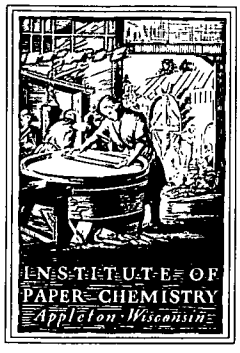


**THE INSTITUTE OF PAPER CHEMISTRY**
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September 30, 1988

TO: Members of the Pulping Processes Project Advisory Committee

The next meeting of the Pulping Processes PAC will be held in Appleton on October 18 and 19, 1988. The meeting will convene Tuesday morning at 8:30 a.m. in the Seminar Room of the Continuing Education Center at The Institute of Paper Chemistry. Accommodations are available for committee members at the Continuing Education Center. Enclosed is a pink "security card" which has instructions for entering the CEC building in the event you find it locked when you arrive. Please confirm that you will attend this meeting at your earliest convenience.

The information enclosed with this letter is for your review for the upcoming meeting. Included are:

(A) a list of current committee members,

(B) the agenda for the October meeting,

(C) lists of current M.S. and Ph.D. student work,

(D) minutes of the March 1988 meeting,

(E) items for discussion at the committee meeting, and

(F) the status reports for the individual funded projects.

The agenda is similar to that of previous meetings. We will plan on roughly 10 minutes after each presentation for comments from the committee and other attendees. This should expedite the project reviews held at the committee meeting the following morning. The evening session will consist of presentations from several of our Ph.D. students.

See you in Appleton.

Sincerely,

Earl

Earl W. Malcolm
Director
Chemical Sciences Division

EWM/gmk
Enclosures

# PULPING PROCESSES PROJECT ADVISORY COMMITTEE

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*Retirement Date

EWM/gmk
8/88

# AGENDA

## PULPING PROCESSES PAC MEETING
October 18-19, 1988

The Institute of Paper Chemistry
Continuing Education Center
Appleton, Wisconsin

## Tuesday, October 18

| | | |
|---|---|---|
| 8:30 | OPENING COMMENTS | D. Johnson |
| 8:35 | INTRODUCTION | E. Malcolm |
| 9:00 | KRAFT CHEMICAL RECOVERY PRESENTATIONS | |
| | Fundamental Processes in Alkali Recovery Furnaces (Project 3473-1) | T. Grace<br>S. Lien<br>A. Jones |
| | Fundamental Studies of Black Liquor Combustion (Project 3473-6) | K. Kulas<br>F. Harper |
| | Computer Model of Recovery Furnace (Project 3605) | |
| | Kraft Black Liquor Delivery Systems (Project 3657-1) | |
| 10:30 | BREAK | |
| 10:50 | RECOVERY PRESENTATIONS (continued) | |
| 11:15 | Fine Structure of Wood Pulp Fibers (Projects 3288 and 3521) | R. Atalla<br>C. Woitkovich |
| 11:35 | Fundamentals of Brightness Stability (Project 3524) | U. Agarwal |
| 12:00 | LUNCH | |
| 1:00 | Improved Processes for Bleached Pulp (Project 3474) | T. McDonough<br>S. Aziz<br>D. Easty |
| 2:30 | BREAK | |

| | | |
|---|---|---|
| 2:50 | Fundamentals of Selectivity in Pulping and Bleaching (Project 3475) | D. Dimmel<br>M. Van Lente<br>B. Barkhau |
| 4:05 | Development and Application of Analytical Techniques (Project 3477) | D. Easty |
| 5:00 | SOCIAL HOUR | |
| 6:00 | DINNER | |
| 7:00 | STUDENT RESEARCH | K. Biasca<br>P. Medvecz<br>I. Uhlin |
| 8:30 | ADJOURN | |

Wednesday, October 19

| | | |
|---|---|---|
| 8:00 | COMMITTEE MEETING (Krannert - Rooms K108-109) | |
| 12:00 | LUNCH (CEC) END OF SESSION | |

NEXT MEETING: March 21-22, 1989

A190

MASTERS

INDEPENDENT STUDY

| Student | Topic | Advisor(s) |
|---|---|---|
| Aloisi | Dynamic simulation with MAPPS. | Jones |
| Best | Effects of warm black liquor impregnation on kraft selectivity. | Malcolm |
| Burkhead | A study of sheet bulk development during impulse drying. | Lindsay |
| Dudek | Preliminary experiments on the encapsulation of zygotic and somatic embryos of Norway spruce. | Nagmani |
| Exarhos | Electron microscopy study of ultrastructure of Picea abies plants obtained through somatic embryogenesis. | Conners |
| Gaudette | The use of flash x-ray radiography in imaging black liquor sprays from flat spray nozzles. | Grace |
| Hagen | Sample preparation techniques for metal analysis by inductively coupled plasma spectrometry. | Easty |
| Horstmann | Influence of sizing and refining on the edge penetration of paper by an aqueous solution. | Stratton |
| Hull | The quantitative determination of formaldehyde in paper. | Easty |
| Lang | Construction of a partial genomic library for restriction fragment length polymorphism analysis in sweetgum (Liquidambar styraciflua L.) | Dinus |
| Logsdon | Patterns of and changes in gene expression associated with maturing and germinating seed. | Dinus |

| Student | Topic | Advisor(s) |
|---|---|---|
| Lynde-Maas | Fructose utilization by embryogenic and nonembryogenic callus cultures of Norway spruce. | Johnson |
| McAdams | Development of an expert advisor for analysis of end-use performance problems in paper. | Jones |
| Myers | The use of acoustic attenuation in tissue to determine air permeability. | Habeger |
| Park | Sludge treatment or utilization by biotechnology. | Johnson |
| Rosik | Modeling end use performance characteristics. | Jones |
| Sachs | Dependence of charge density on the flexibility of a polyelectrolyte. | Stratton |
| Santkuyl | Delamination in impulse drying. | Sprague |
| Tembreull | A case study of the application of ultrasonic measurements of moduli and shear for online control of paper properties. | Jones |
| Wadsworth | Two-sided impulse drying. | Sprague |
| Walker | Culture of somatic embryos in bioreactors. | Becwar |
| Weber | Expert system modeling of pulping parameters effectd by chip dimension. | Malcolm |
| Zavaglia | Flash x-ray investigation of the impulse drying process. | Lindsay |

A490

Ph.D.

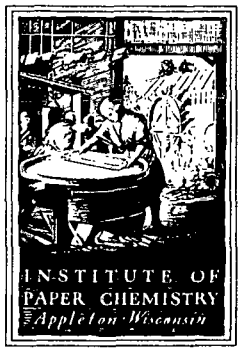
# THESES IN PROGRESS

| Student | Passed to Candidacy | Thesis Approval | Subject | Committee | Room |
|---|---|---|---|---|---|
| Biasca, J. | 1/4/84 | 2/24/84 | Oriented fiber refining: application of individual modes of mechanical action to single pulp fibers. | Habeger, chr. (Baum) McDonough Michael Jackson (Weyerhaeuser) [adjunct member] | 71 K27 |
| Molinarolo, W. (Not in residence Sept. Dec. 1984) | 9/4/84 | 3/14/85 1984 thru | The high temperature alkaline degradation of phenyl-$\beta$-D-glucopyranoside. | Dimmel, chr. (Schroeder) Malcolm | K210 |
| Bither | 9/10/85 | 1/27/86 | Strength development through internal fibrillation and wet pressing. | Waterhouse, chr. Habeger Stratton | 203A |
| Barkhau | 12/6/85 | 12/16/85 | Anthraquinone inhibited lignin condensation. | Dimmel, chr. Malcolm | K206 |
| Kulas, G. | 3/25/86 | 4/16/86 | An investigation of the fireside sulfidization of kraft recovery furnace waterwall tubes. | Grace, (co-chr.) Yeske Crowe | Cor. Lab., Rec. Lab. |
| Triantafillopoulos (Not in residence summer 1986) | 6/13/86 | 1/7/87 | Investigation of coating flows via flash x-ray. | Aidun, chr. Lindsay Dr. Shands (Beloit) [adjunct member] | 203A |
| Kulas, K. (Not in residence summer 1986) | 6/13/86 | 12/2/86 | An overall model for the combustion of a single droplet of kraft black liquor. | Grace, chr. Clay Atalla | 69 |
| Harper (Not in residence summer 1986) | 6/13/86 | 11/24/86 | Sulfur release during black liquor burning. | Grace, chr. Clay McDonough | K115 |
| Burns, B. | 6/27/86 | 10/6/86 | A kinetic study of medium consistency chlorination. | McDonough, chr. Lindsay Malcolm | 168 and 49 |

| Student | Passed to Candidacy | Thesis Approval | Subject | Committee | Room |
|---|---|---|---|---|---|
| Goulet (Not in residence summer 1986) | 6/27/86 | 12/2/86 | The effect of pulping, bleaching, and refining processes on the electrokinetic properties of wood fibers. | Stratton, chr.<br>Conners<br>Easty | 1225 |
| Uhlin (Not in residence summer 1986) | | 5/30/86 | The influence of hemicelluloses on the structure of bacterial cellulose. | Atalla, chr.<br>Johnson<br>Conners<br>(Thompson) | K216 |
| Jones | 9/8/86 | 9/3/86 | A kraft recovery furnace model. | Grace, chr.<br>Cameron<br>Clay | SR11 |
| Walsh | 9/8/86 | 9/11/86 | Development of a computer model for black liquor combustion in a recovery furnace. | Grace, chr.<br>Jones<br>Clay | SR11 |
| Burns, J. | 9/23/86 | 1/7/87 | Investigation of the constrained expansion phase of wet pressing. | Lindsay, chr.<br>Sprague<br>Conners | 251 |
| Sumnicht | 9/23/86 | 11/24/86 | Computer model of a char bed. | Grace, chr.<br>Clay<br>(Farrington) | 312 |
| Biasca, K. | 11/7/86 | 12/11/86 | A study of delignification kinetics during alkaline sulfite anthraquinone pulping. | McDonough,chr.<br>Clay<br>Malcolm | 67 |
| Goerg | 11/7/86 | 12/18/86 | A study of fume particle deposition. | Grace, chr.<br>Orloff<br>Cameron<br>(Farrington) | SR17 |
| Bond | 4/2/87 | 5/12/87 | A Raman microscopic investigation of the patterns of molecular order in the secondary cell wall of southern pine tracheids. | Atalla, chr.<br>Agarwal<br>Conners<br>Dinus | K113 |
| Rudemiller | 6/9/87 | 7/16/87 | A fundamental study of boiling heat transfer mechanisms in impulse drying. | Lindsay, chr.<br>Sprague<br>Orloff<br>Aidun | 143 |

| Student | Passed to Candidacy | Thesis Approval | Subject | Committee | Room |
|---|---|---|---|---|---|
| McKibben (Not in residence summer 1987) | 8/7/87 | 12/18/87 | A numerical and experimental study of a splash-plate type black liquor spray nozzle. | Aidun, chr. (Farrington) Grace Lindsay Halcomb | |
| Medvecz (Not in residence summer 1987) | 8/7/87 | 12/4/87 | Spectroscopic evaluation of the gas phase above a burning black liquor char bed. | Atalla, chr. (Clay) Lindsay | |
| Miller | 9/8/87 | 10/23/87 | Investigation of the role of zeta potential distribution on fines retention. | Stratton, chr. Halcomb Lindsay | 219 |
| Verrill (Not in residence summer 1987) | 12/8/87 | 3/9/88 | Chemical Fume Formation During Kraft Black Liquor Droplet Combustion. | Grace, chr. Lindsay Grace Cameron | SR3 |
| Luettgen (Not in residence summer 1987) | 1/18/88 | 3/18/88 | An Investigation of the Role of Mixing Conditions During Polymeric Retention Aid Addition on the Adsorption Homogeniety. | Stratton, chr. Etzler Lindsay | 1214 |
| Bunker (Not in residence summer 1987) | 11/19/87 | 3/29/88 | An Investigation of the Role of the Drying Strategy in the Structure of Pigment - Adhesive Films. | Conners, chr. Etzler Waterhouse | K127 |
| Spielbauer | 7/14/88 | | | Grace, chr. | 209 |
| Friese | 7/14/88 | | | | |

Attachment D-1




THE INSTITUTE OF PAPER CHEMISTRY
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August 12, 1988

TO: Research Advisory Committee
Pulping Processes Project Advisory Committee

SUBJECT: March 1988 PPPAC Report

Enclosed are the minutes of the last (March, 1988) Pulping Processes Project Advisory Committee meeting prepared by Donald Johnson, Committee Chairman. Several items, particularly the questions of available staff and rate of progress, need to be discussed at the next PAC meeting. Project planning will be a key segment of the status report prepared for the fall meeting. In addition, changes will be made in both written and verbal reporting format to ensure members can distinguish recent progress from previous results.

If you have questions or comments, please contact either me or Don Johnson.

Sincerely,

Earl Malcolm

Earl W. Malcolm
Director
Chemical Sciences Division

EWM/cvz
Enclosure
Copies to: R. Matula
R. Yeske
YS: E. Crocket
R. Dinus
M. Hall
C. Sprague

Weyerhaeuser

Tacoma, Washington 98477
Tel (206) 924 2345

July 27, 1988

Dr. Earl Malcolm
Director, Chemical Sciences Division
The Institute of Paper Chemistry
P.O. Box 1039
Appleton WI 54912

Dear Earl:

Re: Pulping Processes Project Advisory Committee (PPPAC) Report for the March 1988 Meeting

As you will recall, I was only in attendance for part of the first day (March 22) of our last meeting. Ben Ward filled in for me during the discussion on the 23rd and provided helpful written notes of the Committee's discussion. In addition, several other committee members sent written comments on the various projects. Their cooperation is greatly appreciated by the chairman.

The following remarks begin with general comments and continue with specific points addressing each of IPC's programs in the pulping processes areas.

General Comments

The committee felt that there is a need for reexamination of priorities in several of the projects so that the efforts can be better focused. Concern was again raised about the lack of staff and its impact on the rate of progress in many of the projects. This is due in part to the loss of faculty members (not yet replaced) and the relatively low number of students working in these project areas. The committee understands the volatile environment that has followed the announcement of the pending move to Atlanta. It was not clear, however, what projects were to be deemphasized for the immediate future. An overall impression was left with several committee members that there are simply not enough good people (critical mass) to sustain a meaningful effort in all of the present projects.

Once again the committee recommends that presenters clearly show the progress made over the past six months and distinguish that progress from any results reported (for clarification or background) from earlier work.

Project 3473-1: Fundamental Processes in Alkali Recovery Furnaces

Project 3473-6: Black Liquor Combustion (DOE Project)

These projects are closely interrelated and are discussed together. The presentations were introduced by Tom Grace, who gave an overview of past accomplishments and the plans for project completion.

John Cameron reviewed the formation of sulfite at lower bed temperature and the formation of pyrosulfite in the presence of chloride. He also addressed fume generation as a function of bed temperature, sulfonation of carbonate and new data by Kris George on fume particle deposition.

Dave Clay then discussed single-particle burning and indicated that Kathy Kulas was using a two-wavelength pyrometer to follow particle surface temperature. Dave addressed the present state of the Finnish liquor studies and pointed out why there might be differences between results from the two groups. Dave also presented new data on inflight particle testing.

There is strong support for this program as it addresses recovery boiler capacity and builds on the demonstrated strengths of IPC's Chemical Recovery Group. The economic impact of increased recovery boiler efficiency and/or capacity is very large for the industry. The proposed approach is sound and the chances of success are considered good as spray nozzles and associated technology have remained basically unchanged for 40 years.

The Recovery group has had a well-defined focus and the "critical mass" to move ahead in an orderly, productive manner. The committee feels that they have done an excellent job.

The committee was concerned about the timing for completion of the DOE program (about four years), especially in light of the move to Atlanta.

Project 3605: Computer Model of Recovery Furnace

There continues to be strong support and enthusiasm for this effort. The increased computational power (two Microvaxs) will help move this project more rapidly.

The scope of the current effort was clarified; i.e., this is a fuel model only which stops at the boiler bull nose. Boiler plugging issues, relative to cause and effect, are not included in this work, but plugging is one of the next steps - several years away.

Project 3475: Fundamentals of Selectivity in Pulping and Bleaching

Work continues on improving the electrochemical cell for following redox reactions at pulping temperatures. A new working electrode has been developed with higher sensitivity, but there is a problem with its stability which is now being addressed.

The Department of Energy is going to support a joint project of IPC and the Solar Energy Research Institute to explore the generation of pulping catalysts from lignin. This follows the initial findings from the thesis work of John Wozniak. It was noted that low yields of catalysts were obtained from softwood as compared to hardwood lignins. It was suggested that any catalyst-generating unit would need to be designed to handle both hardwoods and softwoods since many mills produce both types of pulps.

The committee had some difficulty in distinguishing the new work on carbohydrate degradation from results presented earlier.

An insoluble polymer-bound cellulose model is being used to further characterize the physical effects associated with DP losses in high temperature alkaline systems. Work has been extended to oxygen-alkali bleaching systems and is expected to yield insight into the reactions of crystalline and amorphous cellulose.

Project 3477: Development and Application of Analytical Techniques

The committee heard reports by Dwight Easty on two main topics: 1) estimation of lignin in pulp and paper by near-infrared spectrometry, and 2) identification and quantification of paper sizing chemicals using gas chromatography-mass spectrometry (GC/MS). Although there appears to be potential for a near-IR method to measure lignin in various pulps, there are significant problems to be overcome. These involve sample loading techniques and the substantial difference between wet and dry samples. Work done thus far has been on an instrument owned by Pacific Scientific at no cost for its use. The committee felt that some additional work was justified to determine if the problems could be solved. However, the priority does not seem very high due to a) ongoing work by Dr. Atalla on lignin determination using Raman spectroscopy and b) the fact that STFI is presently marketing an on-line lignin sensor.

It was recommended that the work on identifying sizing chemicals be continued and that consideration be given to developing a standard or useful method based on the GC/MS approach.

Project 3521: Raman Microprobe Investigation of Molecular Structure and Organization in the Native State of Woody Tissue

With the establishment of the new Raman equipment, this project has moved along nicely. More data has been obtained which supports the original hypothesis that cellulose, lignin and hemicelluloses are intimately intertwined rather than being segmented. Also, recent data indicates that Iα cellulose may be present to a significant level in wood, but in our pulping processes we degrade it or convert it to the β form. Evidence is also mounting to support the concept that cellulose is far less crystalline in its native state, but in isolating the cellulose we convert it to a more crystalline form. The committee continues to support this fundamental work.

The committee questions the practicality of an on-line lignin sensor based on Raman, but this is being funded and the problem is significant so it should be pursued.

The Raman laboratory seems to be well-equipped and at a point of providing excellent insight in selective areas.

Project 3474: Improved Processes for Bleached Pulp

The committee is strongly behind IPC's effort to better understand oxygen delignification, and the investigation of the mechanism of $NO_2$ pretreatment is a good place to start. Despite the promising outlook for this technology, very few mechanistic studies have been published. We hope the Institute will put a priority on this emerging program and bring forth useful and timely results.

Barbara Burns' work on medium consistency mixing has yielded some interesting results. In particular, the fact that mixing efficiency can deteriorate above 1700 rpm was unexpected. Little additional progress is expected by the next review due to Barbara's impending leave of absence.

Project 3566: Strong, Intact High Yield Fibers

In reviewing this project, a frank discussion ensued after which it was generally agreed that the committee was not completely satisfied with the progress to date and that the project should be put "on the back burner" in favor of other activities.

The committee felt that although some progress had been achieved and the goal is important to the industry, we do not have a meaningful program; that is, the effort lacks a focus. A comparison was drawn with the efforts of the Recovery Group wherein three people were dedicated to one objective resulting in a "critical mass" and a well-defined focus. It appears that the Pulping Group is spread too thin and should concentrate on excellence in fewer, selected areas.

The Institute staff was asked to address this recommendation and to respond with a proposal either agreeing with it and redeploying these efforts to other programs, or to redefine a more specific focus for this project with realizable, intermediate goals.

Dioxin Proposals

A discussion on the dioxin proposals was held. The committee backed both proposals and wants the Institute to get very involved in the mechanism studies to understand how dioxins and furans are formed. There was great concern for how this program can be manned. The committee agreed to send technical suggestions on these proposals to Earl within a week. Tom McDonough will be in charge of this area and additional staffing may be possible. Most testing will be done with AOX or whatever emerges as the best test to predict dioxin levels. Actual dioxin analysis will be done on key samples.

Conclusion: Both member contracts and API/NCASI should be pursued. The committee felt this should be a priority effort and was definitely something the Institute should be aggressive in pursuing.

Sincerely,

Don

Donald C. Johnson

DCJ:pmw/b47/0726

# ITEMS FOR DISCUSSION

There are several items that should be discussed at the upcoming PAC meeting. These are (1) the current status of our move to Atlanta now planned for the summer of 1989, (2) recent and pending changes in personnel, (3) program emphasis during the next year, and (4) comments on items mentioned in the minutes of the spring, 1988, Pulping Processes PAC meeting.

## ATLANTA IN 1989

Although several items need to be defined, it is our intent to be functioning in Atlanta in time to start the fall term, 1989. Because the main building will not be complete before 1991, this will involve moving temporarily to an off-campus facility. This off-campus site will remain part of the IPC facility in Atlanta after the main, on-campus building is complete. We will update the committee on what this means as far as our research program is concerned for the upcoming three years. Generally, we expect to be able to maintain all of our critical programs in a somewhat crowded condition.

## PERSONNEL CHANGES

The following changes have occurred since the last meeting:

Dave Clay has resigned and joined James River.
John Cameron has resigned and joined James River.
Tom Grace has shifted to part-time status.
Terry Adams has joined the Recovery Group on a part-time status as Professor and Principal Research Engineer.
Paul Ku has replaced Jay Shu as a postdoctoral fellow working on the black liquor project.

The following additions are anticipated in October 1988:

Ph.D. Chemical Engineer in the Recovery Group.
Ph.D. Organic Chemist in the Wood Chemistry Group.

We are actively searching for a group leader for the Recovery Group; suggestions are welcome.

The planned 1989 move to Atlanta precipitated earlier than anticipated resignations and changes in the Recovery Group. While the changes will undoubtedly slow activity in this group, we will do our best to rapidly bring the group back to full strength. It should be noted that new staff are committed to move to Atlanta. If we can complete restaffing before the actual move, the research time lost during the move will be kept to a minimum.

## PROGRAM EMPHASIS

Staff changes, shifting priorities, the move to Atlanta and several new projects will cause some changes in emphasis for IPC member funded projects during the upcoming year. Several factors must be considered in arriving at a decision as to which programs should be given high priority. For example, it is vital that

we maintain our academic program operating smoothly. We must ensure that student education is not interrupted. Therefore, high priority will be given to student needs. Similarly, we must not lose credibility with government and other agencies that are funding major portions of our research. Once one is removed from the funding cycle, it is difficult and time consuming to reenter. Additionally, direct contract research programs with member companies must be completed. Based on these factors, several changes will be made in the priority attached to selected member-funded projects.

The member funded project on high yield pulping will be given lower priority for the upcoming year. When the high yield pulping project was initiated, additional staff was anticipated. This never materialized. Therefore, work in the chemical pulping area was reduced in favor of the high yield program. While results have been forthcoming, the rate has not been fast enough to satisfy committee desires. This situation will not get any better in the next year. Therefore, work on strength aspects of the high yield project will be halted with the conclusion of the individual fiber strength vs. process parameter program. No further activity on bonding of high strength fibers is planned. Work on the brightness stability question will proceed at a lower level until additional organic staff is available. If a student can be found to continue the work of Lebo, the chemical side of this area will continue to receive attention during the next year.

With environmental questions of major immediate concern to the paper industry, activity related to bleached pulp production will be emphasized. A chlorinated organics program has been established. The effort on use of oxygen and oxygen-based chemicals will continue and will include the work of Don Dimmel and our new organic chemist. This means that the shift of a portion of our fundamental wood chemistry work from pulping chemistry to bleaching chemistry will continue and, in fact, will be expanded. Contract projects with NCASI on chlorinated organics and DOE-SERI on nonsulfur pulping are a part of this center of activity. Student research also contributes to this area.

Kraft chemical recovery will continue to receive high priority. Changes in the technical staff will slow the output of this group. Every effort will be made to obtain the maximum amount of experimental data before key pieces of equipment are dismantled and moved to Atlanta.

## COMMENTS ON MINUTES OF SPRING 1988 MEETING

### General

Project writeups have been changed to ensure it is clear what the reporting period is for each activity. Note that the detailed reports cover the period since the last written report, i.e., since September 1987. On the other hand, the "Results Since Last Report" section given on the Project Summary Sheets is comprised of results only since the last written summary, i.e., roughly February 1988. Please note the difference in coverage time between the written report that covers a one-year period and the summary sheet current results that covers a six-month period.

**Project Related**

Goals for the Fundamentals of Selectivity project will be reviewed during the meeting. They have been shifted to emphasize oxygen bleaching. Also, we will do our best to ensure new data is clearly indicated. I expect that this happens mainly in three situations, (1) when review data is being given, (2) when new data are given that completes a previous presented table or figure, and (3) when data presented orally at a committee meeting and included in that meeting's handouts is repeated in the written section of the next report. Any data obtained between the time a report is written and the actual committee meeting falls into this category.

The Analytical Techniques project will include work with near-IR. We have received an instrument on loan to do further work on lignin analysis. This is discussed in the project writeup.

The project on "Strong, Intact High Yield Fibers" has been put on hold as suggested by the committee. As might be expected, I disagree with the statement that the effort lacked focus. The singular objective for the past two years has been to define the effect of process parameters on individual fiber strength. Tom McDonough has done that and has developed a novel hypothesis to explain the loss of individual strength that occurs during the production of mechanical pulp. Perhaps this should be reviewed at the committee meeting. I don't disagree that too little staff time has been available to make major strides toward a viable process for making high yield pulps with the strength of kraft. As noted above, the demands of other projects on staff time require that work in this area be stopped for the time being. Our best opportunity for further work on high strength, high yield pulps appears to be via a joint DOE-sponsored project with Georgia Tech that would fund additional full-time personnel in this area. We will continue to pursue this option.

We have undertaken work in the chlorinated organic area as part of the member funded program. Also, both NCASI and individual member company projects are part of this area. We continue to pursue API/NCASI funding for a major fundamental study on the source of chlorinated dioxins and furans. As of yet, we have not been successful, but we continue to explore this source of funds.

If you have other items that you feel should be part of the committee discussion, please let Don or me know so that we can ensure their inclusion.

# STATUS REPORTS

TO THE

# PULPING PROCESSES PROJECT ADVISORY COMMITTEE

October 18-19, 1988

The Institute of Paper Chemistry

Appleton, Wisconsin

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