



BLACK LIQUOR RECOVERY BOILER ADVISORY COMMITTEE

OBJECTIVE

The objective of BLRBAC is to promote improved safety of chemical recovery boilers and their auxiliaries through the interchange of technical knowledge, experience, and data on past and any future recovery boiler incidents.

Bylaws - 2.1

OFFICERS

Chairman:	Dean Clay International Paper P. O. Box 7910 Loveland, OH 45140-7910	Tel: 513-248-6564 Fax: 513-248-6679 dean.clay@ipaper.com
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Secretary:	Mike Polagye FM Global P. O. Box 9102 Norwood, MA 02062	Tel: 781-255-4730 Fax: 781-762-9375 michael.polagye @fmglobal.com
Treasurer:	Ron Hess HSB Forest Products Group 110 Cedar Cove Court Buckhead, GA 30625	Tel: 706-484-1723 Fax: 706-485-5267 ronald_hess@hsb.com

REGULAR MEMBERSHIP

Organizations operating, manufacturing, or insuring chemical recovery boilers are eligible.

ASSOCIATE MEMBERSHIP

Organizations having a direct interest or role in the safety of chemical recovery boilers are eligible.

CORRESPONDING MEMBERSHIP

A company residing outside of the United States which finds it impractical to attend meetings on a regular basis because of distance and expenses, but desires to be involved and informed of BLRBAC activities.

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BLRBAC INTERNET ADDRESS: ---- www.blrbac.org
IRS Employer ID/Tax ID (IRS E.I.N.T./T.I.N) ---- #13-366-5137

EXECUTIVE COMMITTEE

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BLRBAC SUBCOMMITTEES

<p>EMERGENCY SHUTDOWN PROCEDURES John Andrews -- Chairman MeadWestvaco Corp. P. O. Box 118005 Charleston, SC 29423-8005 Tel: 843-745-3212 Fax: 843-745-3229 jda6@meadwestvaco.com</p>	<p>FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS Jerry Vuoso -- Chairman International Paper 6400 Poplar Avenue, Tower 1 Memphis, TN 38197 Tel: 901-763-7541 Fax: 901-763-6900 jerry.vuoso@ipaper.com</p>
<p>INSTRUMENTATION David Avery -- Chairman (new) Weyerhaeuser P. O. Box 678 Bennettsville, SC 29512 Tel: 843-479-0200, Ext. 458 or 335 Fax: 843-479-6603 david.avery@weyerhaeuser.com</p>	<p>MATERIALS & WELDING Joan Barna -- Chairwoman Alstom Power 2000 Dayhill Road Windsor, CT 06095 Tel: 860-285-2217 Fax: 860-285-5078 joan.barna @power.alstom.com</p>
<p>PERSONNEL SAFETY Robert Zawistowski -- Chairman Power Specialists Associates, Inc. 531 Main Street Somers, CT 06071 Tel: 860-763-3241, Ext. 126 Fax: 860-763-3608 bob.zawistowski@psaengineering.com</p>	<p>PUBLICITY & NEWS RELEASE Craig Cooke -- Chairman FM Global 815 Byron Drive Oconomowoc, WI 53066 Tel: 262-567-7370 Fax: 847-430-7699 craig.cooke@fmglobal.com</p>
<p>SAFE FIRING OF AUXILIARY FUEL Dave Streit -- Chairman Buckeye Florida One Buckeye Drive Perry, FL 32348 Tel: 850-584-1402 Fax: 850-584-1717 dave_streit@bkitech.com</p>	<p>SAFE FIRING OF BLACK LIQUOR Len Erickson -- Chairman Boise Cascade P. O. Box 50 Boise, ID 83728-0001 Tel: 208-384-4933 Fax: 208-384-7637 lenerickson@boisepaper.com</p>
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BLRBAC MEETING SCHEDULE

Fall	2003	--	October	6, 7 & 8
Spring	2004	--	April	5, 6 & 7
Fall	2004	--	October	4, 5, & 6
Spring	2005	--	April	4, 5, & 6
Fall	2005	--	October	3, 4, & 5

"Bring Operator(s). Give them a chance to hear first hand!"

■ Past Chairman Lon Schroeder

BLRBAC has created its own WEB Site which is:

www.blrbac.org

At this WEB site you will find a copy of the next Meeting Notice. Therefore, each Representative and Associate Representative is asked to inform their people of this WEB site and this is where they should obtain the following information for the BLRBAC meetings:

BLRBAC MEETING NOTICE**COVER LETTER**

General Information

REGISTRATION FORM

Print and mail to Said & Done with appropriate fees

CROWNE PLAZA HOTEL

Blocked room dates, pricing, address, hotel phone number, alternate hotel information, etc.

SCHEDULE

List of Subcommittee activities on Monday & Tuesday

AGENDA

Reports given to Joint BLRBAC Meeting on Wednesday

DELTA AIRLINE

Reduced rates and contact phone number, including discounted Avis rates for BLRBAC attendees.

QUESTIONNAIRE

Mail/e-mail completed questionnaires back to Said & Done. These will be given to the Operating Problems Subcommittee Chairman. He will see that your concerns are brought up and discussed during the Operating Problems session at the next meeting.

Mrs. Barbara Holich
Said & Done
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BLRBAC Publications List

The following is the current status of the BLRBAC publications and are available at the **BLRBAC INTERNET ADDRESS:**

www.blrbac.org

Recommended Practices by BLRBAC

Emergency Shutdown Procedure (ESP) – (October 2002)

Fire Protection in Direct Contact Evaporators and Associated Equipment – (October 2002)

Checklist and Classification Guide for Instruments and Control Systems – (April 2002)

Personnel Safety – (April 1997)

Personnel Training – (April 1997)

Post ESP Guidelines – (October 2002)

Safe Firing of Auxiliary Fuel in Black Liquor Recovery Boilers – (October 2002)

Safe Firing of Black Liquor in Black Liquor Recovery Boilers – (April 2003)

Waste Stream Incineration – (April 2002)

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No meeting was held at this time.

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SAFE FIRING OF AUXILIARY FUEL SUBCOMMITTEE**Dave Streit – Chairman**

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<p>Doug Murch GE GAP Services 1818 Market Street, Ste.2600 Philadelphia, PA 19103 Tel: N/A Fax: N/A douglas.murch@gegapservices.com</p>	<p>Jim Quandt Weyerhaeuser Company P. O. Box 275 Springfield, OR 97477 Tel: 541-741-5428 Fax: 541-741-5895 jim.quandt@weyerhaeuser.com</p>	<p>Ivan Semyanko, PE ABB Alstom Power, Inc. CEP Code 1017-2406 2000 Day Hill Road Windsor, CT 06095 Tel: 860-285-3953 Fax: 860-285-4020 ivan.semyanko@us.abb.com</p>

No meeting was held at this time.

SAFE FIRING OF BLACK LIQUOR SUBCOMMITTEE

Len Erickson, Chairman*

Boise Paper Solutions

P. O. Box 50

Boise, ID 83728-0001

Tel: 208-384-4933; Fax: 208-384-7637

lenerickson@boisepaper.com

<p>Mark Sargent -- Co-Chair* International Paper 6285 Tri-Ridge Blvd. Loveland, OH 45140-7910 Tel: 513-248-6086 Fax: 513-248-6679 mark.sargent@ipaper.com</p>	<p>Larry Hiner* Babcock & Wilcox P. O. Box 351 Barberton, OH 44203-0351 Tel: 330-860-6525 Fax: 330-860-9295 lahiner@babcock.com</p>	<p>Majed Ja'arah* Inland Paperboard & Packaging 1750 Inland Road Orange, Texas 77632 Tel: 409-746-7315 Fax: 409-746-7249 MJaarah@iccnnet.com</p>
<p>Brian Lemay* FM Global 165 Commerce Valley Dr. West, Ste. 500 Thornhill, Ont L3T 7V8 Canada Tel: 905-763-5683 Fax: 905-763-5622 brian.lemay@fmglobal.com</p>	<p>Scott Moyer* Alabama River Pulp P. O. Box 100 Perdue Hill, AL 36470 Tel: 251-743-8361 Fax: 251-743-8529 scottm@ariver.com</p>	<p>Doug Murch * GE GAP Services 1818 Market Street Philadelphia, PA Tel: 215-255-6835 Fax: 215-255-6850 douglas.murch @gegapservices.com</p>
<p>Arie Verloop* Jansen Comb. & Blr. Tech. 12025 115th Ave. NE, Ste.250 Kirkland, WA 98034-6935 Tel: 425-825-0500 Fax: 425-825-1131 arie.verloop @jansenboiler.com</p>	<p>Richard Wiseman Weyerhaeuser 100 Center Street Johnsonburg, PA 15857 Tel: 814-965-6223 Fax: 814-965-6413 rwiseman @weyerhaeuser.com</p>	<p>Rick Young Alstom Power 1119 Riverfront Parkway Chattanooga, TN 37402 Tel: 423-752-2603 Fax: 423-752-2660 frederick.young @power.alstom.com Dave Burton for Rick*</p>

* = Attended 04/03 Meeting

WASTE STEAMS SUBCOMMITTEE**John Rickard* -- Chairman**

Jacobs Engineering

P. O. Box 5456

Greenville, SC 29606

Tel: 864-676-6393; Fax: 864-676-6005

john.rickard@jacobs.com

<p>Craig J. Aderman* sappi (S. D. Warren) P. O. Box 1600 Skowhegan, ME 04976-9512 Tel: 207-238-3177 Fax: 207-856-3675 craig.aderman @sappi-na.com</p>	<p>Henry Beder* Weyerhaeuser WTC 2G25 P. O. Box 9777 Federal Way, WA 98003 Tel: 253-924-4242 Fax: 253-924-5920 hank.beder @weyerhaeuser.com</p>	<p>Mark E. Cooper* FM Global Key Center 601 108th Ave., NE, Ste. 1400 Belluvue, WA 98004 Tel: 425-709-5084 Fax: 425-454-7847 mark.cooper @fmglobal.com</p>
<p>E. Scott Crysel* Granite Park One Plano, TX 75024 Tel: 972-731-1658 Fax: 972-731-1820 scott.crysel@fmglobal.com</p>	<p>Ned Dye* Jansen Combustion &Boiler Technologies 12025 115th Ave. NE, Ste. 250 Kirkland, WA 98034-6935 Tel: 425-825-0500, Ext. 125 Fax: 425-825-1131 ned.dye@jansenboiler.com</p>	<p>James Franks* GE GAP Services 855 Dogwood Road Somerville, TN 38068 Tel: 901-465-6645 Fax: 901-465-0771 james.franks @industrialrisk.com</p>
<p>Arnie Iwanick* Harris Group, Inc. 1750 NW Naito Parkway Portland, OR 97209-2530 Tel: 503-345-4516 Fax: 503-228-0422 arnie.iwanick @harrisgroup.com</p>	<p>Brian Kaufmann* Kimberly-Clark 1400 holcomb Bridge Rd. Roswell, GA 30076-2199 Tel: 770-587-7230 Fax: 770-587-7736 bkaufmann@kcc.com</p>	<p>Olli Kujanpaa* Andritz, Inc. 10745 Westside Parkway Alpharetta, GA 30004 Tel: 770-640-2571 Fax: 770-640-2455 olli.kujanpaa@andritz.com</p>

* = Attended 04/03 Meeting

WASTE STREAMS SUBCOMMITTEE (Cont.)

<p>John Lewis Fluor Daniel Forest Products 100 Fluor Daniel Drive Greenville, SC 29607-2762 Tel: 864-281-8535 Fax: 864-676-7630 john.lewi@fluordaniel.com</p>	<p>Wayne Macintire* International Paper P. O. Box 7910 Loveland, OH 45140-7910 Tel: 513-248-6834 Fax: 513-248-6679 wayne.macintire@ipaper.com</p>	<p>Paul Seefeld* A. H. Lundberg Associates, Inc. 4577 Pebble Brook Drive Jacksonville, FL 32224-7643 Tel: 904-223-4147 Fax: 904-223-4146 paul.seefeld@lundbergassociates.com</p>
<p>Barry Seidel BE&K Engineering P. O. Box 12607 Birmingham, AL 35202-2607 Tel: 205-872-6438 Fax: 205-972-6300 seidelb@bek.com</p>	<p>H. Bentley Sherlock* Babcock & Wilcox 2302 Parklake Dr., NE, Ste. 300 Atlanta, GA 30345 Tel: 770-621-3947 Fax: 770-621-3922 hbsherlock@babcock.com</p>	

* = Attended 04/03 Meeting

Registered for the meeting were:

A.H. Lungberg Associates

Patel, Jean-Claude, Naperville, IL
Seefeld, Paul, Jacksonville, FL

Alabama River Pulp

Browning, John, Perdue Hill, AL
Corbett, Richard, Perdue Hill, AL
Edwards, Robert, Perdue Hill, AL
Moyer, Scott, Perdue Hill, AL
Noah, Kenneth, Perdue Hill, AL
Standridge, Tim, Perdue Hill, AL
Yelverton, Frankie, Perdue Hill, AL

Alert Systems, Inc.

Borsje, Henk, Duxbury, MA

Alstom Power

Brirher, Tom., Knoxville, TN
Britcher, Tom, Windsor, CT
Burton, Dave, Ottawa, Ont.
Farmer, Robert, Beverly, MA
Gadai, David, W. Simsbury, CT
Holbrook, John, Sykesville, MD
Hollenbach, Dennis, Windsor, CT
Kistka, Gerry, Jax, FL
LeBel, Mark, Windsor, CT
Morrison, Stuart, Ottawa, Ont.
Seguin, Mike, Ottawa, Ont.

American Forest & Paper Assoc.

Grant, Thomas, Yonkers, NY

Andritz, Inc.

Collins, Peter, Alpharetta, GA
Holm, Ralf, Alpharetta, GA
Kujanpaa, Olli, Alpharetta, GA
Kvist, Marko, Alpharetta, GA
Lindh, Timo, Alpharetta, GA
Martin, Jim, Alpharetta, GA
Phillips, John, Alpharetta, GA
Sestrich, Michael, Alpharetta, GA
Sopanen, Jari, Alpharetta, GA

Aon Reed Stenhouse

McCloskey, Pat, Vancouver, BC

Automation Applications

McClain, Cliff, Exton, PA
Vigeant, Mark, Fort Mill, SC

AXA Corporate Solutions

Abel, Frederic, Lyon, France

Babcock & Wilcox

Belandria, Manuel, Atlanta, GA
Cerney, Brian, Atlanta, GA
Dickinson, Jim, Barberton, OH
Hiner, Larry, Barberton, OH
Krekeler, Daniel, Cincinnati, OH
Kulig, John, Barberton, OH
Osborne, Steve, Barberton, OH
Pifer, Greg, Barberton, OH
Rose, Aaron, Atlanta, GA
Sherlock, H. Bentley, Atlanta, GA
Yash, John, Atlanta, GA

Boise Cascade

Erickson, Leonard, Boise, ID
Lofgren, Jay, International Falls, MN
Von Oepen, David, Jackson, AL
Zavadoski, Greg, St. Helens, OR

Bowater Newsprint

Conley, Clark, Coosa Pines, AL
Smith, Chris, Coosa Pines, AL

Buckeye Technologies

Baker, Randy, Perry, FL

Buckman Laboratories

Graham, Jim, Memphis, TN
Olavessen, Len, Memphis, TN

C.N.A.

Walker, Billy, Apex, NC

Registered for the meeting were:

Clement Consulting

Clement, Jack, Akron, OH

Clyde-Bergemann, Inc.

Jameel, M. Ishaq, Atlanta, GA

Coen Company

Wadhvani, B.K., Burlingame, CA

CORR System

Ruiz de Molina, Eladio, Birmingham, AL

Diamond Power

Bunton, Mark, Lancaster, OH
 Kaminski, Bob, Lancaster, OH
 Tavares, Alarick, Lancaster, OH
 Urbach, Jonathan, Lancaster, OH
 Whitehead, Brian, Lancaster, OH

DTE Engineering Services

McPherson, William, Ann Arbor, MI
 Pai, Purna, Ann Arbor, MI

Eastern Paper - Lincoln Mill

LaFlamme, Alan, Lincoln, ME
 MacEachern, Pat, Lincoln, ME
 Sanborn, Dennis, Lincoln, ME

Ecolochem

Istre, Richard, Norfolk, VA

Electron Machine Corp., The

Jarrett, Gordon, Umatilla, FL
 Vossberg, Carl III, Umatilla, FL
 Vossberg, Carl IV, Umatilla, FL

Energy & Environmental Technologies

Jones, Russel, Augusta, GA

Environmental Elements

Bringman, Lewis, Baltimore, MD
 Hug, Don, Baltimore, MO

Fluor Daniel Forest Products

Oscarsson, Bo, Greenville, SC

FM Global

Barefoot, David, Four Oaks, NC
 Burbaud, Michel, Lavaltrie, Que,
 Caughman, Bill, Alpheretta, GA
 Cooke, Craig, Oconomowoc, WI
 Cooper, Mark, Bellevue, WA
 Crysel, Scott, Plano, TX
 Harrison, Bob, Vancouver, WA
 Hoffman, Dary, Bellevue, WA
 Labonte, Guy, Montreal, Que.
 Lamb, Ron, Parsippany, NJ
 Lang, David, Bedminster, NJ
 Lemay, Brian, Thornhill, Ont.
 Meehan, Thomas, Brewer, ME
 Morgan, Rick, Plano, TX,
 Onstead, Jimmy, Plano, TX
 Parrish, David, Norwood, MA
 Polagye, Mike, Norwood, MA

Frantschach-Swiecie

Maciejak, Ryszard, Swiecie, Poland

GA Dept. of Labor

Hancock, Gerry, Atlanta, GA

GE Betz (Hercules)

Bowen, Glen, Glenwood, NY
 Gaus, Jeff, Shreveport, LA
 Robinson, James, Trevoise, PA

GE GAP Services

Franks, James, Somerville, TN
 Lynch, Joseph, Alpharetta, GA
 Murch, Douglas, Philadelphia, PA
 Rawls, Lynn, Alpharetta, GA

GeneralCologne Re

Freeman, Stuart Jr., Atlanta, GA

Registered for the meeting were:

George H. Bodman, Inc.

Bayse, Michael, Kingwood, TX
Bodman, George, Kingwood, TX

Georgia Pacific

Burney, S. L., Atlanta, GA
Durham, Rick, Atlanta, GA
Morency, Karl, Atlanta, GA
Orender, Robert, Atlanta, GA
Smith, Roger, Atlanta, GA

GES Consulting

Smith, Ed, St. Helens, OR

Global Risk Consultants

Cain, Morgan, Friendsville, TN
Jackson, Christopher, Beaverton, OR
Smith, Andy, Atlanta, GA

Gulf States Paper

Duckworth, Marty, Demopolis, AL

Harris Group

Iwanick, Arnie, Portland, OR

Hartford Steam Boiler

Garfield, Michael, Lowell, ME
Hess, Ron, Buckhead, GA
Williams, Roy, Jacksonville, FL

Indepenent

Contino, Jamie, Greensboro, GA

Inland Paperboard & Packaging

Covert, Louis, Rome, GA
Ja'arah, Majed, Orange, TX

Inst. of Paper Science & Tech.

Verrill, Chris, Atlanta, GA

International Paper

Camp, Bill, Prattville, AL
Clay, Dean, Loveland, OH
Fuhrmann, Dave, Loveland, OH
MacIntire, Wayne, Loveland, OH
Moore, Lloyd, Loveland, OH
Mynatt, Alan, Eastover, SC
Sargent, Mark, Loveland, OH
Vuoso, Jerry, Memphis, TN

International Technology Co.

Jonsson, Jan Erik, Portsmouth, NH

Interstate Paper Corp.

Cox, Michael, Riceboro, GA
Crosby, Phillip, Riceboro, GA

Irving Pulp & Paper

Mott, Dan, Saint John, NB,

Jacobs Engineers, Inc.

Rickard, John , Greenville, SC

Jansen Technologies

Drottar, Jerry, Kirkland, WA
Dye, Ned, Kirkland, WA
Verloop, Arie, Kirkland, WA

John E. Cover Engineering, Inc.

Cover, John, Birmingham, AL

John Rusch Associates

Rusch, John, New Orleans, LA

Kellogg Brown & Root, Inc.

Adams, Wayne, Mobile, AL

Kimberly-Clark

Fralic, Blanchard, New Glasgow, Nova Scotia
Kaufmann, Brian, Roswell, GA

Registered for the meeting were:

Kvaerner Pulping

Campbell, Craig, Charlotte, NC
 Christiansen, Gene, Charlotte, NC
 Gravel, Tony, Charlotte, NC
 King, Dave, Charlotte, NC
 Lebouthillier, Yvon, Laval, Que.
 Lee, David, Charlotte, NC
 Morgan, Preston, Charlotte, NC
 Sherrod, Hank, Charlotte, NC
 Wasson, Eric, Charlotte, NC
 Weikmann, John, Charlotte, NC

Liquid Solids Control

Sweeney, Michael, Upton, MA

Longview Fibre

Berg, Greg, Longview, WA

Longview Inspection

Cooper, Mike, Longview, TX

Marathon Pulp, Inc.

Rydberg, Blair, Marathon, ON

Marsh Risk Consulting

Hyche, Dwight, Meridian, MS

Marsh, Inc.

Eaves, Dennis, Atlanta, GA
 Wallace, Steve, Atlanta, GA

MeadWestvaco

Andrews, John, Charleston, SC
 Lindsey, Larry, Phenix City, AL
 Sanders, Doug, Phenix City, AL
 Williams, Jimmy, Phenix City, AL

Mechanical & Materials Engrg.

Moskal, Max, LaGrange, IL

National Board of BPVI

Sullivan, Robert, Columbus, OH

Norske Skog

Norton, Bob, Campbell River, BC,

Ondeo-Nalco

Elumba, Wilfredo, Naperville, IL
 Totura, George, Naperville, IL

P. H. Glatfelter Co.

Gentzler, William, Spring Grove, PA

Packaging Corp. of America

Ferrell, Larry, Valdosta, GA
 Hansmann, Bob, Tomahawk, WI
 Pedron, Lester, Counce, TN
 Rabalais, Cliff, Counce, TN
 Stelling, John, Tomahawk, WI
 Thomas, Kirk, Valdosta, GA
 White, Randy, Tomahawk, WI

Potlatch

Hartley, Chuck, Las Vegas, NV

Power Specialists Assoc. Inc.

Bernard, Ron, Somers, CT
 Cummings, Tom, Somers, CT
 Madersky, Tom, Somers, CT
 Pelletier, Jamie, Somers, CT
 Zawistowski, Bob, Somers, CT

Praxair Surface Technologies

Nalwasky, Kenneth, McMurray, PA

Process Automation & Control Engineering

Pilman, John, Talladega, AL

Process Engineering, Inc.

Almond, Charles, Birmingham, AL

Process Equipment/Barron Industries

Nolen, Ken, Pelham, AL
 Ray, Allen, Pelham, AL

Registered for the meeting were:

Rayonier

Holland, Jack, Jesup, GA
 Thomaston, Miki, Jesup, GA
 Thompson, Wayman, Jesup, GA
 Woods, Cliff, Jesup, GA
 Yeomans, Scott, Jesup, GA

Rick Spangler, Inc.

Spangler, Rick, St. Simons Island, GA

RiNan

Pothier, Richard, Peabody, MA

sappi

Aderman, Craig, Skowhegan, ME
 Dorko, Bob, Skowhegan, ME
 Loganathan, Roland, Mandeni, KZN, So. Africa
 McQuillan, Bill, Skowhegan, ME
 Merriman, Nick, Mandeni, KZN, So. Africa
 Segal, Mike, Cloquet, MN

Simpson Tacoma Kraft Co.

Fay, Michael, Tacoma, WA

Smurfit Carton de Colombia

Cubillos, Jairo, Cali, Colombia
 Franco, Daniel, Cali, Colombia

Smurfit Carton de Venezuela

Ledezma, Nelson, San Felite, Venezuela

Smurfit-Stone Container

Craig, David, Hodge, LA
 Davis, Robert, West Point, VA
 Dykes, Phillip, Panama City, FL
 Fuster, Pedro, Panama City, FL
 Green, William, West Point, VA
 Horth, Martin, New Richmond, Qc.
 Mills, Drexel, Missoula, MT
 Phelps, Robert, Hopewell, VA
 Rogers, Todd, Florence, SC
 Vinson, Ralph, Florence, SC

Southern Environmental

Cotton, Rick, Pensacola, FL
 Hayes, Charles, Pensacola, FL

St. Anne-Nackawic Pulp Co.

Lamey, Bernie, Nackawic, N.B.,

Stasuk Testing & Inspection Ltd.

Stasuk, David, Burnaby, BC

Stora Enso North America

Alsemaan, Assaad, Wisconsin Rapids, WI
 Loos, Bill, Wisconsin Rapids, WI

T. M. Grace Company, Inc.

Grace, Tom, Appleton, WI

Turner Company

Breaux, Ronnie, Baton Rouge, LA
 Eppinett, Dan, Baton Rouge, LA
 Junot, Donnie, Baton Rouge, LA

Utilities Project Mgt., Inc.

Osthoff, James, ??

Wausau-Mosinee Paper

Fochs, Jeff, Mosinee, WI

Welding Services, Inc.

Maxwell, Frede, Norcross, GA

Weyerhaeuser

Avery, David, Bennettsville, SC
 Beder, Hank, Federal Way, WA
 Blevins, Ron, Hanesville, KY
 Carter, Larry, Pine Hill, AL
 Dixon, Jim, Pine Hill, AL
 Glendinning, Bob, Kamloops, BC,
 Gore, Chris, Bennettsville, SC
 Morgan, Charlie, Columbus, MS
 Ponton, William, Columbus, MS
 Worsham, Jesse, Bennettsville, SC

INTRODUCTION

BLRBAC's Chairman, Dean Clay, called the meeting to order at 8:00 a.m. on Wednesday, April 9th.

CHAIRMAN: I'd like to welcome all of you all to the Main Committee Meeting for the spring BLRBAC. We thank you for your continued support.

OLD BUSINESS

ACCEPTANCE OF MINUTES OF FALL 2002 – Dean Clay

The first item of business is to approve the Minutes from the Fall 2002 meeting. They have been posted on the Web site. Hopefully, everybody has had a chance to at least review them. I'll entertain a motion to accept the minutes of the Fall 2002 meeting. Seconded? So if I can see a show of hands from the voting members to accept the Minutes? The Minutes stand approved as submitted.

NEW BUSINESS

1. NEW MEMBERS/REPRESENTATIVE CHANGES REPORT – Mike Polagye

In its meeting yesterday, the Executive Committee reviewed five applications for membership to BLRBAC. They were all approved as follows:

NEW REGULAR MEMBERSHIP -- None at this time.

NEW ASSOCIATE MEMBERSHIP

GE Betz – a provider of water treatment chemicals
 James Robinson is the designated Associate Representative
 Daniel Setaro is the designated Alternate Associate Representative

Hercules – a distributor of water treatment chemicals
 Glenn Bowen is the designated Associate Representative
 Bill Carroll is the designated Alternate Associate Representative

Turner Company, LLC – an inspection and repair company
 Ronnie Breaux is the designated Associate Representative
 Dan Eppinett is the designated Alternate Associate Representative

1. NEW MEMBERS/REPRESENTATIVE CHANGES REPORT – (Cont.)
NEW ASSOCIATE MEMBERSHIP – (Cont.)

Utilities Project Management, Inc. – a consulting company
 James Osthoff is designated as Associate Representative
 No Alternate Associate Representative has been designated.

Welding Services, Inc. – a boiler repair and maintenance company
 Bruce Newton is the designated Associate Representative
 Frede Maxwell is the designated Alternate Associate Representative

All of these have demonstrated participation in recovery boiler operation or maintenance. They have been accepted as Associate members.

REGULAR REPRESENTATIVE CHANGES

Bowater

Clark Conley replaces Frank Griffitt as Representative
 Ken Wesson replaces Clark Conley as Alternate Representative

CNA

Billy Walker replaces Robert Norum as Representative

Mitsubishi Heavy Industries

Ted Isoda replaces Hiromi Kevin Nakatani as Alternate Representative

ASSOCIATE REPRESENTATIVE CHANGES

BE&K Engineering Co.

Jerry Garner replaces Barry Seidel as Associate Representative
 Barry Seidel replaces Paul Conner as Alternate Associate Representative

K-Patents Process Instruments

Keijo Pyorala replaces John Groetsch as Associate Representative
 Arto Hamalainen replaces Keijo Pyorala as Alt. Associate Representative

2. EXECUTIVE COMMITTEE REPORT – Dean Clay

The Executive Committee met yesterday afternoon in closed session. All members, with the exception of Joan Barna who was unable to attend, were present. I'm happy to report that we have a lot of good work going on in the subcommittees. We received several submittals of proposed changes to the documents. It is the task of the Executive Committee to review those proposed changes. We either approve them, at which point they would be posted on the Web site for membership review, or we send them back to the subcommittee with comment.

3. **TREASURER'S REPORT** -- Ron Hess

As far as the attendance for this particular meeting, we had 197 Advance registrations and 40 At Door. The breakdown of that participation was 30 paper companies, four boiler manufacturers, and 10 insurance companies, 29 associate member companies and seven members invited guests. From outside North America we have a guest from Poland, two from Colombia, one from Venezuela and two guests from South Africa.

On the financial side, we have two accounts. One is a certificate of deposit account with approximately \$13,000.00 and the BLRBAC checking account right now has a balance of approximately \$30,000.00. Of course, this is before we pay the bills for this meeting. We did increase the registration fees for both Advance and At Door. That should help us maintain the solvency of BLRBAC.

CHAIRMAN: It is good to hear that we will have enough money to finance the next meeting.

4. **SECRETARY'S REPORT**

4.1 **BLRBAC SECRETARY**

Good Morning. I have two items to mention to you this morning. First is a reminder to all presenters that this morning's meeting is being taped and you have the option of submitting a written report or having what you say be transcribed as meeting minutes. I'd appreciate you letting me know either on your way up to or when leaving the podium as to whether or not you'll be submitting a written report. Written reports sent by e-mail to Barbara Holich with a copy to me is the most efficient way of doing this. Barbara's and my e-mail addresses are in the meeting notice for this meeting as well as in the meeting minutes posted on the BLRBAC Web site.

Which brings me to my second item. Our new BLRBAC Web site is available by logging on to www.blrbac.org. We are in the process of transferring our domain name from the previous Internet Service Provider (ISP) to our current ISP. As a result, based on reports that I've received, if you have a bookmark to take you to the Web site that you created prior to the creation of our new site, the bookmark may continue to take you to the old site. This can be easily fixed by logging on to www.blrbac.org and then creating a new bookmark.

Barbara will be sending an e-mail notice to all BLRBAC members and attendees for whom she has addresses when Minutes of this meeting and new material that is ready for membership review and comment is posted on the Web site. E-mail is our sole means of direct communication, so if you want to receive these e-mails, it is important for Barbara to have your current address. Otherwise you are welcome to visit the site every so often and see what's there. All BLRBAC publications are in the public domain and are offered to anyone at no cost and without restrictions.

4. SECRETARY'S REPORT – (Cont.)

4.2 SECRETARIAL SERVICES REPORT -- Barbara Holich

No changes are made to the BLRBAC database until written notification is received. I keep a file folder for each member company which includes correspondence naming the Representative and Alternate for each organization. These letters usually contain the e-mail addresses I must have in order to maintain the BLRBAC address book. Therefore, be sure that I have your current working e-mail address. BLRBAC notices of meetings and meeting minutes will only be sent via e-mail. If an e-mail address is not working properly, it will be discarded from the BLRBAC database.

CHAIRMAN: Thanks to FM Global for volunteering to maintain the Web site. All BLRBAC documents are posted on the Web site. A couple of them have been updated as far as formatting. Again, they are all available to download, print or put on your computer if you wish.

Another reminder, any document that we have out for membership review is posted on the Web site in a separate section. We will be voting on one this morning that was posted for review. We encourage you to look at the proposed documents and if you have any comments, provide your thoughts back to the chairman of the subcommittee.

5. SUBCOMMITTEE REPORTS

5.1 ESP SUBCOMMITTEE REPORT – John Andrews (See *Appendix A* – Incident List)

The ESP Subcommittee met in closed session on Monday with all 13 members represented. One member, Dave Parrish, was represented by Ron Lamb. During the Closed Session, James Franks of GE GAP Services was accepted as a member of the committee replacing Jamie Contino. The Subcommittee met in open session on Tuesday morning. We had 12 of the 13 members present and about 200 guests.

The Subcommittee received 23 incidents from North America and 2 from International mills. Of the 23 North American incidents, one was a dissolving tank explosion. Eight were critical incidents and 13 were non-critical incidents. In eight of the incidents, an ESP was performed, five of the critical incidents and three of the non-critical. One ESP was performed but no leak was found. In that incident, the information from the instrumentation indicated that something was going on and the Subcommittee felt that the mill responded properly to what they saw at the time. They responded quickly.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

The basic definitions of Explosions, Critical Incidents and Non-Critical Incidents were re-established by the Executive Committee in September 1999. They are summarized as follows:

Explosions: Only if discernible damage has occurred. This does not include incidents where there is only evidence of puffs or blowback alone.

With the new emphasis on damage, more attention will be given to the extent of damage and the amount of downtime for the damage repair (as opposed to total downtime that includes other activities).

Critical Incidents: All cases where water in any amount entered the recovery unit forward of isolating baffles (and therefore would be a similar criterion to the need to perform an ESP). This includes leaks of pressure parts of all sizes. Since small leaks often wash adjacent tubes to failure, this category is important to our learning. This new definition will result in more entries for the Critical Incident list. (This new category is being re-titled Critical Incidents, rather than Critical Exposures, since we are not restricting the cases only to “exposure” of smelt to water, as in the past.)

Non-Critical Incidents: Those cases that did not admit water to the boiler cavity defined above.

Incident Locations

The general locations of the leaks are shown in Figure 1, which displays a typical boiler, not representing any particular style or model. The yellow marks are the non-critical incidents. The red were listed as critical incidents and there is one blue one that represents the ESP with no leak. The leaks locations are summarized as follows:

- 10 – Economizer
- 3 – Superheater
- 4 – Wall Tubes
- 4 – Generating Bank
- 1 – Dissolving Tank Explosion
- 1 – ESP w/ No Leak Found

5. SUBCOMMITTEE REPORTS – (Cont.)
5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

Root Cause

The determination of the root cause is somewhat of a subjective determination by the Subcommittee based on information in the reports. The breakdown is listed below:

Cracking

- 12 – Fatigue
- 1 – Corrosion Fatigue or Stress Assisted Corrosion
- 1 – Weld Failure

Holes and Pin Holes

- 2 – Corrosion
- 1 – Weld Failure

Rupture

- 2 – Corrosion
- 2 – Overheat

How Discovered

All, but one of the leaks, were discovered by operator walk-downs and field observations. There was one that was identified by the control room indications. Of the incidents reported, eight had leak detection systems installed and one reported that the system confirmed the leak even if it didn't initially identify it. Several of the reports commented that the leaks were so small they were probably below the sensitivity of the detection system.

Incident History

Figure 2 shows the critical incidents per year. The last bar represents one-half the current year. If that is doubled for the full year, it appears that we are still running at rate of about 15 to 16 critical incidents per year.

Figure 3 shows that the predominance of explosion history for the recent past has been dissolving tank explosions averaging one per year for several years. Fortunately, there have been only four smelt-water explosions or other explosions in the last 10 years. The OSHA report has been released for the Durango explosion in 2002 but it is still listed as "Other" in the listing because we do not have a definitive cause for that explosion.

5. **SUBCOMMITTEE REPORTS – (Cont.)**
 5.1 **ESP SUBCOMMITTEE REPORT – (Cont.)**

Figure 4 shows that the five-year running average of explosions seems to be leveling out over the last four years. We all need to continue making the efforts to try to get that trending back down; especially in developing better procedures to handle heavy smelt runs and plugged spouts. It appears that is the area that we really need to start focusing on.

Figure 5 is a plot of explosion history per 100-boiler operating years. The smelt water explosion experience is continuing to trend down over time, but the total explosions seem to be leveling off at about 1.2 explosions per 100 boiler years. That includes all causes combined, including the dissolving tank explosions.

Eight-Foot Rapid Drain Level

There were several incident reports submitted that included the floor tube thermocouple data. All of the data submitted indicated that, within one to two hours after the ESP, the floor temperatures started coming back up, indicating that the floor may be dry. A report from Alabama River that said that they had actually measured the level and there was no water found in the lower furnace.

The Subcommittee is still soliciting data on that to try to further evaluate if there should be a change in that 8 ft. level. The document posted on the Web site under the link named “*Incident Reporting and Questionnaires*” and titled *Post ESP Water Level* shows the technique to determine the water level in the lower furnace after an ESP. This is a simple system that can only be used after it is safe to reenter the building and there is no pressure on the boiler. The mill in Charleston has used the system a few times and they have found that the water level is below the floor in all those cases. So whenever you have an opportunity, which hopefully will be never but if you do, please use the system and include the level data on the ESP checklist that you fill out.

Revised ESP Questionnaire

The Subcommittee has been working on a revision of the ESP questionnaire. The form has been simplified so that it will be easier to fill out. The form is more interactive. There is a table you can use that tells you, depending upon the type of incident, which sections you need to fill out and which sections you can leave blank. We are in the final revision and formatting. Once that is completed, hopefully within a month or so, we will put the new form on the Web site. When the new form has been published, we would appreciate any comments on it, if you find it simpler or not and any suggestions for further revision.

5. SUBCOMMITTEE REPORTS – (Cont.)
5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

Whenever you need to fill out an ESP Questionnaire please go into the BLRBAC Web site and pull up the latest copy of the form. The form can be filled in electronically and sent it in by e-mail or it can be printed out and filled in by hand and mailed in. Either way is appreciated. Just be sure to fill it out and send it in.

Recommended Change to ESP Document

The Executive Committee approved, for review by the membership, the following recommended change to the ESP document. We recommend adding the following section.

3.13.4 *Torque Limits*

The torque limits should not be included in the motor control open circuit for the rapid drain valves so that the motor will exert maximum effort to open the valves until the open position limit is reached. The torque limits may be used in the valve test mode if desired.

Anybody who has any comments or suggestions, feel free to e-mail me at jda6@meadwestvaco.com. My address and phone number can be found in the Subcommittee Member listing in the Minutes. Depending on comments received, hopefully we will be in a position next meeting to approve the change and put it into the ESP document.

(Editorial Note)

The Subcommittee has been receiving Questionnaires that report several leaks and in some cases several shutdowns in the same Questionnaire. Historically, we have been reporting each Questionnaire as an “Incident”. Reviewing the information received for the Spring Meeting, there were a total 29 shutdowns and 33 leaks reported in the 23 Questionnaires that were reported. At the Fall 2003 meeting, the Subcommittee will decide how best to record the data from those reports. The Subcommittee does not discourage bundling the incidents, especially for economizer leaks that have the same root cause. We would much prefer to obtain the data in that form if it encourages mills to submit the completed Questionnaires.

5. SUBCOMMITTEE REPORTS – (Cont.)
 5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

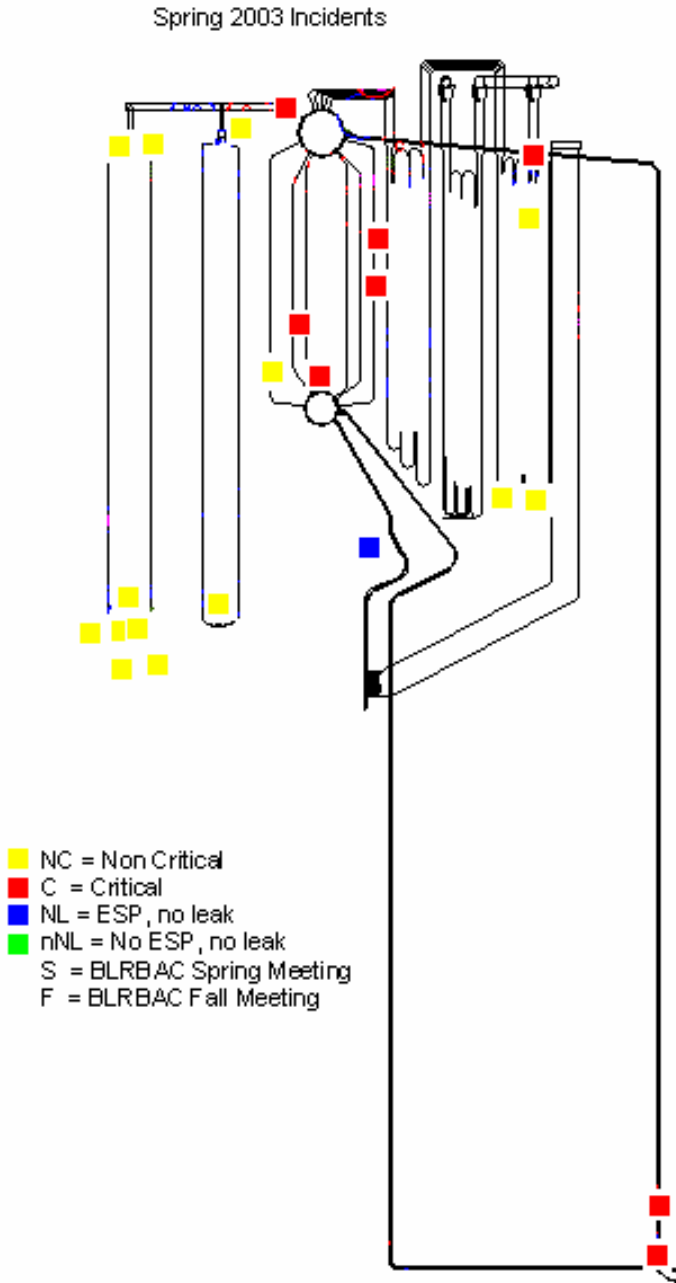


Figure 1

5. **SUBCOMMITTEE REPORTS – (Cont.)**
 5.1 **ESP SUBCOMMITTEE REPORT – (Cont.)**

KRAFT RECOVERY BOILER CRITICAL INCIDENTS
North America Pulp and Paper Industry

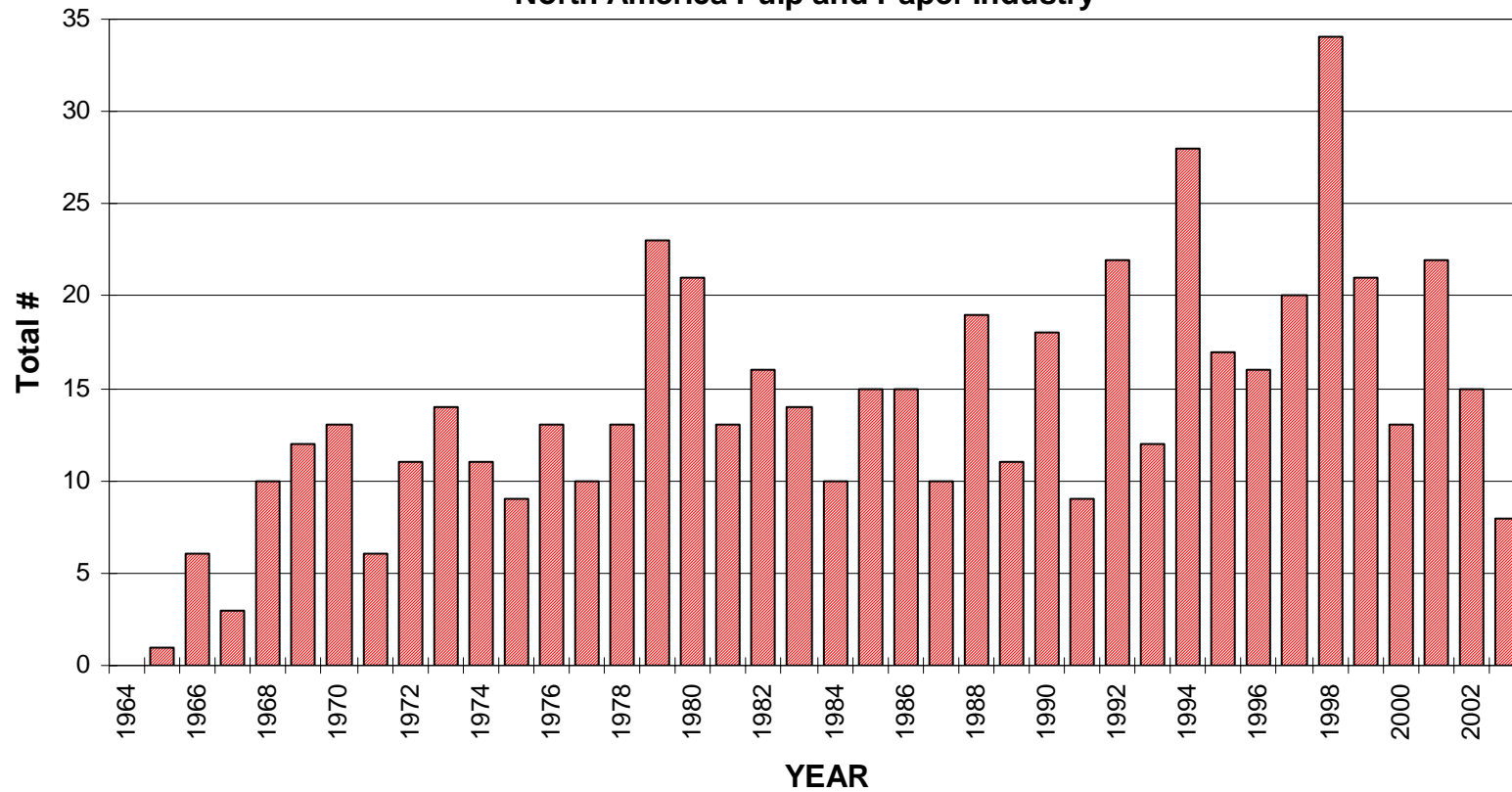


Figure 2 Critical Incidents (Classification Began in 1995)

5. SUBCOMMITTEE REPORTS – (Cont.)
 5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

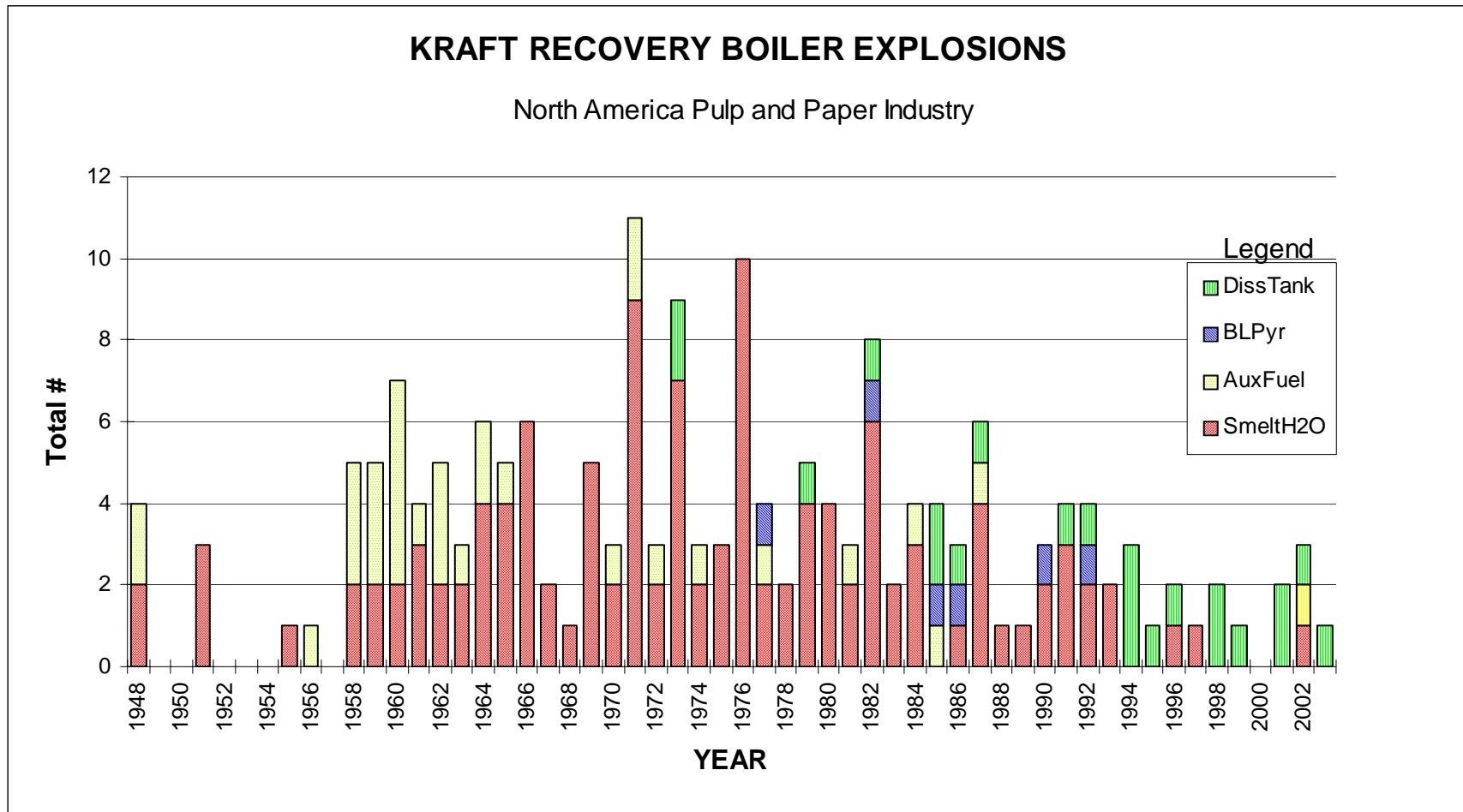


Figure 3

5. SUBCOMMITTEE REPORTS – (Cont.)
 5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

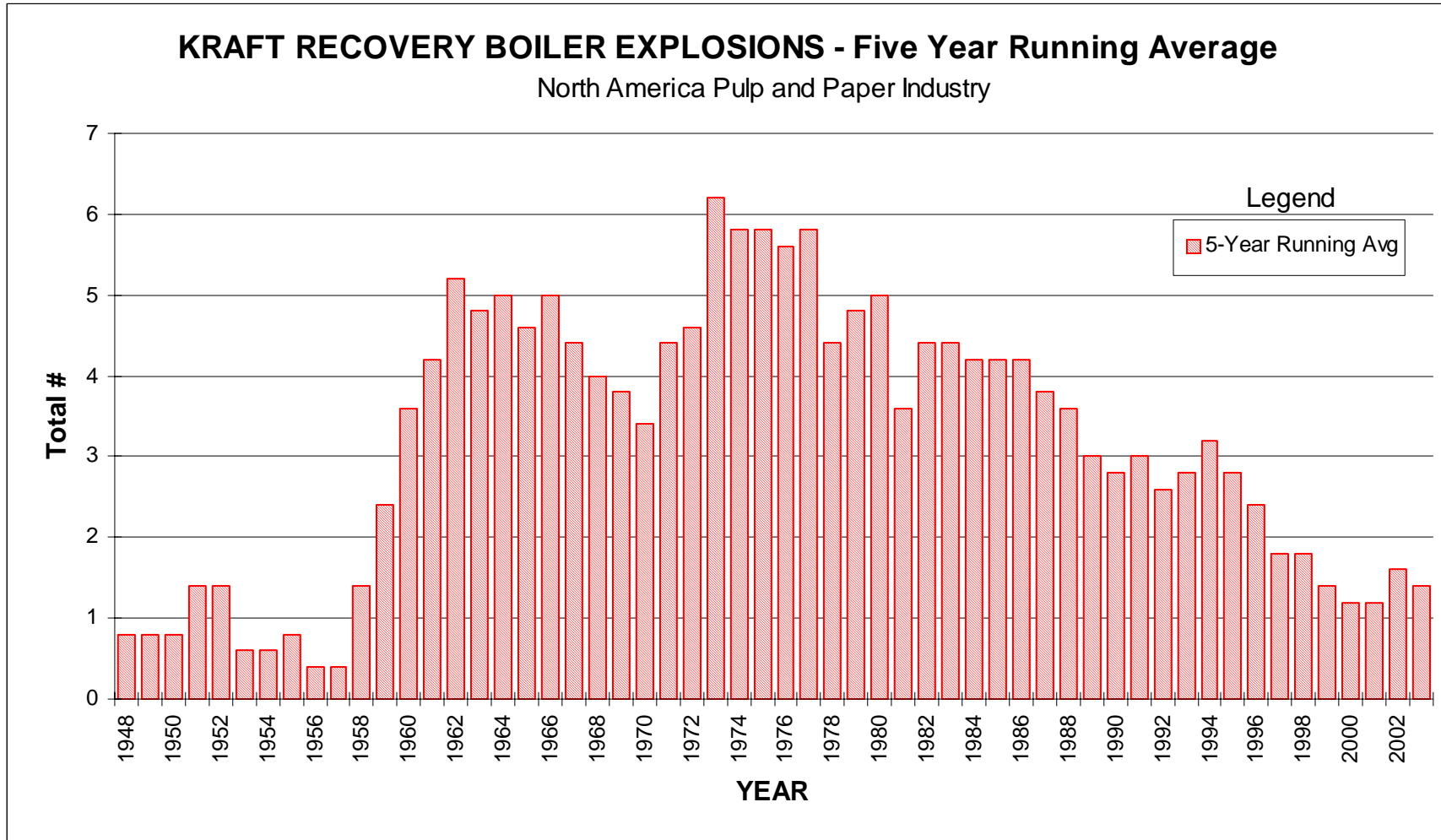


Figure 4

5. **SUBCOMMITTEE REPORTS – (Cont.)**
 5.1 **ESP SUBCOMMITTEE REPORT – (Cont.)**

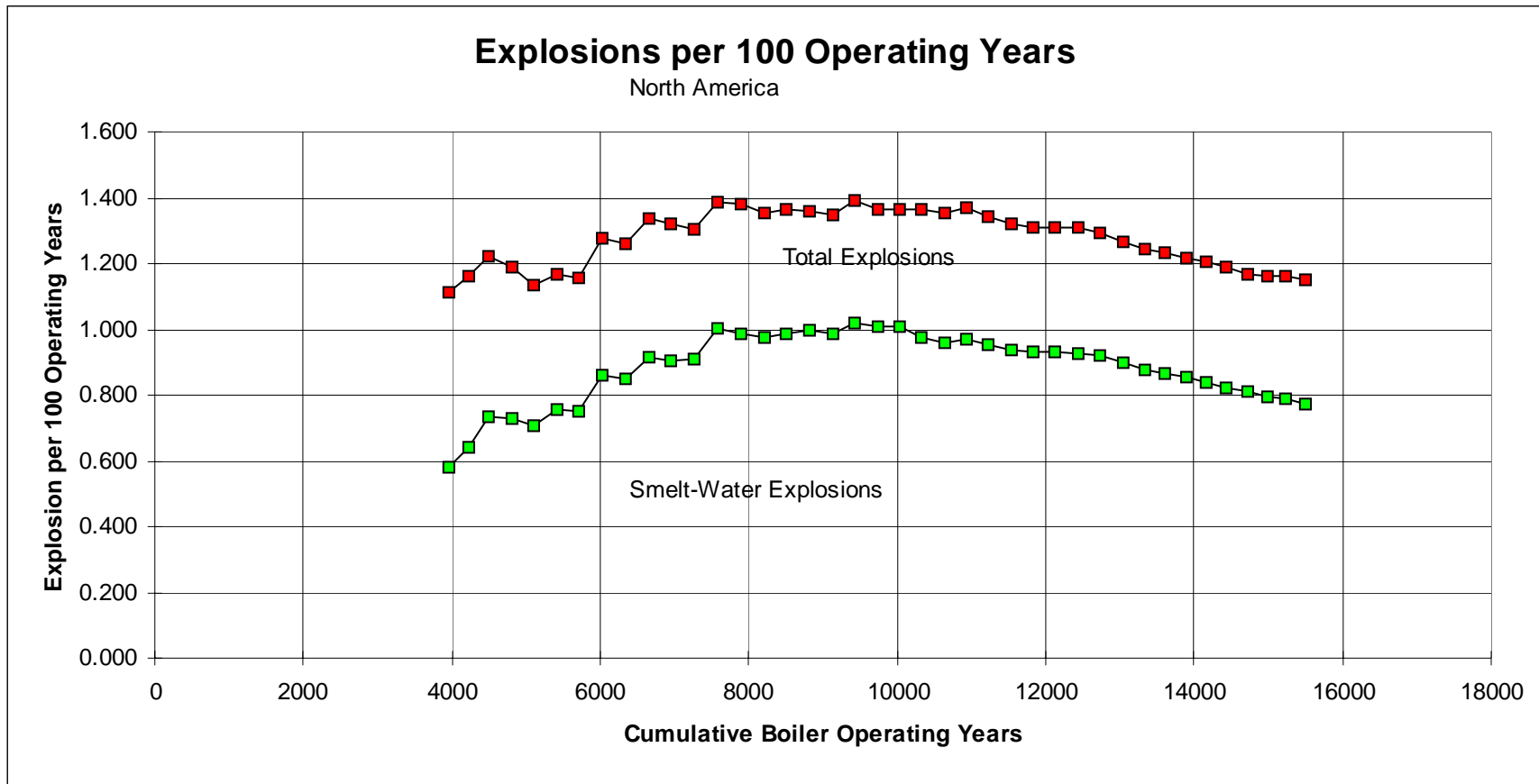


Figure 5

5. SUBCOMMITTEE REPORTS – (Cont.)

5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

CHAIRMAN: Lets hope we can prove Jack wrong by the next meeting and further reduce the number of incidents that we have to report on. John, just for clarification, that incident questionnaire will be a Word document and will be posted so that people can download it and work with it?

JOHN: Yes, the plan is that it will be a Word document in a kind of table format so they will have the table cells that they can put the data into.

CHAIRMAN: Also, the Executive Committee did review the proposed wording here for the torque limit switches and has agreed that it can go for membership review and approval. It will be in the section on the Web site identified as “*Items for Review for Membership Review and Comment.*”

5. SUBCOMMITTEE REPORTS – (Cont.)**5.2 FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS AND ASSOCIATED EQUIPMENT REPORT – Jerry Vuoso (by Chris Jackson)**

The subcommittee on Fire Protection in Direct Contact Evaporators & Associated Equipment met in Open session on Monday morning April 7, 2003 with 5 of 12 subcommittee members and 3 guests present. Due to travel restrictions placed upon Jerry Vuoso, Chairman, Chris Jackson chaired this meeting. Steve Osborne of B&W is replacing Dan Krekeler of B&W on the Subcommittee. Steve has attended as an alternate in the past and we welcome his participation in the future.

As was reported in the minutes from the October 2002 meeting, the new recommended guideline document has been accepted by the membership and the document has been posted on the website. Since then, the Subcommittee has heard a report of one fire incident. No incident report has been received from the mill, though the form has been given to the responsible people and they have been encouraged to make a report to the Subcommittee.

The question of how incident reports will be presented to the membership was discussed. If the number and complexity is low, then perhaps a short narrative delivered to the membership on Wednesday morning, when Subcommittee reports are presented may be sufficient. However, if there are learnings to take advantage of, it may be desirable to allow time for a mill representative to describe the incident and take questions. This could be done before or after the open meeting of the ESP Subcommittee on Tuesday morning or before or after the Operating Problem session Tuesday afternoon. For the time being this will be decided on a case-by-case basis.

In another instance, one mill has used the document to redesign their fire protection for a Cascade evaporator. They found the document easy to use, and made suggestions for improvement. The Subcommittee always welcomes such comments and we will consider making changes to the document.

The Subcommittee will stay active. There are expected to be more questions as the document is put into use. The Subcommittee would like to encourage owners and users of Cascade and Cyclone evaporators to go online, examine the document and send questions to the Subcommittee.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.3 INSTRUMENTATION SUBCOMMITTEE – Bill McQuillan

The Instrument Subcommittee met in two sessions on Monday. In the morning session we had 10 members and 12 guests present. In the afternoon session we had 10 members and eight guests present.

We reviewed the subcommittee reports in the BLRBAC Minutes from the fall meeting to see what might affect us in instrumentation. We spend quite a lot of time on alternate actuation requirements for rapid drain valves from the ESP Subcommittee. We feel we can help people accomplish this if needed. All sites are a little different from each other, so be sure you know what you have now before you try to meet this requirement. Again, we offer our help.

The major portion of the rest of our meeting was spend working on guidelines for functional testing of trips and interlocks on recovery boilers. We presented a draft to the Executive Committee for review.

Next fall we will be working on developing some examples to publish on the Web site on how this might be accomplished without adding a substantial amount of time to your annual recovery outages. Our meeting next fall will be closed in the morning for our work and open in the afternoon.

The last item to report on is the new chairman for the Instrumentation Subcommittee effective at the close of this meeting. Since I no longer can attend fall meetings because of my company's fall outage of recovery boilers, it is time for me to step down. I'm happy to say that David Avery of Weyerhaeuser, a long time member of our subcommittee, has accepted the position of chairman and brings many years of instrumentation experience on recovery boilers with him. David has the support of his company to attend all the meetings and the support of the Instrumentation Subcommittee as we move forward.

CHAIRMAN: Thank you, Bill. We certainly would like to express BLRBAC's thanks for your years of dedicated service as chairman. We certainly appreciate it and we are very pleased to have a very capable replacement in David.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.4 MATERIALS & WELDING SUBCOMMITTEE – Joan Barna (by Dennis Hollenbach)

The Materials & Welding Subcommittee met in an open session on Monday, April 7, 2003, with 14 persons present, including 6 committee members. The chair and co-chair were unable to attend this BLRBAC meeting and Dennis Hollenbach served as meeting moderator.

The committee last formally met during the Spring 2002 meeting. Several procedures and guidelines have been prepared in a draft “work-in-progress” type format and were not reviewed in any great detail. A general consensus was reached to principally focus on two specific procedures for committee review and action: *Generating Bank Tube Plugs* and *Handhole Plates*. By doing this, we will concentrate on the more immediate procedures that could be made available for Executive Committee review and that will have value to the general membership. Also, these first procedures will serve as “templates” or guidelines for future publications as they relate to overall format, technical content, detail, precautions and illustrations.

Generating Bank Tube Plugs: This procedure will be expanded to include a section offering guidelines and procedures when the original tube end is not removed from the drum sheet and requires plugging.

Handhole Plates: This procedure will be similarly expanded to include other header handhole caps or plates that are currently utilized by each boiler manufacturer.

Regarding handhole plates, a general appeal for photographs is made to everyone. Photos of the handhole opening both in clean and acceptable condition and the scarred or rough condition requiring repair or “build-up” are needed. Also, photos of handhole plate weld deposit application during various weld passes and final weld out are needed. Should this information become available for committee use, contact or e-mail Joan Barna, Dennis Hollenbach of ALSTOM or Dan Phillips of Boise Paper.

Max Moskal of M&M Engineering has agreed to begin the search for available information and criteria for Acceptable Size of Dents in Water Tubes. Guidelines, a checklist or specific criteria will be drafted. The committee felt this is just too important a topic and work needs to progress.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.4 MATERIALS & WELDING SUBCOMMITTEE – (Cont.)

Mr. Chairman, we believe these new priorities and focus the committee has established places us in a good position for document submittals for Executive Committee review following our meeting next fall. Generating Bank Tube Plugs and Handhole Plates will be the first for review. These two documents will become a part of a new manual entitled Recommended Guidelines for Materials & Welding for Black Liquor Recovery Boilers.

Thank you and my personal thanks to everyone in committee attendance for your support and guidance.

CHAIRMAN: Thank you, Dennis, for filling in for Joan and again we anxiously await your proposed document.

5.5 PERSONNEL SAFETY – Robert Zawistowski

The Personnel Safety Subcommittee met in an "open" session on Monday, October 7, 2002. There were 12 members and 17 guests in attendance during the morning meeting. A "closed" session meeting was held on Monday afternoon for editing of the Personnel Safety document.

Representation at our meeting included original equipment manufacturers ALSTOM Power, Andritz, Babcock & Wilcox, B&W DPSC (Venezuela), Diamond Power and Kvaerner. Representation from insurance and insurance service companies included AXA Corporate Solutions and FM Global. Operating company representation included, Boise Paper, Frantschach, Georgia Pacific, International Paper Company, MeadWestvaco, Packaging Corporation of America, SENA, Smurfit Carton de Venezuela, Smurfit-Stone Container, Stora Enso, Wausau-Mosinee Paper and Weyerhaeuser. Water treatment company representation included Buckman Laboratories International. Service company representation included Welding Services. Consultant representation included The National Board, RSI and Power Specialists Associates, Inc.

We had one request for information clarification since the last meeting.

We solicited information regarding the Durango - St. Mary's, GA, explosion. Limited information was available on this boiler due to confidentiality reasons. However, some general information that has been made public was exchanged and some photos were reviewed.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.5 PERSONNEL SAFETY – (Cont.)

We had extensive discussions regarding the use of the ESP alarm for evacuation purposes prior to initiation of an ESP. After extensive discussion, we developed some language to allow the use of the ESP alarm for the purpose of building evacuation. This new language is being included in the updated version of the Personnel Safety Document. Assuming the language passes Executive Committee and membership reviews, it will be up to individual mills to decide if they wish to use the alarm for this purpose, and they will need to develop mill specific procedures for its use.

The Personal Safety document underwent several re-drafts and edits since the October 2002 meeting. During part of the morning session, and the entire afternoon session, the entire document was reviewed and edited. This draft has been submitted to the Executive Committee for review. Once the review has been completed, the Personnel Safety Subcommittee will make corrections and/or modifications, if needed, before being made available to the membership for review and vote for acceptance.

This subcommittee remains open to those members who would like to participate.

5.6 PRESS RELEASE & PUBLICITY SUBCOMMITTEE REPORT – Craig Cooke

No report given at this time.

5.7 SAFE FIRING OF AUXILIARY FUEL REPORT – Dave Streit

CHAIRMAN: The Safe Firing of Auxiliary Fuel Subcommittee did not meet this time, so we have no report from that subcommittee. Again, Dave Streit or other subcommittee members can be reached via e-mail, etc. If you have any questions or items that you would like to have brought up at a subcommittee meeting, please contact them.

5.8 SAFE FIRING OF BLACK LIQUOR REPORT – Len Erickson

A closed meeting was held Monday morning with eight members and one alternate in attendance. The meeting lasted two and one half hours.

The Fall 2002 minutes were approved.

5. SUBCOMMITTEE REPORTS – (Cont.)**5.8 SAFE FIRING OF BLACK LIQUOR REPORT – (Cont.)**

The Revision to SFBL providing for the use of a keyed interlock switch for water washing the lower furnace was forwarded to the executive committee for approval at the fall meeting, but was returned to have the logic diagrams revised prior to being approved. The committee approved the two logic diagrams and added a third logic diagram for lower furnace washing. The logic diagrams are being forwarded to the executive committee approval and hopefully to the general membership for comment. *(Note from BLRBAC Secretary: The Executive Committee reviewed the logic and determined it was not ready for general membership review and comment. Comments will be forwarded to the subcommittee chairman and this will be worked on further at the Fall meeting.)*

The revisions to SFBL to allow an increase in the testing interval when firing high solids (> 70%) black liquor were submitted to the general membership for comments. The comments received related to off line test methods and refractometers adjustments. Several comments were received supporting the proposed change. No comments were received that contested or disagreed with the proposed revision.

Note that all references to T650-om-89 in the Safe firing documents should be changed to read T650-om-99.

Weyerhaeuser (Richard Wiseman) has proposed a revision to SFBL for high solids systems that re-circulate back to a pressurized storage tank. This Item was deferred to the Fall 2003 meeting.

Oxygen Enrichment: Alstom Power and Jansen Technologies have agreed that there is insufficient interest at this time to pursue further work on this subject. Safe Firing will defer the review of this technology.

Electron Machine has raised the issue of Off-line solids measurement methods. The committee reviewed the Electron machine submittal and additional discussion occurred during the afternoon open meeting.

Alabama River Pulp has requested a review of the starting logic diagram. Current logic requires switching valves to be in the divert position and the selector to be in "Operate" prior to purge starting. We will consider revising to have one set of permissives to start purge. The committee will submit the revised logic diagrams to the Executive Committee for approval at the Fall 2003 meeting.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.8 SAFE FIRING OF BLACK LIQUOR REPORT – (Cont.)

It has been brought to the committee's attention that some manufacturers provide sub-header designs, (wall headers), that do not meet the intent of SFBL. Chapter 8, pg. 12 states: "The length of piping from the liquor supply valve to the Liquor Gun should be minimized to facilitate Liquor Purge." These designs allow a substantial un-purged length of liquor piping between the header and the gun.

The Executive Committee has suggested that SFBL address the issue of stuck sootblowers. Upon review, SFBL subcommittee advises:

- a) The Instrumentation subcommittee move stuck sootblower or sootblower out of position from a class II alarm to a class I alarm.
- b) Section 5, *Safety Guidelines for "Emergency" Conditions*, of the RP for Personnel Safety refers to sootblower failures.

An open meeting was held Monday afternoon with the committee members and approximately 50 guests present.

The notes from the morning-closed session were reviewed. Comments were solicited from the general membership.

No new questions were fielded from the membership in attendance. The membership was advised as to how to contact the committee members in order to submit questions or requests for clarifications.

Electron Machine requested a clarification of the refractometer notes, in particular why laboratory refractometers were not the preferred testing method. The committee explained the rationale. Electron Machine advised that the bench top / laboratory refractometers is different from the "hand held" device that is referred to in the SFBL document. The committee agreed that some education was in order.

- The committee is requesting that manufacturers of on-line solids & density measurement devices attend the Fall 2003 Safe Firing Open meeting and present the capabilities of their technology. This includes Refractometers, Coriolis and Nuclear technologies.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.8 SAFE FIRING OF BLACK LIQUOR REPORT – (Cont.)

The meeting was adjourned after about 45 minutes.

- Contact Len Erickson at 208-384-4933, e-mail lenerickson@boisepaper.com, or Fax 208-384-7637, with questions or comments.
- Or contact Mark Sargent at 513-248-6086, e-mail mark.sargent@ipaper.com, or Fax 513-248-6679 with questions or comments.

CHAIRMAN: We have a proposal on the floor. I will just quickly review our voting procedure. The member companies are each allowed one vote. If the representative for that company is present, they should be voting. If not, the Alternate is able to vote in the representative's place. So, hopefully, you have a red ribbon if you are a voting member, except for Tom Grant who we just like. For the vote, what I need is a second. If the voting members could all stand, we will just do a quick show of hands. Okay, those in favor please raise your hand. We have accepted that change. Thank you. (Refer to Appendix B – Testing Interval.)

5.9 WASTE STREAMS REPORT – John Rickard

The Waste Streams Subcommittee met in closed session at 8:00 AM on April 7, 2003 with 13 members present. Three new members attended, Hank Beder of Weyerhaeuser, Mark Cooper of FM Global replacing Bill Caughman, and Brian Kaufmann of Kimberly Clark.

During the Fall 2002 meeting we did two things that created an agenda for our morning meeting. First, we had decided to recommend that turpentine not be blended with black liquor for thermal oxidation. This recommendation resulted in a written request from an operating company to reconsider our decision to exclude turpentine. The recommendation was debated thoroughly with a final decision to continue recommending that turpentine not be blended with black liquor. We will include in the guidelines an explanation of why turpentine is excluded. These reasons center on the volatility and explosiveness of turpentine, which can cause problems during upset conditions. For example, if turpentine is re-circulated with black liquor it will pass through tanks including the salt cake mix tank. This tank may be vented to the DNCG system, which is not designed for gases with the explosion potential of turpentine.

5. SUBCOMMITTEE REPORTS – (Cont.)
5.9 WASTE STREAMS REPORT – (Cont.)

Also last fall we presented Chapter 6, *Liquid Waste Streams Blended With Black Liquor*, to the Executive Committee. Their comments on this document took our remaining time in the morning. Our discussion caused us to recognize the need for more input from operators who have experience blending waste streams with black liquor. Of particular interest are the effects on refractometer readings, ratio of waste stream to black liquor, injection point location, and problems encountered.

We will add wording recommending that a “management of change” procedure be applied to a proposed design for liquid waste stream blending. Two well-known management of change procedures are HAZOP and PSM. This systematic method of analysis will improve the safety robustness of the new system.

Additionally, we will also add flow sheets to the chapter.

The afternoon session convened at 1 PM in an open meeting. There were 13 subcommittee members present and 10 visitors. We began work on guidelines for firing liquid waste streams in dedicated burners. Mr. Matti Kyto, the R&D Manager for Oilon Energy Oy of Lahti, Finland, made a presentation of his company’s burners for gaseous and liquid fuels emphasizing their experience with firing waste streams in recovery boilers. Oilon has eight waste stream burners on recovery boilers. They fire CNCG, methanol, and turpentine with natural gas, light fuel oil or heavy fuel oil for flame stabilization. Three of their recovery boiler waste burners are on U.S. boilers.

Following Matti’s presentation we continued discussion from the morning meeting. Mr. Clark Connelly of Bowater Coosa Pines shared his ongoing experience with blending methanol.

Also presented for the subcommittee’s use were a translation of the Finnish Recovery Boiler Committee NCG Incineration Recommendations for methanol and turpentine by Olli Kujanpaa, and a rough draft of guidelines for liquid waste streams in dedicated burners prepared by Bentley Sherlock.

CHAIRMAN: Thank you, John. Again, to all attendees and members of BLRBAC, the subcommittee is requesting your assistance. If you are disposing of waste streams in a recovery boiler, they would very much appreciate your input.

6. AMERICAN FOREST & PAPER ASSOCIATION REPORT – Tom Grant

The AF&PA Recovery Boiler Program had another busy year in striving to produce greater awareness of safe practices and improvement in the operation, maintenance, safety and efficiency of recovery boilers.

Membership

Currently, we have 27 companies in the Program including 4 non-AF&PA member companies. Early last year, Domtar Industries joined the Program and this year Alabama River Pulp joined the Program. We are continuing to contact and encourage those other companies with recovery boilers, who are not in the Program, to join with the current members in the cooperative efforts for safe operation and research to improve the reliability of the recovery boilers. All companies operating recovery boilers gain directly from the benefits of the Program.

Operational Safety Seminars

Last October, I explained that in 2002 we had the lowest attendance at the Operational Safety Seminars in the all the years since they were started in 1985. The committee considered discontinuing the seminars if the interest was no longer there. I received many favorable responses after the meeting and survey we conducted to continue the seminars. Thus, the committee decided to hold three seminars again this year. We had 53 attendees at the first seminar in Atlanta and 38 attendees at the Portland, OR seminar, which is usually less than the Atlanta sessions because of mill locations. The last seminar for the year will be held in Atlanta May 20 - 21 and already we are over the limit of 64 that we try to hold. Since this will be the last seminar of the year, if anyone needs to get someone to it, please let me know. The two explosions last year, sorry to say, apparently made many mills aware of the need to have people attend these seminars. A superintendent recently told me that upon the return of one of his operators from a seminar, he said, "I got so much from the seminar, why don't we send every one." A good sign! Over 1,900 people have attended the seminars since 1985.

Explosion Monitor

Mr. Jack Clement continues in his role as the AF&PA explosion monitor. He is also working with the BLRBAC ESP Subcommittee on collecting, reporting and tracking recovery boiler incidents.

6. AMERICAN FOREST & PAPER ASSOCIATION REPORT – (Cont)

Training Program

The Organization and Training Subcommittee is reviewing various aspects and uses of the AF&PA Recovery Boiler Training Program. We are currently surveying the mills regarding their use of the material and possible tie-ins with CBTs. Some mills still do not have the Training Program although the Committee recommends that this material is essential to all operators.

Recovery Boiler Char Bed Cooling following an ESP

The final report on the *Recovery Boiler Char Bed Cooling following an ESP* project sponsored by AF&PA was completed along with the video produced by Drs. Grace and Tran. Copies of the final report were distributed to Program members. Non-members may order copies through AF&PA. The field study on molten smelt cooling will be completed later this year.

Damage Mechanism

The “*Damage Mechanism*” project sponsored by the R&D Subcommittee, and working with the Pressure Vessel Research Council (PVRC) of the Welding Research Council (WRC), to create a document on damage mechanisms has been delayed. There are questions regarding the format of the material that was developed by Dr. Bennett and M&M Engineering. We are attempting to get the work that has been completed thus far, to move forward either with PVRC, or together with M&M, which feels it is nearly complete and about ready to publish.

Overheat Floor Tube Failures

The project to “*Investigate Experiences with Overheat Floor Tube Failures in Chemical Recovery Boilers*” was completed. The R&D Subcommittee sponsored this project. Mr. Clement and Dr. Grace studied the reports of BLRBAC, AF&PA, B&W, Alstom, Andritz-Ahlstrom and Kvaerner - both in the U. S. and in Scandinavia. The study provides a better understanding of the issues involved. The investigators reported that this is not a crisis situation. The cooling side of the equation is the one where improved understanding is needed. It was decided that there is no immediate follow-up to be done at this time. Work has been done in this area by various sources, but has not been published. Based upon the degree of success in encouraging the publication of this work, the Subcommittee will reevaluate the need for further research in this area. A copy of the report was distributed to AF&PA Program members and those manufacturers who participated. The report is available to non-members through AF&PA at a cost of \$1,500.

Non-Destructive Technologies for Detecting Waterside Deposits

The R&D Subcommittee is sponsoring a study with Mc Dermott Technology (MTI) to identify potential non-destructive technologies for detecting waterside deposits in recovery boiler furnace wall tubes. The goal of this project is to identify non-destructive methods for cost-effectively scanning large tube areas for waterside deposit locations. An AF&PA Advisory Group, headed by Mr. Evans of IP is working with the MTI team on this study. The Advisory Group consists of representatives from operating companies, manufacturers and a water treatment company.

6. AMERICAN FOREST & PAPER ASSOCIATION REPORT – (Cont)

The Subcommittee identified the following criteria to be used to screen potential technologies:

- * Cost competitive relative to the cost of chemical cleaning
- * Ability to complete a boiler assessment during the normal outage time frame
- * Minimal interference with other outage activities (e.g. welding)
- * Equipment must be both portable and durable

Work started in early March and it is expected that the study will be completed in six months.

Agenda 2020

AF&PA is continuing to work with the US Department of Energy in the Agenda 2020 program to develop projects with a vision for the future. There are a number of projects currently underway, including gasification, with funding from DOE. DOE is reviewing this effort for the future.

Annual Meetings and Conference

The annual AF&PA's Recovery Boiler meetings and Conference was held February 4 and 5th in Atlanta with nearly 60 attendees from operating companies, insurers and manufacturers. The presentations included reports on the projects currently underway and sponsored by the AF&PA Recovery Boiler Program. A status report on the research projects in the Agenda 2020 program funded by DOE and subcommittee reports on their accomplishments were also be presented. The object of the Conference is to keep not only the members advised, but also the remainder of the recovery boiler community, as well. The next Conference will be held in early February 2004. The Conference is open to vendors, insurers, as well as companies operating recovery boilers. We hope that many of you will plan to attend next year's Conference.

CHAIRMAN: Thank you, Tom. We are encouraged by the strong support shown for the training seminar.

7. TAPPI RECOVERY BOILER SUBCOMMITTEE REPORT – Karl Morency

The TAPPI Recovery Boiler Subcommittee met last September 9th in San Diego during the annual Engineering Conference. The Spring Meeting is scheduled for the afternoon of April 9th here in the Crown Plaza Hotel following the completion of the BLRBAC meeting.

TAPPI recently published the 2003-2004 edition of the Technical Information Papers (TIP's) which includes the following papers recently completed by the Recovery Boiler Subcommittee:

- 0416-08 Guidelines for replacement of generating bank tubes with expanded joints in two-drum boilers
- 0416-09 Collection and burning of concentrated noncondensable gases: regulations, design, and operation

7. TAPPI RECOVERY BOILER SUBCOMMITTEE REPORT – (Cont.)

0416-10 Stripping of kraft pulping process condensates: regulation, design, and operation

0416-11 Recommended test procedures for black liquor evaporators

These TIP's, as well as a number of other recovery boiler related TIP's, are available on the TAPPI Web page, www.TAPPI.org. TAPPI members can download up to 10 TAPPI papers from the Web page at no charge.

The Recovery Boiler Subcommittee continues to work on two other TIP's: "Recovery Boiler Performance Calculations – Long Form" and "Effect of Composition on the First Melting Temperature of Fireside Deposits in Recovery Boilers".

8. NATIONAL BOARD OF BOILER & PRESSURE VESSEL INSPECTORS' REPORT – Bob Sullivan

The past few months have been quite active at the National Board. The following may be of interest to the BLRBAC members:

In January of 2002, the *Criteria for Acceptance for Authorized Inspection Agencies for New Construction*, NB-360, was approved. This document formalizes approval of Authorized Inspection Agencies and revises the current description of a jurisdiction. This document will permit jurisdictions outside of North America to provide inspection services for units constructed to the ASME code. However, ASME will need to adjust their requirements for this change to actually become effective.

This past January, *Qualifications and Duties of Authorized Inspection Agencies (AIA's) Performing In-service Inspection Activities and Qualification of Inspectors of Boilers and Pressure Vessels*, NB-369, was approved by the Board of Trustees. This document also formalizes the qualification for in-service inspection agencies and revisions to the requirements for these agencies. This document permits inspection agencies to be other than insurance companies. Jurisdictions, insurance companies, inspection companies, and owner/user inspection organizations may employ commissioned inspectors to perform in-service inspections. However, each jurisdiction's laws will either permit or prohibit these new agencies, which are private companies, to perform inspection activity. Accreditation by the National Board does not automatically permit an AIA to work in a jurisdiction.

The third major item of change was the adoption of *Accreditation of Owner/user Inspection Organizations*, (OUIO) NB-371. This document contains the requirements for a company to become an owner/user inspection organization and thus permitted to have National Board commissioned inspectors as employees. There is one item that needs to be accomplished before this is effective and that is the NBIC committee must delete these rules from the NBIC. This deletion is in progress via letter ballot that closes today, April 9th. This change will not affect companies that are accredited owner/users with regard to who will provide the inspections required by jurisdictional laws.

8. NATIONAL BOARD OF BOILER & PRESSURE VESSEL INSPECTORS' REPORT – (Cont.)

The National Board staff is working on developing inspection guides for various pieces of pressure equipment. There is unique pressure equipment in many plants that has no generally accepted guides relating to the inspection methods. We are asking for your assistance in providing us with any written material or information that will help in producing an appropriate guide for equipment with which you are familiar. These guides will not be considered rules, nor only for inspectors use, but should be helpful to plant personnel. Hopefully, we will receive information from owner/users, manufacturers, and organizations such as Black Liquor Recovery Boiler Advisory Committee (BLRBAC), and others whose interests are in particular equipment. We do not intend to re-write that which is already recorded in some form elsewhere. Our intent is to gather the information centrally so it is readily available to those who find such information useful.

The Training Department continues to develop new courses. One recent course, a pre-commission course, for those planning to sit for the National Board Inspector Commission Examination, was given in February. This course will be offered several weeks prior to the quarterly inspector's commission examination. The purpose of this course is to prepare those taking that examination. This course and the "Introduction to Basic Inspection" course are important to those paper companies planning to develop an owner/user inspection services, to insurance companies and to inspection companies that will be applying for authorized inspection agency status for in-service inspections.

NATIONAL BOARD INSPECTION CODE (NBIC)

The next meeting is scheduled for August 7, 2003, in Boston, Massachusetts. Subcommittee meetings will be held two days prior and are open for your pleasure.

The following items were approved at the January NBIC meeting:

REVISION TO RA-2151(k): This paragraph specifies what the written quality program must include for welding, NDE, and heat treatment. The revision adds the following phrase to the paragraph:

"The manual shall also describe controls for assuring that the required WPS or standard weld procedure is available to the welder or welding operator at the work site prior to welding."

This addition reinforces the common belief that the weld procedure is a document that gives instructions to the welder or welding operator.

REVISIONS TO APPENDIX 4, GLOSSARY OF TERMS: Two additions were made which define the words "shop" and "field".

Shop – "A permanent location, the address of which is shown on the certificate of authorization, from which a certificate holder controls the repair and/or alteration of pressure retaining items."

Field - "A temporary location, under the control of the certificate holder, that is used for repairs and/or alterations to pressure retaining items at an address different from that shown on the certificate of authorization."

8. NATIONAL BOARD OF BOILER & PRESSURE VESSEL INSPECTORS' REPORT – (Cont.)

DEFINITION OF “ALTERATION” WAS CHANGED. It now reads:

“Any change in the item described on the original manufacturer’s data report which affects the pressure containing capacity of the pressure retaining item. Non physical changes, such as an increase maximum allowable working pressure (internal or external) increase in design temperature, or a reduction in minimum temperature of a pressure retaining item shall be considered an alteration.”

REVISIONS TO APPENDIX I, INSTALLATION REQUIREMENTS: A change to the I-2600 section, “Operating Systems” is:

I-2630 STEAM SUPPLY

- g. When boilers are connected to a common header, the connection from each boiler having a manhole opening shall be fitted with two stop valves having an ample free blow drain between them. The discharge of this drain shall be visible to the operator while operating the valve. The stop valves shall consist of one ~~automatic non-return valve~~ stop check valve (set next to the boiler) and a second valve of the outside-screw-and-yoke type or two valves of the outside-screw-and-yoke type.

I-2871 ECONOMIZER PRESSURE RELIEF PROTECTION: This is an addition to the 2800 section for pressure relief valves and reads as follows:

”An economizer that may not be isolated from a boiler does not require a safety relief valve. Economizers that may be isolated from a boiler or other heat transfer device, allowing the economizer to become a fired pressure vessel, shall have a minimum of one safety relief valve. Discharge capacity, rated in lbs./hr (kg/hr), of the safety relief valve or valves shall be calculated from the maximum expected heat absorption rate in BTU/hr. (Joules/hour) of the economizer, and will be determined from manufacturer data, divided by 1000. The safety relief valve shall be located as close as possible to the economizer outlet.”

8. NATIONAL BOARD OF BOILER & PRESSURE VESSEL INSPECTORS' REPORT –
(Cont.)

REVISIONS TO APPENDIX A, STANDARD-WELDING PROCEDURES: Five new standard weld procedures were added to Appendix A.

B2.1-1/8-227:2002 ADD	<i>Standard Welding Procedure Specification (SWPS) for Gas Tungsten Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 through 1-1/2 inch Thick, E309(L), As-Welded Condition, Primarily Pipe Applications</i>
B2.1-1/8-228:2002 ADD	<i>Standard Welding Procedure Specification (SWPS) for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 through 1-1/2 inch Thick, E309(L)-15, -16, or -17, As-Welded Condition, Primarily Pipe Applications</i>
B2.1-1/8-229:2002 ADD	<i>Standard Welding Procedure Specification (SWPS) for Gas Tungsten Arc Welding followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 through 1-1/2 inch Thick, E309(L) and E309(L)-15, -16, or -17, As-Welded Condition, Primarily Pipe Applications</i>
B2.1-1/8-230:2002 ADD	<i>Standard Welding Procedure Specification (SWPS) for Gas Tungsten Arc Welding with Consumable Insert Root of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 through 1-1/2 inch Thick, IN309 and ER309(L), As-Welded Condition, Primarily Pipe Applications</i>
B2.1-1/8-231:2002 ADD	<i>Standard Welding Procedure Specification (SWPS) for Gas Tungsten Arc Welding with Consumable Insert Root followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 through 1-1/2 inch Thick, IN309, ER309, and E309-15, -16, or -17, or IN309, ER309(L), and ER309(L)-15, 16, or -17, As-Welded Condition, Primarily Pipe Applications</i>

Also, one revision,

B2.1-8-215:2001 REVISE	<i>Standard Welding Procedure Specification (WPS) for Gas Tungsten Arc Welding with Consumable Insert Root of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1) 1/8 through 1-1/2 inch Thick, IN3XX and ER3XX, As-Welded Condition, Primarily Pipe Applications</i>
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PART RC, REPAIRS AND ALTERATIONS OF PRESSURE RETAINING ITEMS: Addition of new rule:

RC-2032 - WELD REPAIRS TO PRESSURE RELIEF VALVE PARTS. This addition permits an "R" stamp holder to perform weld repairs on pressure relief devices.

8. NATIONAL BOARD OF BOILER & PRESSURE VESSEL INSPECTORS' REPORT – (Cont.)

All these changes and additions will be presented to the National Board of Trustees for approval and thereafter to the American National Standards Institute (ANSI) for public review before being submitted as an addendum to the NBIC.

9. WESTERN CANADA BLRBAC REPORT – Bob Norton (written report submitted)

The fall meeting was held in Vancouver, BC on November 6th, 2002, with 27 members attending the session.

Submitted Incidents: There were two incidents reviewed at the meeting,

- 1) June 6, 2002, pinhole leak in an economizer handhole cap weld. The boiler had been off liquor, and the operator noticed leak in the hopper. The boiler was off line for 36 hours to make the repairs. It has been suggested the failure was due to porosity in the weld.
- 2) October 16, 2002, leak in the lower furnace of the Recovery boiler. The boiler was ESP'd due to a leak in the lower furnace. The leak was approximately 2 feet above the secondary air ports on the front wall. The cause of the failure was the result of using the wrong size burner tip creating flame impingement on the front wall in a localized area. A load burner tip had inadvertently been installed on a hearth burner. The total down time was 276 hours as the boiler waterside was chemically cleaned.

Operating session

- Mills inspecting steam lines for possible cracking
- Insurance company recommendations
- Power to precipitators
- Power to ESP valves
- Leak detection devices
- Drying of the furnace after water wash
- Bypassing the precipitator for water wash
- Furnace floor depressions
- Burning NCG in the Recovery boiler
- Burning tires in a power boiler
- Protecting waterside of superheater during shutdowns
- Inspection frequency of pressure vessels

Boiler Manufacturers Presentations

Alstom---Tomlox Technology in Recovery Boilers: This is a technology to increase the capacity of recovery boilers by using oxygen-enriched air to increase runtime and/or liquor burning capacity.

8. WESTERN CANADA BLRBAC REPORT – (Cont.)

Kvaerner: A review of primary air port design and the effect of boiler design parameters.

Andritz: Burning DNCg's in a recovery boiler

The spring 2003 meeting will be held in Prince George, BC. The dates are April 16th and 17th.

CHAIRMAN: We have an additional report this morning. Mr. Chris Verrill from Institute of Paper Science & Technology (IPST) has agreed to provide us with a short update of their work in our area of interest.

10. INSTITUTE OF PAPER SCIENCE & TECHNOLOGY REPORT – Chris Verrill

Thanks Dean and thank you to everyone for the opportunity to speak for a few minutes. This message is basically directed to the member companies of the Institute of Paper Science & Technology in Atlanta, but I think there is information here of general use for everybody. Facetiously I asked the question, "Is conventional recovery really the lowest priority?" This is the message that I'm getting from the officers of your companies that establish research priorities at the Institute.

First, I want to give you a little background on what's going on at IPST. Things have changed in the way that our projects are reviewed and how feedback comes in from the member companies. I see a problem because the conventional recovery projects like recovery boiler and evaporator fouling and black liquor oxidation, no longer have a technical advisory committee made up of what I call "technical counterparts;" that is, mill and corporate engineering people in an equivalent position to the IPST researchers. Starting last July, a small subcommittee of senior technical officers decides the fate of these core technology programs. Last week it was decided that conventional recovery was no longer a priority area. My questions to you is, "Does this advisory group lack awareness or is this just not a priority at the mills?" Have all the problems been solved in recovery boiler and evaporator fouling?

Today, I want to give you a quick summary of the program. What I'm asking for here is to "write your congressman" – I'm not looking for money – it's more to just raise the level of awareness of the type of work we do at IPST. Our mission at the Institute in the conventional recovery area is to demonstrate the means to improve evaporators and recovery boilers utilizing existing pilot facilities. If you recall the work that Jim Frederick did during the mid-1990's to build pilot facilities at the Institute, it is really my job to make sure that that equipment is utilized to its maximum potential and then to transfer the technology developed with those facilities to the member mills. It is also possible for us to work with non-member companies through contract research arrangements to improve process efficiency, productivity, and energy efficiency in their recovery operations.

9. INSTITUTE OF PAPER SCIENCE & TECHNOLOGY REPORT – (Cont.)

I see value to the industry in several areas. One is to further the basic science; we have been doing some very productive work with Georgia Tech on the fundamental mechanisms of soluble scaling in high solids concentrators and falling film evaporators. We also evaluate new technologies, for example the HydroDynamics Shockwave Power Generator for black liquor oxidation and a donated technology from Air Products known as Oxidized Heat Treatment for viscosity reduction. We have the pilot facilities to do trials in advance of changes in the mill; to support mill implementations. I think one of the important things that the Institute provides is a historical perspective. Tom Grace and his colleagues did a lot of work in the 1970's on evaporator fouling and black liquor properties. That information tends to get forgotten over time. Just in the short time I've been at the Institute, I've had two requests about problems with residual alkali, low pH black liquor forming sludge in lines and recovery headers. It's not like this is new information. It is just that somebody needs to be there to point you back to the previous work.

We are available for process troubleshooting. In prior years we have done a lot of work in helping with evaporator fouling problems. IPST offers specialized and standardized testing services. Of course, we also have an education segment and we teach graduate students about the basics of the conventional recovery process. I've gotten involved in teaching a few lectures for those classes.

I don't want to spend too much time on specifics, but just enough to tell you that we have been very active over the last year. We've enhanced the capabilities of our pilot evaporator facility. We have been working with Georgia Tech on the fundamentals of soluble scaling (hopefully that work will continue under the Georgia State Department of Energy TIP 3 program this year). We've developed a new test for measuring the solubility of carbonate and sulfate in black liquors at high solids. In the recovery boiler area, we've worked on particulate formation from char bed burning. This is a big project that is being led by Sandia National Lab; we are completing our experimental scope. Fume sulfation refers to the chemistry between the flue gases and dust in recovery boilers and we are working on this with a professor who left the Institute. She is in the process of finishing up this work where she has looked at conditions in which you can purge some chloride out of the process by maintaining a low SO₂ level in the stack. Finally, one of the things that I am hoping to do at IPST is to establish some standard tests and protocol for doing recovery boiler fouling troubleshooting for the mills.

So the message is that we are going to lose our base funding on July 1st. The work won't cease; it is just going to be a bigger administrative burden for me to manage several small projects instead of one portfolio project. What I have been advised to do is to break this down into several smaller projects, and propose those as a series of exploratory projects. Because the same group of technology officers has to approve each of those projects, I need the message to get to these representatives that recovery is still an important priority. Perhaps there aren't the capacity pushes right now, but you have to think a little bit further down the road to the next upswing in orders.

10. INSTITUTE OF PAPER SCIENCE & TECHNOLOGY REPORT – (Cont.)

The take home message I want to leave you with is, if you are a member of IPST and you believe that there is a benefit from our continued activity in this field, please talk with the individuals in your company that participate in IPST funding decisions. If you don't know who those people are, you can give me a call. I'd also be happy to provide more information about the work that we are doing with recovery boilers, evaporators, black liquor oxidation, or newer technology, such as black liquor gasification.

I thank you for the opportunity to speak.

11. ACTIVITIES OUTSIDE NORTH AMERICA REPORTS

11.1 REPORT FROM SOUTH AMERICA – Jorge Romano and Ruben Marmioli

As reported at BLRBAC last fall, the 15th Latin American Recovery Boiler Meeting is planned for this year in Argentina. It is tentatively planned to have the meeting at the San Carlos de Bariloche, the Mar del Plata, or the Buenos Aires Hotel in September. These locations have easy access and adequate facilities for hosting this kind of meeting.

We want to maintain the high technical content and excellent participation in the previous meetings. Therefore, we encourage all Recovery System owners, operators, and suppliers that have an interest in safety, quality, and the environment to participate. We are also trying to contact people in Colombia and Mexico to expand participation.

Those interested in attending should send an e-mail or fax indicating their intentions. Also, suggestions for meeting topics or visits are most welcomed. Send your fax to +54 (341) 4913 190 or e-mails to ruben.marmioli@celulosaargentina.com.ar.

We look forward to seeing you in Argentina this September.

12. OPERATING PROBLEMS SESSION REPORT – Karl Morency

There was a large turnout Tuesday with excellent participation for the full 2 hours. The following topics were discussed during the session.

- **Design and Procedures for Use of Smelt Spout Flow Restrictors** – a number of mills reported that they currently use smelt spout flow restrictors to prevent heavy smelt runoffs after opening plugged spouts. The restrictors consist of a heavy plate the shape of the spout opening with a half moon cut out at the bottom. The plate is welded to the end of a long rod. Immediately after opening a plugged spout, the restrictor plate is inserted into the spout opening. One mill advised that they have a means for dogging it off so that it doesn't have to be tended by an operator.

12. OPERATING PROBLEMS SESSION REPORT – (Cont.)

There was additional discussion about preventing conditions that result in plugged spouts to minimize the need for using the restrictors. One mill advised that during chill-and-blows they have several operators rodding the primary air ports and spouts to prevent ash deposits from the superheater from plugging the port openings and spouts. Another mill reported that when a spout plugs, liquor is pulled and the burners are shut down while the spout is cleared. The burners are then restarted. This minimizes the potential for large accumulations of molten smelt in the furnace.

- **Design of Liquor Gun Doors and Limit Switches** – a request was made for information about successful designs for liquor gun doors and interlocks. One mill reported that they mounted an arm on the end of the shaft of the liquor gun oscillator on a C-E recovery boiler. This allowed the limit switch to be mounted quite a ways from the liquor gun port which significantly improved the reliability. A second mill reported using a keyed lock system similar to those used on precipitator doors. A third mill described an interlock system using limit switches on the valves for each burner.
- **Mill Experience with Corrosion at the Composite Weld Line in the Upper Furnace** – Increasing the amount of tertiary air may increase the risk of corrosion above the composite weld line but the evidence is inconclusive. It may be more a function of how well the tertiary air mixes with the furnace gases. If the mixing is poor, there is increased potential for having localized areas with a reducing atmosphere that will result in corrosion. Some of the corrosion on the carbon steel side of the weld line has been attributed to heavy water side deposits that start at the weld line. Apparently turbulence caused by the presence of the weld is sufficient to initiate deposit formation. Once they are initiated, the deposits become self sustaining and continue to grow. There may also be some influence due to the difference in heat flux in the carbon steel section of the tube versus the stainless clad section.
- **Attemperator Inspection Frequency and Problems Experienced**

One company uses a 5 year frequency. Another has 10 years after initial installation and then every five years. Inspection technique is unit specific, but should be looking for nozzle wear, nozzle cracking, and/or liner cracking. Problems have been found in all these areas. Problems appear to be independent of design; both nozzle and spray can designs have experienced cracking. Fragments can plug superheater tubes.
- **Refractories for Use in Lower Furnace and on Floor** –

MagShot - One mill used it in the spout area and it had a very short life, as if it had never set properly. Some mills have had both good and bad experience with MagShot. Current recommendation is to go back to OEM and follow their recs.

Resco Bond 3000 has worked very well at three mills and there have been good results with Criterion 92SR. Dry spouts operate at higher temperature than water cooled spouts and require better refractory in the wallbox. Check with Alstom for refractory recommendations.

12. OPERATING PROBLEMS SESSION REPORT – (Cont.)

- **Alternative to Optical Flame Scanners for Auxiliary Burners** - A number of mills reported good success using flame rods. Flame rods work with igniters and a newer model has a retractable igniter with flame rods that provide continuous flame sensing. Flame scanners have had a history of problems. Alstom's new gas igniters have ionic flame detection and they report good success with them.
- **Reliable Burner Air Flow Switch** – Currently using differential pressure across register, but maintenance is a problem. One mill has a very low range differential pressure transmitter and it has worked well.
- **Minimum Air Temperature for Preventing Pluggage of Rotary Feeders for Salt Cake Mix Tank** - Air from FD fan at about 280 F has worked with precipitator rotary feeders at one mill. Also need a good vacuum draw on mix tank. Flash vapor has to be evacuated.
- **Availability of Flame Scanners that Differentiate Between Oil Flame and Liquor Flame** - They exist but no one had any information to offer.
- **Reliable Green Liquor Density Meters** - Texas Nuclear gages have been used by one mill. The density meter works well but density control is still difficult. The meter works well if it is backwashed regularly. Another mill uses a bubble tube which work wells, but they still have difficulty controlling the density. Temperature compensation is needed for accurate density assessment.
- **Chemical Injection to Control Ash Sintering** - One mill injects chemicals (MgO plus additives) at the tertiary air port level. The results have been mixed, but mill does not want to stop using it.
- **Use of Superheated vs. Saturated Steam for Sootblowing** - Some superheat is needed to avoid wet steam, which can cause erosion. Blending superheated steam with saturated steam can minimize energy consumption. Another mill switches back and forth. Use of saturated steam increases erosion likelihood, but can provide more effective cleaning.
- **Auxiliary Oil Burners** – A question was asked about starting auxiliary burners remotely from the control room. BLRBAC's position is that the burners should be tended when they are being started.
- **Raising Smelt Spouts to Enhance Smelt Flow** – no feedback
- **Use of Refractory on Sloped Floors** - used to protect floor tubes from wastage and overheat damage. A number of refractories have been utilized with mixed success. Alstom has been conducting research into alternative refractory materials and preliminary reports are that there are some refractories available that will hold up on the floor of a recovery boiler but they are expensive. Alstom should have a report available by the Fall meeting.

12. OPERATING PROBLEMS SESSION REPORT – (Cont.)

- **Experience with Swivel Joints on Oscillating Liquor Guns.**

B&W advised that the preferred joint is Union Flownetics – but reliability has been a problem. Barco as makes a swivel joint but there is limited experience with it. Another option is to take the vertical motion to a flex hose and use a swivel joint for the horizontal motion. One mill who has used hoses has had mixed success with hose failures. Regular inspections are recommended. Correct hose material specification is critical. Use caution when changing suppliers. Inner liner failure can occur bringing liquor into contact with the steel braiding used for hose reinforcement. Corrosion of the reinforcement braiding can result in catastrophic hose failure. Hoses with external stainless steel braiding provide protection from catastrophic failure.

- **How Does a Total Boiler Water Level System Work? How Widely Available are They?** – They are common on Kvaerner boilers, especially in Europe. A pressure tap at the bottom of a downcomer is used to measure differential pressure to steam drum. There is a sketch on the BLRBAC Web page showing how to use tygon tubing to measure the water level in the bottom of the furnace following an ESP.
- **Advantages and Disadvantages of Mini-hood Design for Smelt Spouts** – Advantages: Reduces opportunity for corrosion attack on furnace pressure parts from the shatter jet sprays. They also allow for greater shatter jet sprays adjustments. Reduced air infiltration through the spout openings which can improve spout operation and improve reduction efficiency. Disadvantages: Improper adjustment of spray can more easily result in spattering outside minihood. If hood is too small, it may be more difficult to use a flow restrictor.
- **Inspection of economizers** - Some long flow economizers have small sootblower cavities that do not provide access for inspection and repairs. The only option is to remove a row of tubes but this will raise outlet temperature and reduce boiler efficiency.
- **Operator Training for Recognizing Tube Leaks** – Recovery boiler simulators are available but they are relatively expensive. Andritz and Delta also have a training program that one speaker felt is very good for training and updating operators.
- **Options for Repairing Smelt Leaks at Floor to Rear Wall Seal (B&W Boilers)** - Short of full seal removal and replacement, there does not appear to be a good fix. No patch approach has been successful.
- **Steam Drum Low Level Protection** – Redundant systems with common water and steam taps are not acceptable because of common mode failure from line pluggage. Most boilers are equipped with independent connections for the two systems since this is a Code requirement.

12. OPERATING PROBLEMS SESSION REPORT – (Cont.)

- **Trip for High Steam Drum Level** – this is considered good practice for units supplying steam to steam turbines. Other approaches – use low temperature switch either alone or in combination with level high level trip.
- **Refractory Removal for Studded Floor Inspection** - If the refractory is in good condition, it shouldn't be necessary to remove it. The refractory should provide protection from corrosion or overheat damage.
- **Minimum Safe Re-entry Time after ESP** - Many mills use a fixed time interval. Only a few condition based. The minimum is four hours with many in the 12 to 24 hour range. BLRBAC data on time from ESP to time for explosion: except for one case with a floor tube leak, no explosions occurred after more than 3 hours. Adding water on a hot bed can cause an explosion more than 24 hours after ESP.
- **Minimum Safe Distance for Evacuation During ESP** - this is sight specific and depends on what intervening structures are present.
- **CO Analyzers on Recovery Boilers** – a number of mills reported having them. On trip of black liquor are CO readings high? – Yes. CO readings are used as a guideline for determining when it is safe to restart the auxiliary burners. High CO readings last longer than the five minute purge timer. One mill uses 500 ppm as the safe limit for relighting burners. Some mills use a higher limit. Levels in excess of 2000 ppm have been seen.
- **Tripping Electrostatic Precipitator as Part of Emergency Shutdown Procedure** – this remains controversial. There is no history of an explosion resulting from a spark in a precipitator igniting a combustible gas mixture following an ESP. Mills reported that some include the trip as part of the ESP procedure and others don't. One issue is the impact on emissions and potential violations if the precipitator is tripped.
- **Leak Detection Systems and Operator Training** - In some cases, operators have not recognized that there has been a major tube rupture for more than an hour after it occurred. Some of the leak detection systems have significant time delays before they alarm following a major tube rupture. Operators need to be able to recognize the symptoms of a major tube rupture. They also need to understand the capabilities of the leak detection systems and their limitations.
- **Chemical Cleaning of Recovery Boilers** – A limited number of mills have a maximum time interval between chemical cleanings. Most base it on tube sample water side analysis. Those who have a time frequency require cleaning even if water side samples show no problems. Flushing following chemical cleaning on a one drum boiler is difficult to accomplish. Challenge is to boiler manufacturers to design the boilers so that they can be easily chemically cleaned and flushed.

12. OPERATING PROBLEMS SESSION REPORT – (Cont.)

- **Cracking on the Cold Side of Composite Tube Spout Opening for Non-insertable Spout Design** - A B&W representative advised that the spout openings in question were the old style with the weld-on seal bars. Most mills have changed to the new design that do not have the weld-on seal bars. Removal of the bars has eliminated the cracking problem.
- **Liquor Density Measuring Devices** – Most mills are using refractometers. A limited number are using nuclear and Coriolis meters. SFBL is looking for feedback on experience and where these technologies now stand. Outside North America, there seems to be little experience with refractometers.
- **AF&PA – BLRBAC Jointly Sponsored Training Seminars** - Anyone with a recommendation for a topic for a joint seminar should send it to Dean Clay. Operator training is one of the topics being considered.

TIME & PLACE OF NEXT MEETING: The next meeting will be held on October 6, 7, & 8, 2003, at the Crowne Plaza Hotel/Atlanta Airport, in Atlanta, Georgia.

CHAIRMAN'S CLOSING COMMENTS: I would like to remind you that we do have two excellent Technical Presentations scheduled following our break. We encourage you to stay around. One includes a very exciting video. Also note, that as part of your registration material you received notice that the TAPPI Steam & Power Energy Management spring meetings are going to be held following BLRBAC. These meeting will start at one o'clock. If you have any questions about that, you could probably see Jim Dickinson or Karl Morency.

Are there any questions or comments from the audience that need to be addressed?

BILL LOOS: Mr. Chairman, my name is Bill Loos from Stora Enso, I'm probably blatantly guilty of exhibiting new kid syndrome, but this being my first meeting, I for one would like to thank the committee for the opportunity to be here. A lot of good, useful information has been presented and I feel like I can take something back to my company. I for one appreciate it. Thank you.

CHAIRMAN: Well thank you for your comment. Certainly we encourage everyone to take back what you have gained from this meeting and share it with those within your company who were unable to attend. Again, we are a volunteer organization; so, while there is an Executive Committee – you know it's the volunteers working on these subcommittees who are getting the work done. We thank you for your help and encourage those not participating on subcommittees to volunteer. So thank you.

ADJOURNMENT: With that, I'd like to adjourn the meeting. Again, the Technical Presentations will start up at 10:00 a.m. Everyone have a safe trip home!

TECHNICAL SESSION:

"Char Bed Cooling"

presented by Tom Grace of T. M. Grace Company
(Honghi Tran, University of Toronto, co-author)

"Recovery Boiler Igniter Systems"

presented by Mike Seguin of Alstom Power

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Summary of Recovery Boiler Incidents – Spring 2003

<p>Spring 2003 - 1 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>Critical Incident No. 567 Longview Fibre Co., Longview, Washington No. 15 Furnace, CE Contract 01596. Startup 1956. CE Revamp Contract 72796 in 1997. 2.1 million ppd solids. 279,000 lb/hr steam flow. Operation at 850 psig & 750F. Design at 895 psig. 2 drum boiler/DCE. Generating bank single pass, crossflow design (no baffle). November 2, 2002 Economizer – 2 tubes of 26 that connect the economizer to the steam drum had cracks at the toe of the fillet weld at the steam drum connection. Leak in 4th tube from right sidewall cracked from 10 to 2 o'clock position. 2nd tube from RSW had ¾ in. long crack at 12 o'clock position that was not through the tube. Good chart information on O₂ and CO. Total downtime 114.5 hours ESP was initiated 15 minutes after leak discovered. Current irrevocable policy is to stay out of recovery area 24 hours. Critical Incident Helper making rounds observed steam coming from behind lagging at rear penthouse mandoor None installed Helper observing steam notified fireman who summoned the foreman. Noise was heard with and without sootblowers. Source of steam (superheater in penthouse or economizer connecting tubes) not being identified, made decision to ESP because boiler bank had no baffles. None No New tube sections rolled into drum, seal welded, and re-rolled. Mechanical stress of over rolled tubes replaced in 1999 that moved up and down with thermal expansion of the economizer. Unit was to be moth-balled at end of December 2002. Before unit is again operated, expectation is that the 1956 economizer will be replaced & 26 connection tubes replaced with two pipes. Inspection in April 2002. Chemical cleaning in 1999.</p>
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<p>Spring 2003 - 2 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>Norske Canada, Elk Falls Division, British Columbia No. 1 Recovery Boiler. B&W Contract 5682. Startup 1964. 1.396 million ppd solids. 220,000 lb/hr steam flow. Operation at 625 psig & 675F. Design at 650 psig. 2 drum boiler/DCE. Generating bank 2 pass, longflow with baffle in bank November 7, 2002 Economizer – Pinhole leak from a 2 inch crack in seal weld of a mechanical (stud and nut) handhole fitting in the upper header, first handhole from left of center. Total downtime 20.8 hours None Non-critical Incident Junior Recovery 3rd on boiler walkdown noticed water vapor coming from the external handhole None installed Junior operator notified shift engineer, and with concurrence on leak, an orderly shutdown was initiated. No No Crack completely removed by grinding and weld repaired with preheat. Crack initiated internally. Possible cause age and fatigue Inspection in May 2002</p>
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Summary of Recovery Boiler Incidents – Spring 2003

<p>Spring 2003 - 3 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>MeadWestvaco, Charleston, South Carolina No. 1 Recovery Boiler. .B&W Contract PR-206. Startup 1984 4.5 million ppd solids. 691,000 lb/hr steam flow. Operation at 1450 psig and 880F. Design at 1725 psig. 2 drum boiler/large economizer. Economizer replaced pre-incident date. October 23, 2002 Economizer – rear bank tube to header (header with extruded nozzles) welds; longitudinal cracks propagating from the inside of the tube. One at upper header (46th element, 10th tube from rear) & other at lower header (85th element, 14th tube from rear). Each element is 18 tubes deep. Total downtime 36:45 hours No Non-critical Incident Operator during routine walkdown observed water in the ash conveyor Acoustic leak detection system in operation did not detect or confirm the leak After finding wet ash, oil burners were placed in service as liquor burners removed. Economizer doors at header elevations opened. Visual inspection determined two leaks. Boiler normal shutdown to take off-line and cool. No No Cracks repaired by grinding and welding the defect Primarily by thermal fatigue although some evidence of corrosion products in cracks. Evaluating various options. (bypassing economizer bank, replacing lower headers, etc) Inspection March 7, 2001. Acid cleaned with HCl September 25, 2002</p>
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<p>Spring 2003 - 4 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>MeadWestvaco, Charleston, South Carolina No. 1 Recovery Boiler. .B&W Contract PR-206. Startup 1984 4.5 million ppd solids. 691,000 lb/hr steam flow. Operation at 1450 psig and 880F. Design at 1725 psig. 2 drum boiler/large economizer. Economizer replaced pre-incident date. November 12, 2002 Economizer – rear bank tube to header welds; longitudinal cracks propagating from the inside of the tube. One at lower header (90th element, 7th tube from rear) “washed out” adjacent tube in 88th header, & a third at lower header (92nd element, 3rd tube from rear). These are recorded as leak Nos. 17, 18 and 19. Elements are 18 tubes deep. Total downtime 50:40 hours No Non-critical Incident Operator during routine walkdown observed water in the ash conveyor Acoustic leak detection system in operation did not detect or confirm the leak After finding wet ash, oil burners were placed in service as liquor burners removed. Economizer doors at lower header elevation opened. Visual inspection determined large quantity of water from undetermined number of leaks. Boiler taken off-line and cooled. No Yes Cracks in elements 90 and 92 repaired by grinding and welding the defect. Element 88 plugged at the headers & lower header removed for analysis Primarily by fatigue although some evidence of corrosion Evaluating various options. (bypassing, replacing lower headers, etc) Inspection March 7, 2001. Acid cleaned with HCl September 25, 2002</p>
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Summary of Recovery Boiler Incidents – Spring 2003

<p>Spring 2003 - 5 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>MeadWestvaco, Charleston, South Carolina No. 1 Recovery Boiler. .B&W Contract PR-206. Startup 1984 4.5 million ppd solids. 691,000 lb/hr steam flow. Operation at 1450 psig and 880F. Design at 1725 psig. 2 drum boiler/large economizer. Economizer replaced pre-incident date. December 5, 2002 Economizer – rear bank tube to header weld; longitudinal crack propagating from the inside of the tube. At lower header (39th element, 3rd tube from rear) Total downtime 35:15 hours No Non-critical Incident Operator during routine walkdown observed water in the ash conveyor Acoustic leak detection system in operation did not detect or confirm the leak After finding wet ash, oil burners were placed in service as liquor burners removed. Economizer doors at lower header elevation opened. Visual inspection determined leak location. Boiler taken off-line and cooled. No No Crack repaired by grinding and welding the defect Primarily by thermal fatigue although some evidence of corrosion Evaluating various options. (bypassing, replacing lower headers, etc) Inspection March 7, 2001. Acid cleaned with HCl September 25, 2002</p>
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<p>Spring 2003 - 6 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>International Paper, Androscoggin, Jay, Maine B&W Contract PR-182. Startup 1976. Tampella revamp Contract 24154 in 1991 for new economizer. 2.56 million ppd solids. Steam flow 365,000 lb/hr. Operation at 900 psig & 810F. Design at 1000 psig. 2 drum boiler/large economizer January 31, 2003 Economizer – circumferential crack at base of extruded nozzle in upper header of cold section. In 7th pendant from right to left, 5th tube to the rear. This was due to leaks in this area of economizer in the same tube row. Bank has side-to-side restraints, front and rear. Total downtime 31 hours No Non-critical Incident Operator noticed wet ash in the economizer hopper during normal inspection. None installed During mid-shift hopper inspection, wet salt cake ash was observed in the west economizer hopper. Liquor burning was stopped. Further visual inspection found water present in top section of the final economizer. No No Defect ground out and crack welded. NDE completed. Believed to be fatigue cracking Investigation continuing Side to side ties added at two elevations on tubes adjacent to sootblower cavity. Economizer sootblower pressures reduced to 145-155 psig. High performance sootblower nozzles installed September 2002 with nozzle pressure of 175-230 psig. Inspection April 2002. Acid cleaned 1997</p>
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Summary of Recovery Boiler Incidents – Spring 2003

<p>Spring 2003 - 7 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>Weyerhaeuser, Kamloops Pulp, Kamloops, British Columbia No. 1 Recovery Boiler. CE Contract CA64103. Startup A965 1.2 million ppd solids. Steam flow at 142,000 lb/hr. Operation at 640 psig and 730F. Design at 735 psig. 2 drum boiler/large economizer November 9, 2002 Economizer – Small, internal horizontal crack in tube adjacent to feedwater inlet header Total downtime 30 hours. No Non-critical Incident After a loss of liquor firing, operator investigating found water on economizer ash conveyor Triple Five Acoustic Leak detection system neither detected nor confirmed the small leak. Boiler tripped on low density of black liquor. Recovery Boiler Engineer noted during rounds the presence of water on the conveyor. As the boiler was off liquor, orderly shutdown and bed burn out started. No Original leak caused external thinning and failure of adjacent tube. Two tubes removed and headers plugged. Stress Assisted Corrosion pits joined together to form a crack, possibly when economizer subjected to an external stress. Appears to be some restriction of downward expansion causing a bending movement of tube resulting in a crack to form along the SAC pits. Investigate possibility of expansion restriction. Investigate cause and extent of SAC pitting. Inspected October 2002. Chemical cleaned (EDTA) October 2002</p>
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<p>Spring 2003 - 21 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>Weyerhaeuser, Johnsonburg Mill, Johnsonburg, Pennsylvania Tampella Contract 90132. Startup 1993. 2.2 million ppd solids. 346, 000 lb/hr steam flow. Operation at 1250 psig & 900F. Design at 1600 psig. Single drum/large economizer. June 17, 2002. Economizer – pinhole in tube to header weld in No. 1 economizer at lower header, tube No. 2 (counting upward on inclined header), platen No. 25. Total downtime 26 hours No Non-critical Incident Operator walkdown None installed Operator noticed moisture in economizer ash conveyor during routine walkdown. Economizer leak suspected due to past history in this area. Visual inspection showed a wet area in the economizer directly above the ash hopper. Orderly shutdown made to repair leak. No No Weld defect removed by grinding and site weld overlaid. Pinhole probably caused by stress corrosion fatigue cracking based on laboratory analysis of previous leaks Change out of headers during yearly outages. Inspected April 2002. Acid cleaned in 1991.</p>
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Summary of Recovery Boiler Incidents – Spring 2003

<p>2003 April - 22</p> <p>Location:</p> <p>Unit:</p> <p>Size:</p> <p>Incident Date:</p> <p>Leak/Incident Loc:</p> <p>Downtime hrs due to leak/total:</p> <p>ESP?</p> <p>Classification:</p> <p>How discovered:</p> <p>Leak detection:</p> <p>Sequence of events:</p> <p>Bed cooling:</p> <p>Wash adjacent tube:</p> <p>Repair procedure:</p> <p>Root cause:</p> <p>Future prevention:</p> <p>Last full inspection:</p>	<p>Weyerhaeuser, Johnsonburg Mill, Johnsonburg, Pennsylvania</p> <p>Tampella Contract 90132. Startup 1993.</p> <p>2.2 million ppd solids. 346, 000 lb/hr steam flow. Operation at 1250 psig & 900F. Design at 1600 psig. Single drum/large economizer.</p> <p>August 10, 2002.</p> <p>Economizer – pinhole in tube in No. 1 economizer above lower header, tube No. 1 (counting upward on inclined header), platen No. 37. Leak at 6 o'clock position (bottom of tube)</p> <p>Total downtime 30 hours</p> <p>No</p> <p>Non-critical Incident</p> <p>Operator walkdown</p> <p>None installed</p> <p>Operator noticed moisture in economizer ash conveyor during routine walkdown. Economizer leak suspected due to past history in this area. Further investigation determined a 'hissing' noise from lower economizer area. Visual inspection showed a wet area in the economizer directly above the ash hopper. Orderly shutdown made to repair leak.</p> <p>No</p> <p>No</p> <p>Weld defect removed by grinding and site weld overlaid.</p> <p>Pinhole probably caused by stress corrosion fatigue cracking based on laboratory analysis of previous leaks</p> <p>Change out of headers during yearly outages.</p> <p>Inspected April 2002. Acid cleaned in 1991.</p>
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<p>2003 April- 23</p> <p>Location:</p> <p>Unit:</p> <p>Size:</p> <p>Incident Date:</p> <p>Leak/Incident Loc:</p> <p>Downtime hrs due to leak/total:</p> <p>ESP?</p> <p>Classification:</p> <p>How discovered:</p> <p>Leak detection:</p> <p>Sequence of events:</p> <p>Bed cooling:</p> <p>Wash adjacent tube:</p> <p>Repair procedure:</p> <p>Root cause:</p> <p>Future prevention:</p> <p>Last full inspection:</p>	<p>Weyerhaeuser, Johnsonburg Mill, Johnsonburg, Pennsylvania</p> <p>Tampella Contract 90132. Startup 1993.</p> <p>2.2 million ppd solids. 346, 000 lb/hr steam flow. Operation at 1250 psig & 900F. Design at 1600 psig. Single drum/large economizer.</p> <p>January 27, 2003.</p> <p>Economizer – pinhole in tube in No. 1 economizer above lower header, tube No. 4 (counting upward on inclined header), platen No. 68.</p> <p>Total downtime 26 hours</p> <p>No</p> <p>Non-critical Incident</p> <p>Operator walkdown</p> <p>None installed</p> <p>Operator noticed moisture in economizer ash conveyor during routine walkdown. Economizer leak suspected due to past history in this area. Visual inspection showed a wet area in the economizer directly above the ash hopper. Orderly shutdown made to repair leak.</p> <p>No</p> <p>No</p> <p>Weld defect removed by grinding and site weld overlaid.</p> <p>Pinhole probably caused by stress corrosion fatigue cracking based on laboratory analysis of previous leaks</p> <p>Changeout of headers during yearly outages.</p> <p>Inspected April 2002. Acid cleaned in 1991.</p>
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Summary of Recovery Boiler Incidents – Spring 2003

<p>Spring 2003 - 8</p> <p>Location:</p> <p>Unit:</p> <p>Size:</p> <p>Incident Date:</p> <p>Leak/Incident Loc:</p> <p>Downtime hrs due to leak/total:</p> <p>ESP?</p> <p>Classification:</p> <p>How discovered:</p> <p>Leak detection:</p> <p>Sequence of events:</p> <p>Bed cooling:</p> <p>Wash adjacent tube:</p> <p>Repair procedure:</p> <p>Root cause:</p> <p>Future prevention:</p> <p>Last full inspection:</p>	<p>Weyerhaeuser, Kamloops Pulp, Kamloops, British Columbia</p> <p>No. 2 Recovery Boiler. B&W Contract 68100. Startup 1972.</p> <p>4.6 million ppd solids. Steam flow 740,000 lb/hr. Operating at 740 psig & 700F. Design at 850 psig. 2 drum boiler/large economizer</p> <p>December 24, 2002</p> <p>Superheater – overheat resulted in fish mouth failure of superheater tube in 2nd row of 5th platen from left sidewall midway between top two rows of hinge pin tube ties. Tube is in front bank of superheater immediately behind furnace screen.</p> <p>Total downtime 90 hours</p> <p>ESP initiated. Current revocable policy is to stay out of recovery area 12 hours</p> <p>Non-critical Incident</p> <p>Operator noted steam flow drop on panel coincident with loud noise from furnace</p> <p>Triple 5 reported that Acoustic Leak Detection System removed about 1 year before leak occurred. Boiler engineer noted drop in steam flow, with everything else stable, and did walkdown with sootblowers off. Loud noise from furnace noted. Called for senior operator and Shift Engineer; tube leak quickly determined & thought to be in superheated. Observed through front wall handhole that leak was deflecting pendants. At this point, steam flow had dropped further and ID fan speed had increased. Liquor was being removed from boiler when it tripped on low drum level. Shift Engineer returned to control room and directed ESP be initiated.</p> <p>Tried CO2 for a short time using 2" lance tubes. Personnel would not use for concern could not safely control lances</p> <p>No</p> <p>Platen removed and jumper tube loops installed because of concern with integrity of the complete platen</p> <p>Overheat of tube that may have occurred with boiler off-line for 4 days with superheater vent open and firing auxiliary fuel. Operating pressure maintained; steam flow off bottom of chart. Analysis indicated tube may have been at 900-1300F for a number of hours. Thermoprobes inserted 2-2.5 ft into furnace measured > 1200F.</p> <p>Implemented method for minimum steam rate for recovery boilers and action to be taken when steaming rate will be low for extended period. ESP education carried out January 2003, and to be an annual event.</p> <p>Inspected Spring 2002. Chemical cleaning (EDTA) Spring 2002.</p>
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<p>Spring 2003 - 9</p> <p>Location:</p> <p>Unit:</p> <p>Size:</p> <p>Incident Date:</p> <p>Leak/Incident Loc:</p> <p>Downtime hrs due to leak/total:</p> <p>ESP?</p> <p>Classification:</p> <p>How discovered:</p> <p>Leak detection:</p> <p>Sequence of events:</p> <p>Bed cooling:</p> <p>Wash adjacent tube:</p> <p>Repair procedure:</p> <p>Root cause:</p> <p>Future prevention:</p> <p>Last full inspection:</p>	<p>International Paper Co., Augusta, Georgia</p> <p>B&W Contact PR-89. Startup 1965</p> <p>1.79 million ppd solids. 185,000 lb/hr steam flow. Operation at 850 psig & 900F. Design at 875 psig. 2 drum boiler/ DCE.</p> <p>November 13, 2002</p> <p>Superheater – ½" by 1 ½ " rupture of secondary loop (inside loop of a two loop arrgt)</p> <p>Total downtime – 64 hours.</p> <p>ESP initiated 20 minutes after hearing loud noise. Current policy is to stay out of recovery area 4 hours. Floor thermocouple data shows maximum floor temperature of 625F 2 hrs after ESP</p> <p>Non-critical Incident</p> <p>Operator during walkdown heard a loud noise</p> <p>None installed</p> <p>On learning of noise, foreman and operator valved out sootblowers and confirmed noise still existed.</p> <p>Southland injected sodium bicarbonate. Estimate saved 36 hours on downtime.</p> <p>No</p> <p>Replace loop</p> <p>Possible corrosion. Operation results in carryover of liquor into superheater.</p> <p>Loops NDT tested annually. Testing bottom of loops could have missed thinned area as on side of loop.</p> <p>Inspected during 2002. Chemically cleaned April 1999</p>
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Summary of Recovery Boiler Incidents – Spring 2003

<p>Spring 2003 - 10 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>Smurfit-Stone Container Corporation, Brewton, Alabama B&W Contract PR-79. Startup 1963 1.1 million ppd solids. 186,000 lb/hr steam flow. Operation at 860 psig and 825F. Design at 975 psig. 2 drum boiler/DCE. August 30, 2002 Superheater – primary superheater tube sheared off about 12 inches below a field weld from February 2002 when the loop was replaced. The loop bridges the frontmost sootblower cavity and is supported inside the penthouse at the cavity center. Total downtime – 48.4 hours ESP initiated immediately. Policy is to stay out of recovery area 8 hours after an ESP. Non-critical Incident Recovery operator saw the furnace blowback and heard a loud noise None installed Operator in the control room observed the boiler blowback and heard a loud noise. Drum level went up about 5 inches and then back down. Before the feedwater flow could increase, operator initiated ESP. No No Installed a 12 ft. long loop bridging the sootblower cavity Cracked due to attachment weld at C&D lug Filling boiler and pressurizing to 125 psig after repair of failed tube revealed a 2nd leak (a crack 3 inches long) in lower loop of secondary SH. Inspected May 2002. Chemically cleaned 18 years earlier.</p>
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<p>Spring 2003 - 11 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>Critical Incident No. 568 Stora Enso North America, Wisconsin Rapids, Wisconsin No. 1 Recovery Unit. CE Contract 1166. Startup 1968 1.5 million ppd splids. 215,000 lb/hr steam flow. Operation at 1250 psig & 880F. Design at 1450 psig. 2 drum boiler/DCE. Single pass, crossflow boiler bank (no baffles). November 5, 2002 Boiler Bank – ¾ in. horizontal crack in a boiler bank sidewall tube. Crack in a thinned, blister ~ 2 in. diameter blistered tube in a sootblower wall opening ~ 3' to rear and ~ 8' above mud drum Total downtime 41 hours ESP initiated. Current irrevocable policy is to stay out of area minimum 4 hours. Critical Incident Operator heard steam leak during inspection round. None installed Noise was checked at several boiler doors & seemed to be from economizer area. Operators began burning out bed and a normal shutdown. No water could be seen. Operators continued to investigate, with all sootblowers out of service. There were no fluctuations in furnace pressure, or in steam/water ratio. 1hr 25 min after hearing steam, an operator was probing through inspection doors with a piece of wood, which at a location just above the leak, was wetted. Boiler was ESPd. There was no evidence of water entering the furnace. No No Replaced 14 inch of tube with a Dutchman Mechanical erosion of wall-tube by a protruding nozzle on a sootblower lance rubbing against the tube. The opening in the wall was too small for the nozzle. With sootblower vendor concurrence, the ports in the nozzle were ground down flush with the lance, reducing the diameter by 1 ¼ ". During June 2003 outage, larger openings will be installed at openings and proper nozzles reinstalled. Three openings are affected. Inspected June 2002. Acid cleaned July 1997 with ammonia/HCl/citric acid</p>
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Summary of Recovery Boiler Incidents – Spring 2003

<p>Spring 2003 - 14 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>Domtar, Cornwall, Ontario B&W Contract. Startup 1958. 1.1 million ppd solids. 200,000 lb/hr steam flow. Operating at 250 psig saturated steam. 2 drum boiler/DCE February 11, 2003 Boiler Bank – buckstay pulled away from boiler bank sidewall tube Total downtime – 26 hours No. Revocable current policy is to stay out of recovery area 12 hours. Non-critical Incident Engineer making final rounds before firing liquor on a startup noticed water leaking out of the casing. None installed Engineer discovering the water checked that sootblower steam trap was functioning properly. As there was no bed in the boiler and water could not get into the furnace from the leak location, he called in the Chief Engineer from home for a second opinion. Water could not be found at any opening. Decision made to terminate auxiliary fuel firing and call B&W to repair possible leak. Boiler cooled and casing removed to reveal the leak. No No Weld to buckstay overlaid At next outage in March 2003, remove casing on both walls over 3 floors to inspect sidewall tubes. Inspection during 2002.</p>
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<p>Spring 2003 -15 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>Critical Incident No. 571 Weyerhaeuser, Grand Prairie, Alberta CE Canada Contract A-70129. Startup 1973. Revamp by B&W in 1990 on Contract 809-0359. 4.2 million ppd solids. 670,000 lb/hr steam flow. Operation at 900 psig & 800F. Design at 1050 psig. 2 drum boiler/large economizer. January 5, 2003 Furnace, Upper – small pinhole in sootblower opening that had been previously overlaid. Opening in cavity between superheater and generating bank. Total downtime 52 hours ESP initiated 43 minutes after maintenance people heard noise in furnace.. Current irrevocable policy is to stay out of area 12 hours. Critical Incident Sootblower mechanic working in area thought he heard a steam leak and called operator, who confirmed the leak. Mass Balance system in operation did not detect the leak as it was too small. Operator initiated removing sootblower feed and lance tubes which revealed small leak. ESP initiated. No No Dye penetrant identified pinhole and another pit that were ground out and TIG welded. Porosity in an old weld overlay Tubes forming sootblower opening to be replaced at April 2003 outage. All openings with previous weld repairs will also be replaced. Inspected May 2002. Chemical cleaned in 1990 using EDTA</p>
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Summary of Recovery Boiler Incidents – Spring 2003

<p>Spring 2003 - 16 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>Critical Incident No. 572 Domtar, Ashdown, Arkansas CE Contract 27477. Startup 1979. 4.2 million ppd solids. 560,000 lb/hr steam flow. Operation at 850 psig & 850F. Design at 1075 psig. 2 drum boiler/large economizer. December 23, 2002 Furnace, Upper (Roof) – crack in tube at weld between seal bar and furnace roof. Bar is between primary SH inlet crown seal boxes. Penthouse casing seal welds to bar. Leak location could discharge into furnace. SH has steam-cooled spacer tube to restrain Total downtime 100 hours ESP initiated 40 minutes after furnace back pressured. Current irrevocable policy is to stay out of recovery area 6 hours after ESP. Critical Incident Operator checking furnace back pressure. Recovery Boiler Advisor in service did not detect leak Within 5 min. of shift change, boiler started to back pressure. Steam & liquor flows did not change, but ID fan speed kept dropping. ESP initiated 40' after furnace started to back pressure. Floor TC data shows tube temperature rise to about 600F one hour after ESP initiated. Carbon dioxide used in selective local hot areas is credited with saving 4 hours No Crack ground out and weld repaired. Fatigue or stress assisted corrosion crack at support weld Inspected October 2002. Acid cleaned 1998</p>
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<p>Spring 2003 - 17 Location: Unit: Size: Incident Date: Leak/Incident Loc: Downtime hrs due to leak/total: ESP? Classification: How discovered: Leak detection: Sequence of events: Bed cooling: Wash adjacent tube: Repair procedure: Root cause: Future prevention: Last full inspection:</p>	<p>Critical Incident No. 573 Pope and Talbot, Harmac Operations, Nanaimo, British Columbia No. 6 Recovery Boiler. B&W Contract C5315. Startup 1963 3.3 million ppd solids. 480,000 lb/hr steam flow. Operation at 600 psig & 750F. Design at 750 psig. 2 drum boiler/large economizer. October 16, 2002 Furnace, Lower – 3/16 in. hole on fireside crown of tube ~ 2 ft. above front wall (spout wall) secondary airport. Composite clad area about size of an egg lost & exposed CS wasted. Total downtime 276 hours ESP initiated. Critical Incident Steam leak heard by operator cleaning liquor guns. None installed Upon hearing the leak, sootblowers were checked without discovering a reason for the noise. Steam & water flows normal, no indication in furnace of a leak and char bed normal. After further checking and discussion with Shift Supervisor, it was decided that there was a leak in the lower furnace and EXP initiated No No Two 4 ft. long sections of wall tube replaced. Boiler chemically cleaned 18 years before this incident. Sample showed sulphidization and high heat in[ut. Flame impingement from a hearth oil burner with a wrong size sprayer plate. DWD 130 mg/sq cm in affected area Mill Stores changed bins & parts correctly identified. Burner assembly drawing posted in various locations so all people involved with burners have information to correctly identify the plates. Inspected May 2002</p>
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Summary of Recovery Boiler Incidents – Spring 2003

<p>Spring 2003 – Intl 2</p> <p>Location:</p> <p>Unit:</p> <p>Size:</p> <p>Incident Date:</p> <p>Leak/Incident Loc:</p> <p>Downtime hrs due to leak/total:</p> <p>ESP?</p> <p>Classification:</p> <p>How discovered:</p> <p>Leak detection:</p> <p>Sequence of events:</p> <p>Bed cooling:</p> <p>Wash adjacent tube:</p> <p>Repair procedure:</p> <p>Root cause:</p> <p>Future prevention:</p> <p>Last full inspection:</p>	<p>Australia</p> <p>Australian Paper, Maryvale, Victoria, Australia</p> <p>No. 5 Recovery Boiler. B&W Contract 7105. Startup _____. Ahlstrom revamp 1992</p> <p>1.85 million ppd solids. 256,000 lb/hr steam flow. Operation at 915 psig & 840F. 2 durm boiler/DCE</p> <p>December 5, 2002</p> <p>Furnace, Upper – 30 meter (100 Ft) above furnace floor in first cavity of superheater. 10 mm long crack that propagated across the tube from the membrane termination just below the sootblower wall box. 2nd crack at toe of adjacent membrane fillet weld that propagated vertically down the side along the weld.</p> <p>Total downtime 11 hours</p> <p>No</p> <p>Operator installing oxygen probe noticed water on a girder.</p> <p>None installed.</p> <p>Boiler being filled with water for startup when leak was found by an operator installing an oxygen probe for startup. Cold boiler drained and crack repaired.</p> <p>No</p> <p>No</p> <p>Membrane cut away to gain access to failure and size verified with dye penetrant. Cracks removed by rotary de-burring. A 'V' preparation was filled with weld metal.</p> <p>Crack at fillet weld</p> <p>Area on this and other sootblower openings to be inspected at February 2003 outage.</p> <p>Inspected February 2002</p>
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CHAPTER 6

OFF-LINE BLACK LIQUOR SOLIDS MEASUREMENT (LABORATORY AND FIELD TECHNIQUES)

PURPOSE

The procedures and interlocks described in this recommended good practice take action to remove black liquor from the furnace or prevent its introduction if the liquor solids fall below a predetermined, absolute value (58%). The reference method for determining absolute values for black liquor solids is the TAPPI Standard Method, T650 om-99.

Actions taken to prevent low solids black liquor from entering the recovery furnace are based on readings from continuous recording black liquor solids monitors (normally refractometers). These continuous monitors measure a property of the black liquor (e.g. refractive index) that is proportional to the dissolved black liquor solids content. In order to convert the continuous solids monitor reading to an absolute basis, it is necessary to calibrate the continuous solids monitor with respect to T650- om-99. T650- om-99 is a laboratory method. It is time consuming and requires skilled laboratory techniques. The recommended practice is to verify the continuous solids monitor reading through periodic, off-line field tests. The field test measurement technique, in turn, should be checked against T650- om-99 at least once per week.

This chapter discusses off-line black liquor solids measurement and makes recommendations as to how this should be carried out. Correct procedures for both collection of samples and sampling techniques are essential for good results. Both of these are discussed in this chapter.

SAMPLING

It is essential that the black liquor sample is representative of the black liquor that is being fired into the furnace and that is being measured by the continuous solids monitor. The sampling location should be on the line to the furnace header or on the header itself. There should be no sources of dilution or chemical addition downstream of the sampling point. Use of liquor samples from other locations (such as the cascade flow box), chosen for convenience, can give erroneous results.

The black liquor sample will be under some pressure and could be at a temperature above the boiling point. Precautions need to be taken to deal with the possibility that the liquor may flash. Flashing could result in spattering of hot black liquor and will cause some evaporation of water (and an erroneously high solids content). If flashing is excessive, it may necessary to cool the sample or use a pre-dilution technique that will be described later. In all cases, the sample line must be adequately flushed before taking a sample for analysis.

Field solids measurements should be made as soon as possible after the sample is taken. Firing strength black liquor normally contains suspended solids that are insoluble at that concentration. These particles can settle rather quickly in hot black liquor and are difficult to re-suspend uniformly once they have settled out. The sample of black liquor should be stirred just prior to removal of a small representative portion for testing. The black liquor sample should not be allowed to cool below 140°F (60°C) before the test portion is taken since suspended saltcake particles can absorb moisture from the liquor on cooling and form large hydrate crystals that are difficult to disperse. In low-odor units without direct contact evaporators, the black liquor sample should be kept closed. This will minimize contact with air which could oxidize some of the sulfide in the liquor and give an erroneously high solids value. One convenient sampling container is a pint-size, screw-capped, wide-mouth, vacuum-jacketed bottle.

Special precautions need to be taken for the laboratory T650- om-99 sample. The relatively long time involved before the measurement is made will lead to extensive settling of un-dissolved solids. It is recommended that the pre-dilution technique be used in taking this sample. After flushing the sample line, about 200 ml of heavy black liquor is drawn into a tared (weighed) sample bottle of at least 400 ml volume. A second weighing establishes the liquor sample weight. The sample can then be diluted with a known amount of water to a working concentration in the 30-40% solids range where all liquor constituents are soluble. The solids concentration in the original undiluted liquor can be calculated from that measured in the diluted sample using the formula given in T650- om-99.

OFF-LINE FIELD MEASUREMENT TECHNIQUES

There are a number of solids measurement techniques that are reasonably straight forward and suitable for field use. A partial listing includes:

moisture balances,	-Preferred
microwave oven drying,	-Acceptable
density (Baumé) readings	not recommended
hand held refractometers	not recommended

All of these methods are procedure dependent. The accuracy and repeatability of results depends strongly on small (but important) details of the equipment and procedures used. Frequently, the absolute value of the solids obtained will vary with the operator running the test.

Moisture balances are probably the most common method for field solids testing. Moisture balance results can be dependent on such variables as the age or brand of infrared bulb used, the height of the heating element above the sample, the amount of sample used, and the distribution of the sample on the pan. In recent years, automated

moisture balances have become available and help to take some of the variation out of field solids measurements.

Experience has shown that microwave oven drying can give highly variable results with black liquor. Overheating of samples can result in pyrolysis of liquor organics and erroneously low values for the measured solids. Microwave fields in most ovens are not uniform and the heat absorbed by the sample may depend on its exact position and orientation in the oven.

Specific gravity (Baumé') readings are not recommended for making calibration adjustments to continuous solids monitors. This technique measures the specific gravity on a pre-diluted sample of firing strength black liquor and uses a conversion chart to determine the percent solids. This is not a direct measurement of solids content. The Baumé vs. solids curve is dependent on liquor composition. Experience has shown that this method lacks the accuracy of other methods when applied to a wide variety of black liquors and liquors subject to changes in makeup rate, recycled dust load, and chemical addition rates.

Hand-held refractometers are also not recommended for making calibration adjustments to continuous solids monitors, especially if the continuous device is also a refractometer. The field test should provide a cross-check on the continuous device and should be a direct measurement of the solids content, not a measure of a property that depends on solids content. Refractive index depends on liquor composition as well as solids content and does not respond to the suspended solids that would be present in firing strength black liquor. For these reasons, confirmation by direct solids measurement is needed.

Moisture balance techniques are a reliable method for field solids measurement but it is necessary to recognize that the values obtained can be dependent on procedural details. These details need to be standardized as much as possible. It is recommended that a standard, detailed solids testing method be written up for each recovery unit and a copy posted at the testing station. The procedure should specify the liquor sampling point, treatment of the sample before weighing, sample size, and all equipment parameters found to influence the result.

GENERAL COMMENTS:

Field solids measurements should be made at regular, frequent intervals. During start-up and periods of upset, more frequent field-testing is recommended.

- Boilers with an as-fired solids less than or equal to 70% BLS:
 - Every two hours is a recommended minimum frequency during normal operation.
- Boilers firing Black Liquor solids greater than 70% BLS:
 - Manually test the black liquor solids a minimum of every eight (8) hours if the following conditions are met:
 - The refractometers must be within 2%.

- The boiler must be in an established stable firing conditions.
- The weekly TAPPI test procedures must be in agreement with the refractometers.
- The low solids divert should be increased to 62% BLS.
- An audible alarm should sound if the solids drop to 70% solids or below.
- If the Black Liquor solids drop to 70% or below the two hour testing frequency shall be resumed.

All solids measurement methods should be checked against the TAPPI Standard, T650-om-99, on a regular basis. Once per week is a recommended minimum frequency.

Refractometers do not see suspended solids while direct solids measurements do include them. The liquor composition should be as stable and representative as possible when taking samples for off-line solids measurement. There should be no deliberate changes in saltcake makeup, or chemical addition when the refractometer is being checked against an off-line measurement.

If the continuous solids monitor differs from the field measurement by more than 2% on an absolute basis, the continuous monitor should be recalibrated

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Note: Editorially, all references to T650-om-89 in this chapter were changed to T650-om-99. TAPPI revised the document and T650-om-99 is the new number.

Any references to T650-om-89 in other chapters of this document as well as all other BLRBAC documents will be changed to T650-om-99.