BLACK LIQUOR RECOVERY BOILER
ADVISORY COMMITTEE

Meeting Minutes
Crowne Plaza Hotel/Atlanta Airport
Atlanta, Georgia
April 5, 6, & 7, 2004

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

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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

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BLRBAC MEETING SCHEDULE

Fall	2004	--	October	4, 5, & 6
Spring	2005	--	April	4, 5, & 6
Fall	2005	--	October	3, 4, & 5
Spring	2006	--	April	3, 4, & 5

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

■ Past Chairman Lon Schroeder

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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.

OPERATING PROBLEMS: — Mail/e-mail completed forms 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.

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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

(Click on "Recommended Practices" on BLRBAC Home page)

Emergency Shutdown Procedure (ESP)
91kb (October 2003)

Fire Protection in Direct Contact Evaporators and Associated Equipment
162kb **(April 2004) – Revised**

Checklist and Classification Guide for Instruments and Control Systems
409kb (April 2002)

Personnel Safety
208kb **(April 2004) – Revised**

Post ESP Guidelines
139kb (October 2002)

Safe Firing of Auxiliary Fuel in Black Liquor Recovery Boilers
653kb (October 2002)

Safe Firing of Black Liquor in Black Liquor Recovery Boilers
728kb (March 2004)

Waste Stream Incineration
374kb (April 2002)

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* = Attended 04/04 Meeting

FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS AND ASSOCIATED EQUPMENT

Chris Jackson* -- Chairman
Global Risk Consultants Corp.
c/o 12848 SW Thunderhead Way
Beaverton, OR 97008
Tel/Fax: 503-671-9829
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Randy Baker Buckeye Technologies One Buckeye Drive Perry, FL 32348 Tel: 850-584-1380 Fax: 850-584-1738 **randy_baker @bkitech.com**	Craig Cooke* - Co-chairman FM Global 815 Byron Drive Oconomowoc, WI 53066 Tel: 262-567-7370 Fax: 847-430-7411 **craig.cooke @fmglobal.com**	John Lisenby International Paper P. O. Box 950 Vicksburg, MS 39180 Tel: 601-631-8371 Fax: 601-631-8392 **john.lisenby @ipaper.com**
Joseph Lynch (Secretary) GE GAP Services 1105 Sanctuary Pkwy., Ste 200 Alpharetta, GA 30004-4741 Tel: 770-569-7091 Fax: 888-964-7348 **joe.lynch @ge.com**	Nick Merriman, sappi Forest Products Tugela Republic of South Africa Tel: +27 (0) 32 456 1433 Fax: N/A **nick.merriman @sappi.com**	Steve Osborne* Babcock & Wilcox 20 S. Van Buren Ave. Barberton, OH 44203 Tel: 330-860-1686 Fax: 330-860-9023 **slosborne @babcock.com**
George Orme Allianz 7480 Cason Circle Gladstone, OR 97207 Tel: 503-657-8530 Fax: N/A **gorme @aic-allianz.com**		

* = Attended 04/04 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

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**	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**	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**
E. Scott Crysel FM Global Granite Park One Plano, TX 75024 Tel: 972-731-1658 Fax: 972-731-1820 **scott.crysel** **@fmglobal.com**	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**	Jerry Garner BE&K Engineering P. O. Box 12607 Birmingham, AL 35202-2607 Tel: 205-972-6432 Fax: 205-972-6300 **garnerj** **@bek.com**
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**	Brian Kaufmann Kimberly-Clark 1400 Holcomb Bridge Rd. Roswell, GA 30076-2199 Tel: 770-587-7230 Fax: 770-587-7736 **bkaufmann** **@kcc.com**	Olli Kujanpaa* Andritz 10745 Westside Parkway Alpharetta, GA 30004 Tel: 770-640-2571 Fax: 770-640-2455 **olli.kujanpaa** **@andritz.com**

* = Attended 04/04 Meeting

WASTE STREAMS SUBCOMMITTEE (Cont.)

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**	Wayne Macintire* International Paper P. O. Box 7910 Loveland, OH 45140-7910 Tel: 513-248-6834 Fax: 513-248-6679 **wayne.macintire** **@ipaper.com**	Rob Orender* Georgia Pacific Corp. 133 Peachtree St., 18th floor Atlanta, GA 30303 Tel: 404-652-4606 Fax: 404-584-1466 **rhorende** **@gapac.com**
Winston "Jerry" Pate* Smurfit Stone Container Corp. P. O. Box 709 Brewton, AL 36427 Tel: 251-867-8371 Fax: 251-867-1153 **wpate** **@smurfit.com**	Jean-Claude Patel A. H. Lundberg Assoc., Inc. 406 Sagebrush Road Naperville, IL 60565 Tel: 630-355-5120 Fax: 630-355-5120 **jc.patel** **@lundbergassocates.com**	Paul Seefeld* A. H. Lundberg Assoc., Inc. 4577 Pebble Brook Drive Jacksonville, FL 32224-7643 Tel: 904-223-4147 Fax: 904-223-4146 **paul.seefeld** **@lundbergassociates.com**
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**	Michael D. Sides* GE GAP Services 1105 Sanctuary Pkwy, Ste.200 Alpharetta, GA 30004-4741 Tel: 770-569-7123 Fax: 888-964-7348 **michael.sides** **@gegaps.com**	B. K. Wadhwani Coen, Inc. 1510 Rollins Road Burlingame, CA 94010 Tel: 650-686-3271 Fax: 650-686-5655 **bwadhwani** **@coen.com**

* = Attended 04/04 Meeting

Registered for the meeting were:

Abitibi-Consolidated
Gustafson, Larry, Fort Frances, ON

Alabama River Pulp
Browning, John, Perdue Hill, AL
Edwards, Bobby, Perdue Hill, AL
Gornto, Bruce, Perdue Hill, AL
Needham, Chris, Perdue Hill, AL
Newton, Carlos, Monroeville, AL
Standridge, Tim, Perdue Hill, AL
Thomas, Anthony, Perdue Hill, AL
Timothy, Eugene, Perdue Hill, AL
Wilson, Joe, Perdue Hill, AL

Alert Systems, Inc.
Borsje, Henk, Duxbury, MA

Alstom Power
Barry, Mike, Charlotte, NC
Gadai, David, Windsor, CT
Grasso, Bob, Vancouver, WA
Holbrook, John, Sykesville, MD
Hollenbach, Dennis, Windsor, CT
Kistka, Gerry, Jacksonville, FL
LeBel, Mark, Windsor, CT
Quinlan, Michael, Chattanooga, TN
Young, Frederick, Chattanooga, TN

AMEC E&C Inc.
Dresser, Bob, Alpharetta, GA
Dunlap, Bill, Greenville, SC

American Forest & Paper Assoc.
Grant, Thomas, Yonkers, NY

Andritz, Inc.
Collins, Peter, Alpharetta, GA
Holm, Ralf, Alpharetta, GA
Kujanpaa, Olli, Alpharetta, GA
Lindh, Timo, Alpharetta, GA
Phillips, John, Alpharetta, GA
Sopanen, Jari, Curitiba, Brazil
Treger, Glen
Alpharetta, GA

Appleton Papers
Lezzer, Tom, Roaring Spring, PA

Automation Applications
Vigeant, Marc, Fort Mill, SC

AXA Corporate Solutions
Abel, Frederic, Lyon, France

Babcock & Wilcox
Blair, Michael, Atabaster, AL
Dickinson, Jim, Barberton, OH
Kittel, David, St. Marys, CA
Kulig, John, Barberton, OH
Lance, Gail, Barberton, OH
Osborne, Steve, Barberton, OH
Sherlock, H. Bentley, Atlanta, GA
Yash, John, Atlanta, GA

Blue Ridge Paper Products
Hennessy, Kevin, Canton, NC
Holland, Brook, Canton, NC

Boise Cascade
Erickson, Leonard, Boise, ID
Nease, Scott, DeRidder, LA
Schlieff, Scott, Wallula, WA
Stensberg, Paul, International Falls, MN
Zavadoski, Greg, St. Helens, OR

Bowater
Hitch, Tony, Calhoun, TN
Moses, Roger, Calhoun, TN

Buckeye Technologies
Streit, David, Perry, FL

Buckman Laboratories
Graham, Jim, Memphis, TN
Olavessen, Len, Memphis, TN

C.N.A. Risk Control
Walker, Billy, Apex, NC

Registered for the meeting were:

Chaddick Consulting, Inc.
Chaddick, Louis, Wando, SC

ChemTreat
Kanney, Mike, Glen Allen, VA

CIMS Ltd
Young, Jim, Richmond, BC

Clement Consulting
Clement, Jack, Akron, OH

Coen Company
Wadhwani, B.K., Burlingame,CA

Cooperheat - MQS
O'Connor, Shawn, North Augusta, SC

CORR System, Inc. (TTS)
Ruiz de Molina, Eladio, Birmingham, AL

Delta National Kraft
Taylor, Lynn, Pine Bluff, AR

Diamond Power
Abdallah, Rami, Lancaster, OH
Kaminski, Bob, Lancaster, OH
Tavares, Alarick, Lancaster, OH
Whitehead, Brian, Lancaster. OH

Dynamic Energy Systems
McClain, Cliff, St. Albert, MO

Electron Machine Corp., The
Jarrett, Gordon, Umatilla, FL
Vossberg, Carl III, Umatilla, FL
Vossberg, Carl IV, Umatilla, FL

Environmental Elements
Bringman, Lewis, Baltimore, MD
Elam, Stan, Hot Springs, VA
Hug, Don, Baltimore, MD
Shelton, Jeff, Baltimore, MD

FLS - Airtech
Shanahan, Dennis, Pensacola, FL
Brown, Mike, Jacksonville, AL

Fluor Daniel Forest Products
Lewis, John, Greenville, SC

FM Global
Cloutier, Guy, Montreal, QU
Cooke, Craig, Oconomowoc, WI
Cooper, Mark, Bellevue, WA
Crysel, Scott, Plano, TX
Hoffman, Daryl, Bellevue, WA
Janusauskas, Paul, Montreal, QU
Lamb, Ron, Parsippany, NJ
Lang, David, Bedminster, NJ
Lemay, Brian, Thornhill, ON
Matarrese, Rick, Alpharetta, GA
Onstead, Jimmy, Plano, TX
Parrish, David, Norwood, MA
Polagye, Mike, Norwood, MA

G&M Consultadores, Ltda
Schreiber, Guido, Canoinhas, Brazil

GA Dept. of Labor
Everett, Earl, Atlanta, GA
Hancock, Gerry, Atlanta, GA

Gaylord Container
Villarrubia, David, Bogalusa, LA

GE GAP Services
DiLeonardo, Lino, Toronto, ON
Franks, James, Somerville, TN
Rawls, Lynn, Perkinston, MS
Sides, Michael, Ocoee, FL

General Reinsurance Corp.
Freeman, Stuart Jr., Atlanta, GA

Registered for the meeting were:

George H. Bodman, Inc.
Bayse, Michael, Kingwood, TX
Bodman, George, Kingwood, TX

Georgia-Pacific
Andrews, Jimmy, Pennington, AL
Burney, S. L., Atlanta, GA
Emerson, Randy, Ashdown, AR
Morency, Karl, Atlanta, GA
Orender, Robert, Atlanta, GA
Phillips, Tony, Palatka, FL
Smith, Roger, Atlanta, GA
Tenbrunsel, Robert, Atlanta, GA
Yarbrough, Lonnie, Palatka, FL

Global Risk Consultants
Jackson, Christopher, Beaverton, OR
Smith, Andy, Atlanta, GA

Gulf States Paper
Duckworth, Marty, Demepolis, AL

Harris Group
Iwanick, Arnie, Portland, OR

Hartford Steam Boiler
Garfield, Michael, Lowell, ME
Hess, Ron, Buckhead, GA

Hercules
Bowen, Glenn, Glenwood, NY
Gaus, Jeff, Shreveport, LA

HSB Professional Loss Control
DeBeer, Thomas, Woodstock, GA

Industra
McKamey, Del, Portland, OR
Phillips, Dan, Portland, OR

Inland Paperboard & Packaging
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
Sargent, Mark, Loveland, OH

Interstate Paper Corp.
Crosby, Phillip, Riceboro, GA

Irving Pulp & Paper
Murray, Trevor, Saint John, NB
Savoy, Dave, Saint John, NB

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

John E. Cover Engineering, Inc.
Cover, John, Birmingham, AL

Kimberly-Clark
Chiasson, Mike, New Glasgow, NS
Kaufmann, Brian, Roswell, GA
Sponagle, David, New Glasgow, NS

K-Patents, Inc.
Hamalainen, Arto, Naperville, IL
Pyorala, Keijo, Naperville, IL

Kvaerner Pulping
Abrams, Larry, Charlotte, NC
Campbell, Craig, Charlotte, NC
Christiansen, Gene, Charlotte, NC
Geedey, Jim, Charlotte, NC
King, Dave, Charlotte, NC
McKinney, Carolyn, Charlotte, NC
Morgan, Preston, Charlotte, NC
Sherrod, Hank, Charlotte, NC
Wasson, Eric, Charlotte, NC
Weikmann, John, Charlotte, NC

Registered for the meeting were:

Liquid Solids Control
Sweeney, Michael, Upton, MA

Longview Fibre
Berg, Greg, Longview, WA

Marsh, Inc.
Hyche, Dwight, Meridian, MS

MeadWestvaco
Andrews, John, Charleston, SC
Lindsey, Larry, Phenix City, AL
Long, Rick, Charleston, SC
Murch, Douglas, Miamisburg, OH
Williams, Jimmy, Phenix City, AL

Mechanical & Materials Engrg.
Moskal, Max, Indian Head Park., IL

Nalco
Totura, George, Naperville, IL

National Board of BPVI
Sullivan, Robert, Columbus, OH

Norske Skog
Norton, Bob, Campbell River, BC

P. H. Glatfelter Co.
Gentzler, Bill, Spring Grove, PA

Packaging Corp. of America
Farris, Mike, Counce, TN
Ferrell, Larry, Valdosta, GA
Hilgendorf, Joe, Tomahawk, WI
Jelinek, Bob, Tomahawk, WI
Stelling, John, Tomahawk, WI

Potlatch
Bliss, Dave, McGehee, AR
Hartley, Chuck, North Las Vegas, NV

Power Specialists Assoc. Inc.
Bernard, Ron, Somers, CT
Blaylock, Tommy, Somers, CT
Madersky, Lee Anne, Somers, CT
Madersky, Tom, Somers, CT
Popielnicki, Ted, Somers, CT
Zawistowski, Bob, Somers, CT

Process Equipment
Nolen, Ken, Pelham, AL
Ray, Allen, Pelham, AL

PROSWECO
Thorslund, Gunnar, Brazil

Rayonier
Goober, Glynn, Jesup, GA
Moyer, Scott, Jesup, GA
Roberts, Willie, Jesup, GA
Winngate, Danny, Jesup, GA
Yeomans, Scott, Jesup, GA

Rigesa Celulose
Klitzke, Rudimar, Tres Barras, Brazil

RiNan, Inc.
Pothier, Richard, Peabody, MA

RMR Mechanical
Roy, Bob, Cumming, GA

Sage of America
Rambo, Edward, Onetewak, TN

SAPPI Forest Products
Aderman, Craig, Westbrook, ME
Luedtke, Scott, Cloquet, MN
McQuillan, Bill Skowhegan, ME

Simpson Tacoma Kraft Co.
Fay, Michael, Tacoma, WA

Registered for the meeting were:

Smurfit Carton de Colombia
Cubillos, Jairo, Cali, Colombia
Franco, Daniel, Cali, Colombia

Smurfit-Stone Container
Allard, Andre-Benoit, New Richmond, QU
Craig, David, Hodge, LA
Dykes, Phillip, Panama City, FL
Dykes, Tommy, Panama City, FL
English, Phil, Jacksonville, FL
Fuster, Pedro, Panama City, FL
Jones, Robert, Stevenson, AL
Mills, Drexel, Missoula, MT
Morin, Nathalie, Latuque, QU
Pate, Jerry, Brewton, AL
Phelps, Bob, Hopewell, VA
Wynn, Doug, Stevenson, AL

Southern Environmental
Cotton, Rick, Pensacola, FL
Hayes, Charles, Pensacola, FL

SRV Associates
van der Veen, Steve, Boston, MA

Stasuk Testing & Inspection Ltd.
Stasuk, David, Burnaby, BC

Tembec
Terrell, Carl, St. Francisville, LA
Thornton, Jeff, St. Francisville, LA

Teck Cominco
Pistner, Peter, Trail, BC
Reiter, Brian, Trail, BC

Temple-Inland Forest Products
Scoggins, Jim, Sugarland, TX

Utilities Project Mgt., Inc.
Osthoff, James, Ray, OH

Welding Services, Inc.
Welch, Mike, Norcross, GA

Weyerhaeuser
Avery, David, Bennettsville, SC
Cooley, Mark, Bennettsville, SC
Dixon, Jim, Pine Hill, AL
Gore, Chris, Bennettsville, SC
Harrison, Danny, Pine Hill, AL
Keech, Randy, Bennettsville, SC
Larrimore, Brad, Pine Hill, AL
Touchton, Robert, Oglethorpe, GA
Worsham, Jesse, Bennettsville, SC

INTRODUCTION

BLRBAC's Chairman, Dean Clay, called the meeting to order at 8:00 a.m. on Wednesday, April 7th.

CHAIRMAN: I'd like to welcome all of you to the spring meeting. This is the BLRBAC Main Committee Meeting. We do have a published agenda and will attempt to follow the agenda this morning. We want to thank you for your continued support and attendance.

OLD BUSINESS

ACCEPTANCE OF MINUTES OF FALL 2004 – Dean Clay

The first item of our business meeting is to approve the Minutes from the fall 2003 meeting. These Minutes are posted on the BLRBAC.ORG Web site. That has been our procedure now for the last year or two. Hopefully, the new Minutes will be available on-site within two months after the conclusion of the meeting. We are still attempting to e-mail the members and attendees with a Notice that the Minutes have been posted. We are no longer mailing out Meeting Minutes. So again, they are all available on the BLRBAC WEB site. The voting members should have a red ribbon. So when I call for a vote, please just have the voting members respond. There should be one member per company. So I now would entertain a motion from the voting members to approve the Minutes from the fall 2003 meeting. Could I have a second? Okay. All in favor please raise your hand. Opposed? The Minutes stand approved.

NEW BUSINESS

1. NEW MEMBERS/REPRESENTATIVE CHANGES REPORT – Mike Polagye

Last night at the Executive Committee Meeting eight applications for membership in BLRBAC were reviewed and approved. Those included:

NEW REGULAR MEMBERSHIP

None at this time.

1. NEW MEMBERS/REPRESENTATIVE CHANGES REPORT (Cont.)

NEW ASSOCIATE MEMBERSHIPS

Applied Technical Services (ATS), Marietta, GA -- Providing NDE services for recovery boilers.
Rodney Thomas designated as Associate Representative
Mark Elrod designated as Alternate Associate Representative

Boiler Tek, Saraland, AL -- Providing mechanical repair for recovery boilers.
O. T. Moody designated as Associate Representative
Fred L. Pace designated as Alternate Associate Representative

Diffusion Technologies, Saraland, AL -- Providing erosion/corrosion coating application services for recovery boilers.
Fred L. Pace designated as Associate Representative
O. T. Moody designated as Alternate Associate Representative

F. L. Smidth Airtech, Inc., Bethlehem, PA -- Providing electrostatic precipitators for recovery boilers and other boilers.
Dennis Shanahan designated as Associate Representative
Mike Brown designated as Alternate Associate Representative

Prosweco AB, Stockholm, Sweden -- Providing technical services for recovery boilers.
Gunnar Thorslund designated as Associate Representative
Peter Aspgren designated as Alternate Associate Representative

Sage of America Company, Collegedale, TN -- Providing technical services for recovery boilers.
Marcio Gerep designated as Associate Representative
Edward Rambo designated as Alternate Associate Representative

To each of these, as well as our other current Associate members offer services that support recovery boiler operation and safety; we welcome you as new Associate members to BLRBAC. We encourage and solicit your participation on our subcommittee work, especially addressing issues that are related to your areas of expertise. Again, the primary focus of BLRBAC is recovery boiler safety. We look forward to all of you, the operating companies, the boiler manufacturers, the insurance companies and our Associate members, to help us by maintaining our Recommended Practices and providing us with the best information that we can have in there so that we achieve our goal of recovery boiler safety.

1. NEW MEMBERS/REPRESENTATIVE CHANGES REPORT (Cont.)

CORRESPONDING MEMBERSHIP

Propal Pulp & Paper, Columbia, South America. They operate two recovery boilers.
Alfonso Ocampo designated as Corresponding Representative
Moises Castillo designated as Alternate Corresponding Representative

PT Lontar Papyrus Pulp & Paper Industry, Jakara, Indonesia. Operating two recovery boilers.
Hasrul Khaidir designated as Corresponding Representative
Richard Stonebridge designated as Alternate Corresponding Representative

REGULAR REPRESENTATIVE CHANGES

Georgia-Pacific
Karl Morency replaces Jules Domingues as Representative
Rick Durham replaces Karl Morency as Alternate Representative

Smurfit-Stone
Phil English replaces Hollis Elder as Representative

ASSOCIATE REPRESENTATIVE CHANGES

AMEC E&C Services, Inc.
N. W. Dunlap, Jr. designated as Associate Representative
Don Sorenson designated as Alternate Associate Representative

Universal Dynamics, Ltd.
Dale Roskob replaces Eddie Koyama as Alternate Associate Representati**ve**

MEMBERSHIP COMPANY NAME CHANGE

AMEC E&C Services, Inc.
Previously Simons Engineering

2. EXECUTIVE COMMITTEE REPORT – Dean Clay

We met in closed session on Tuesday afternoon with all seven members present. As noted in our fall Minutes, Joan Barna passed away on October 26, 2003. Joan had been a member of the Executive Committee and Chairman of the Materials & Welding Subcommittee. We miss Joan both personally and professionally. To allow us to continue on, we have appointed Preston Morgan of Kvaerner to the Executive Committee as the Boiler Manufactures' Representative.

2. **EXECUTIVE COMMITTEE REPORT** (Cont.)

I'd like to quickly review the Executive Committee members. The current composition is:

> I'm the Chairman of BLRBAC. Karl Morency from Georgia-Pacific is the Vice-Chairman. Mike Polagye of FM Global is our Secretary. Ron Hess of HSB Forest Products is the Treasurer. Scott Moyer of Rayonier Performance Fibers is the Operator Representative. As noted, Preston Morgan of Kvaerner is the Boiler Representative. Jimmy Onstead is the Insurance Representative.

BLRBAC was formed by those three groups: insurance, operators and boiler manufacturers. That's the reason we always maintain a representative from each group on the Executive Committee. Every two years we vote on a new slate of officers. The next vote is schedule to be held in the Main Committee Meeting on Wednesday, October 6, 2004. Per our procedures, we have selected a Nominating Committee to present a proposed list of candidates for the members to vote on. Ron Hess has agreed to head up that committee. Dave Streit and Mark Sargent will be on the committee also. If you have any input, please feel free to contact any of them. As a note, the membership up for vote will be Chairman, Vice-Chairman, and then the three Representatives: Insurance Representative, Operators Representative and Boiler Manufacturers Representative. The Secretary and Treasurer positions are nominated positions by the Executive Committee. We will also accept nominations from the floor at the time of the vote.

Dan Phillips of Industra, who was the Co-chairman of Materials & Welding, has agreed to become the Chairman of that Subcommittee. We thank you for that Dan.

We have reviewed the work of the Subcommittees and we are going to have two changes to our Recommended Practices to vote on this morning. There are also several additional changes to be presented to the Executive Committee for our review. If we agree with the changes, those will be posted on our WEB site for membership review. We encourage everyone to look at the WEB site and read through the proposed changes. It's important, if members disagree or can find a better way to do it, they should feed this information back to the Subcommittee. Usually we don't get much feedback. So, we are assuming that we are doing good work, but we would encourage you to read it. It may have some impact on you in the future.

We have also agreed to support a joint AF&PA/BLRBAC Seminar on Water Treatment. This kind of follows a progression of seminars on no particular schedule. We had some on Materials & Corrosion, Welding, etc. Currently we intend to do this following the spring 2005 meeting. The seminar will start Wednesday afternoon, after lunch, and conclude Thursday, probably at 5:00 p.m. We are still finalizing it. We will be publishing information on that seminar.

2. EXECUTIVE COMMITTEE REPORT (Cont.)

Last night we had a jointly sponsored BLRBAC-supplier hospitality function sports night downstairs across from the pool. We encourage you to provide us with any feedback as to whether that is something we should continue to do or not.

Another announcement, the TAPPI Steam & Power Energy Management Committee meetings will be held following BLRBAC today.

Finally, and I think Len Erickson will mention this also, there is a March 2004 revision to the Safe Firing of Black Liquor Guidelines document currently posted on the WEB site. If any of you had downloaded the previous version, we found some errors in that document. The current version is dated March 2004 and is the correct version.

3. TREASURER'S REPORT -- Ron Hess

We had 182 Advance registrations for this meeting. Thirty-one people chose to register At-Door. That represented 28 paper companies; seven insurance companies, four manufacturers, 34 Associate member companies and we had five guests. Our foreign visitors, we have two from Colombia; two from Brazil; and one from Sweden. That comprises the population for this particular meeting.

On the financial side, the organization has two financial accounts. We have a checking account used for operations. The balance of that account is approximately $34,000.00, before we pay the bills for this event. We also have a CD with a balance is right at $15,000.00. So the increase in membership fees has helped give us a little bit of cushion on the side for the financial operations. We had a financial audit performed of the books in 2003. I'm still here, so it was a successful audit.

Attached to the e-mail that announces these Meeting Minutes are posted on the Web site will be a short member survey/questionnaire for you to give us some feedback. We encourage you to give us the requested information. It can be returned electronically or by hard copy back to Barbara Holich. It is pretty short, trying to get some information from you; how you attend and why you attend; things of that nature. We are trying to get a handle on the fluctuation of membership and things that we can do differently to try to maintain member participation.

As Dean indicated, everything is driven off your e-mail address. So again, to repeat to you, please keep your e-mail address current and try to advise us of any changes. You can do it on the back of your luncheon ticket or you can just send Barbara an e-mail. Your e-mail address is our link to you. So if your e-mail address changes we no longer have a direct means to communicate with you. It is kind of a two-way street and we need your help to maintain a working database.

3. **TREASURER'S REPORT** (Cont.)

As Dean also indicated, I'll be working on the Nominating Committee. If anyone has an interest or has some questions, please contact us. We hope to have more participation.

CHAIRMAN: Yes, we are always open for your feedback. As Ron noted, the attendance has been gradually declining. We have no particular number goals. We are here to serve our members. If you have any comments on how we could improve what we do and make it more valuable to you, we would be more than happy to address any suggestions.

4. SECRETARY'S REPORT – Mike Polagye

Dean and Ron already stole my thunder. I was going to remind everybody that BLRBAC's means of communication is through e-mail and to keep your e-mail current. Dean said that and Ron said that, and I guess now I've said it. That's my message, thank you.

SECRETARIAL SERVICES REPORT -- Barbara Holich

It is recommended that each Regular Member Company (boiler insurers, boiler operaters and boiler manufacturers – voting members) have a designated Representative and Alternate Representative, preferably someone who attends BLRBAC at least occasionally.

If you are your organization's designated Representative or Alternate Representative but you have not been receiving e-mail notices from me, then I have no working e-mail address listed for you. Anyone who wishes to be added to the BLRBAC e-mail list, please e-mail me (fhholich@aol.com) your address.

I need someone to take the initiative and advise me of any member company name changes, mergers, etc. so that the BLRBAC database can be properly maintained.

No changes are made to the database until written (e-mails are acceptable) notification is received. I keep a file folder for each member company that 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.

If you are a designated Representative or Alternate Representative for your organization and something happens wherein you will no longer be functioning in this capacity, such as, retirement, occupational change, downsizing, etc., please let me know or supply me with the name and e-mail address of whomever will fill your vacated position within BLRBAC.

5. SUBCOMMITTEE REPORTS

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

The ESP Subcommittee met in closed session on Monday April 5th with 12 of 13 members represented. Two new members, Dean Clay of International Paper and Chris Gore of Weyerhaeuser, were accepted into the Subcommittee. The Subcommittee met in open session on Tuesday morning April 6th with 12 of the 13 members represented and about 190 guests.

The Subcommittee received 46 incident reports from North America and 8 International reports. The 46 incidents were the largest number ever reported at a single meeting. Of the 46 incidents, one was a dissolving tank explosion. Twelve (12) were critical incidents and 32 were non-critical incidents. An ESP was performed in 24 of the incidents including 8 of the critical incidents and 16 of the non-critical. One spout leak was reported.

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 learnings. 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.

5. SUBCOMMITTEE REPORTS (Cont.)

5.1 ESP SUBCOMMITTEE REPORT (Cont.)

Incident Locations

The general locations of the leaks for boilers in North America 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 and the red were listed as critical incidents. The leaks locations are summarized as follows:

- 17 – Economizer
- 13 – Superheater
- 9 – Wall Tubes
- 4 – Generating Bank
- 1 – Screen Tube
- 1 – Dissolving Tank Explosion with Damage
- 1 – Smelt Spout

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:

- 19 – Fatigue
- 2 – Corrosion Fatigue or Stress Assisted Corrosion
- 6 – Weld Failure
- 14 – Corrosion
- 2 – Erosion
- 1 – Improper Material
- 1 – Overheat

How Discovered

Operator observations during boiler walkdowns continue to be the prevalent method of detecting leaks and accounted for identification of 33 of the leaks. Twelve (12) of the leaks were identified by the control room indications. Of the incidents reported, 11 had leak detection systems installed and two mills reported that the leak detection system confirmed the leak. Several of the reports commented that the leaks were so small they were probably below the sensitivity of the detection system. It is important that mill operations be familiar with the capabilities and the shortcomings of any leak detection system installed.

5. SUBCOMMITTEE REPORTS (Cont.)

5.1 ESP SUBCOMMITTEE REPORT (Cont.)

Incident Review

Appendix A contains a summary of the incidents reviewed during the meeting. There were two incidents that were noted to provide a learning experience. Incident 41 involved a partial blockage of a tube by a foreign material and it highlighted the need for proper design and utilization of "downcomer covers" to prevent foreign objects from entering the boiler water circuit during maintenance outages. Also the incident was significant in that the mill spent over 30 hours to locate and remove the foreign object that turned out to be the lid of a can. Incident 42 involved a unit with a "flash-to-sky" rapid drain system. The decision to rapid drain the unit was made after the boiler had been off line for some time and the pressure was about 170 psi. Total level indicator and floor tube thermocouple data showed that the unit drained in to about 10 feet in 82 minutes and to 8 feet in 168 minutes. The mill had added low point drains to the rapid drain flash-to-sky lines in 2003.

Figure 2 shows the critical incidents reported each year. The 12 critical incidents reported this meeting represents half a year and would represent an annual rate of 24 that is above the recent average.

Figure 3 shows that the predominance of explosion history for the recent past has been dissolving tank explosions with four explosions last year and one so far this year. Fortunately, there have been only four smelt-water explosions or other explosions in the last 10 years.

Figure 4 shows the five year running average of smelt water explosions and gives a good indication of the progress that has been made in reducing smelt water explosions with only two incidents reported in the last 5 years.

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 starting to level out just under 1.2 explosions per 100 boiler years. That includes all causes combined, and is being driven by the recent dissolving tank explosions. We all need to continue the making the efforts to try to get that trending back down. Effort should be focused in developing better procedures to handle heavy smelt runs and plugged spouts.

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

Eight-Foot Rapid Drain Level

There were several incident reports submitted that included the floor tube thermocouple data. Thermocouple data submitted with several incidents indicated that, within two to twelve hours after the ESP, the floor temperatures started coming back up, indicating that the floor may be dry. Tom Grace has reviewed bed-cooling mechanisms and estimated that the time to properly cool the bed will increase by about 50% if the floor tubes do not contain water.

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 Post ESP Procedures document posted on the Web site at 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. Please report any information on floor tube temperatures or actual water level measurements after an ESP on the ESP Questionnaire. Jack Clement will maintain an archive of information submitted on floor water level information following an ESP.

Recommended Change to ESP Document

Clarification of Fuel(s)

The consensus was to expand two articles in the ESP document to make it clear that the fuel(s) to be isolated from the furnace is all encompassing. These changes are:

Chapter 1

Proposed Language:
•**Stop All Fuels**
Immediately stop firing all fuels and ensure positive isolation of fuels from boiler. Shut off the auxiliary fuel supply at a remote location, manually or automatically.

3.6 All Fuel
The system should prove that all fuels, including black liquor, NCG and other waste fuels have stopped entering the furnace. One method is to obtain positive feedback from valve proof-of-closure or position indicator switches. Liquor firing systems recirculating to a pressurized tank require an automated shutoff valve in the recirculation line.

5. SUBCOMMITTEE REPORTS (Cont.)

5.1 ESP SUBCOMMITTEE REPORT (Cont.)

Clarification of 'Local Test' Switches for valves other than RDV's

The Subcommittee approved the revision of Section 3.13 of the ESP Recommended Procedure

> **3.13 ESP Valve Local Selector Switch**
> The actuators on the rapid drain valves and all other valves that operate during an ESP should be wired to move the valves to the ESP position upon initiation of the ESP system regardless of the position of any local selector switch on the valve actuators.

It was noted that this statement is not applicable for dampers.

ESP Reset Timer

The ESP Recommended Practice in Section 3.21 and the Post ESP Procedure in Chapter 4 should incorporate the same statement. The Subcommittee is recommending that the language of Chapter 4 should be adopted, with one change of the final word 'heater' to 'heater(s)', The Subcommittee has adopted the following paragraph for both Sections:

> **3.21 System Reset**
> The ESP system should not be reset until reentry to the area is permitted. The ESP system reset logic/procedures may result in automatic movement of controls to undesired positions. Proper caution should be taken to position controls where intended. Examples of valves that may need isolation or manual positioning prior to reset include the feedwater to economizer and the steam-to-steam coil air heater(s).

Floor Thermocouples-Clarification of Language

The Subcommittee approved the proposed wording of Section 3.23 of the ESP Recommended Procedure

> **3.23 Thermocouples**
> Recovery boilers should be equipped with floor thermocouples. The thermocouple readings should be monitored and recorded during an ESP as a means to evaluate potential floor tube overheating damage.

5. SUBCOMMITTEE REPORTS (Cont.)

5.1 ESP SUBCOMMITTEE REPORT (Cont.)

The intent is that the floor should be inspected if the thermocouple data, in combination with other information or observations, indicates there could have been damage. Thermocouple data indicating the floor was boiled dry is one indication of possible damage. Most floors do become dry as the result of an ESP and total information needs to be considered.

The preceding four proposed revisions to the ESP document were submitted to the Executive Committee on April 5, 2004. *{Secretary's Note: The Executive Committee approved the document for membership review and comment and a draft mark-up of the ESP document is posted on the Web site. Comments should be sent to John Andrews, chairman of the ESP Subcommittee.}*

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 and is more interactive. You will fill out certain sections depending upon the type of incident and the form contains a table that tells you which sections you need to fill out and which sections you can leave blank. The final revision is posted on the Web site. We would appreciate any comments on it, if you find it simpler or not and any suggestions for further revision.

Whenever you need to fill out an ESP Questionnaire please go into the BLRBAC Web site www.blrbac.org and pull up the latest copy of the form. The form can be filled in electronically and sent in by e-mail to jlclement3315@sbcglobal.net 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. **Note that Jack Clement has a new email address.**

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

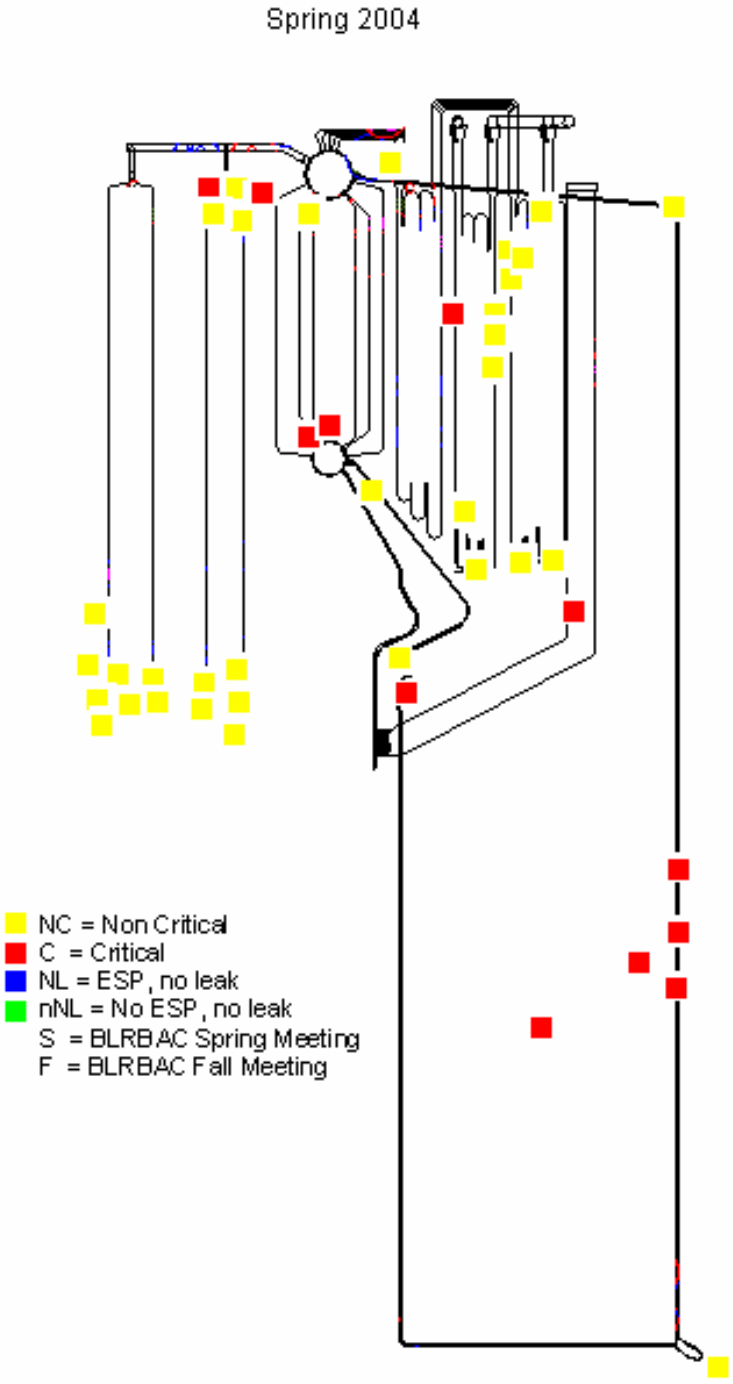

Figure 1

5. SUBCOMMITTEE REPORTS (Cont.)

5.1 ESP SUBCOMMITTEE REPORT (Cont.)

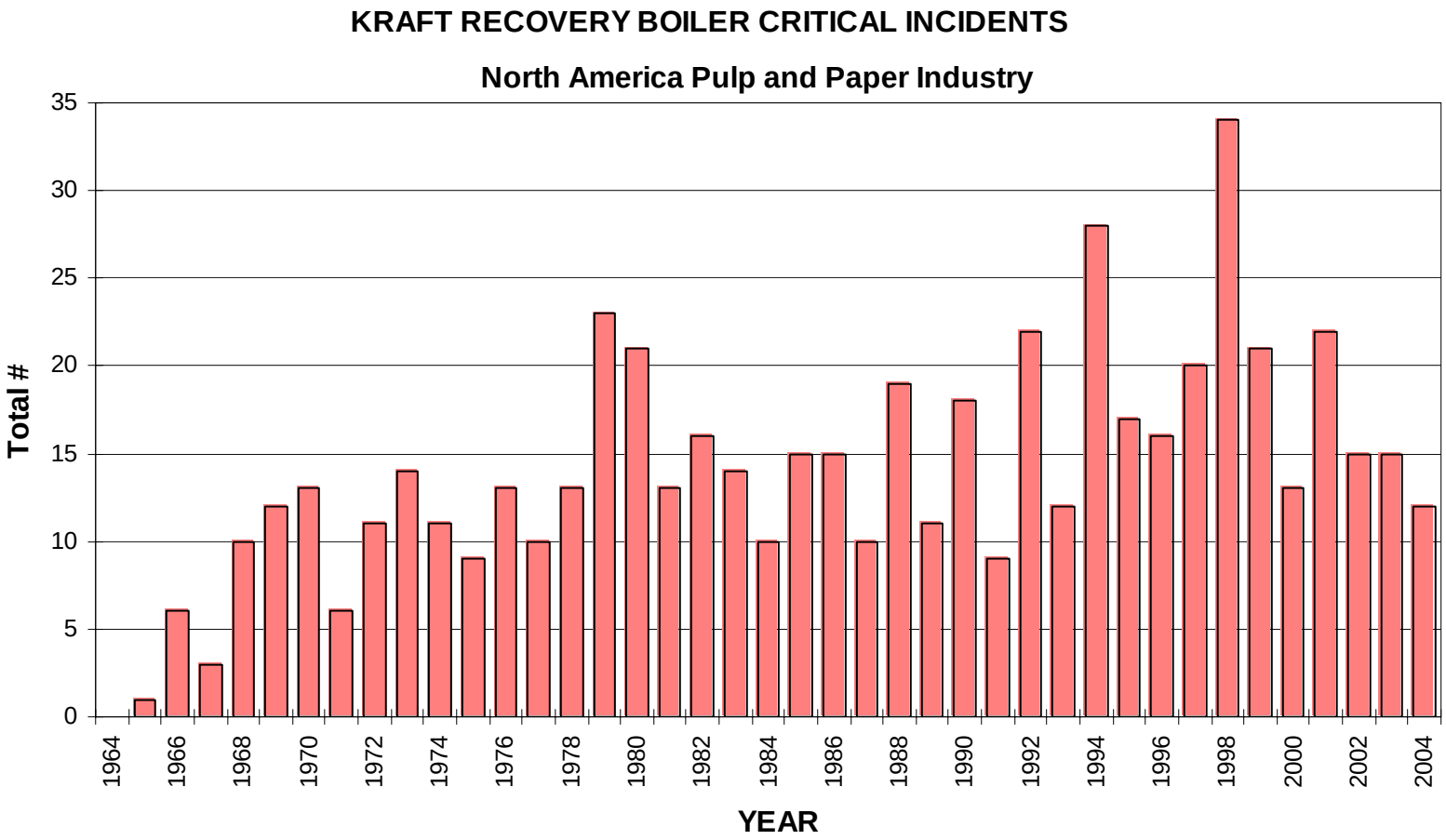

Figure 2

(Critical Incident Classification Began in 1995)

5. SUBCOMMITTEE REPORTS (Cont.)

5.1 ESP SUBCOMMITTEE REPORT (Cont.)

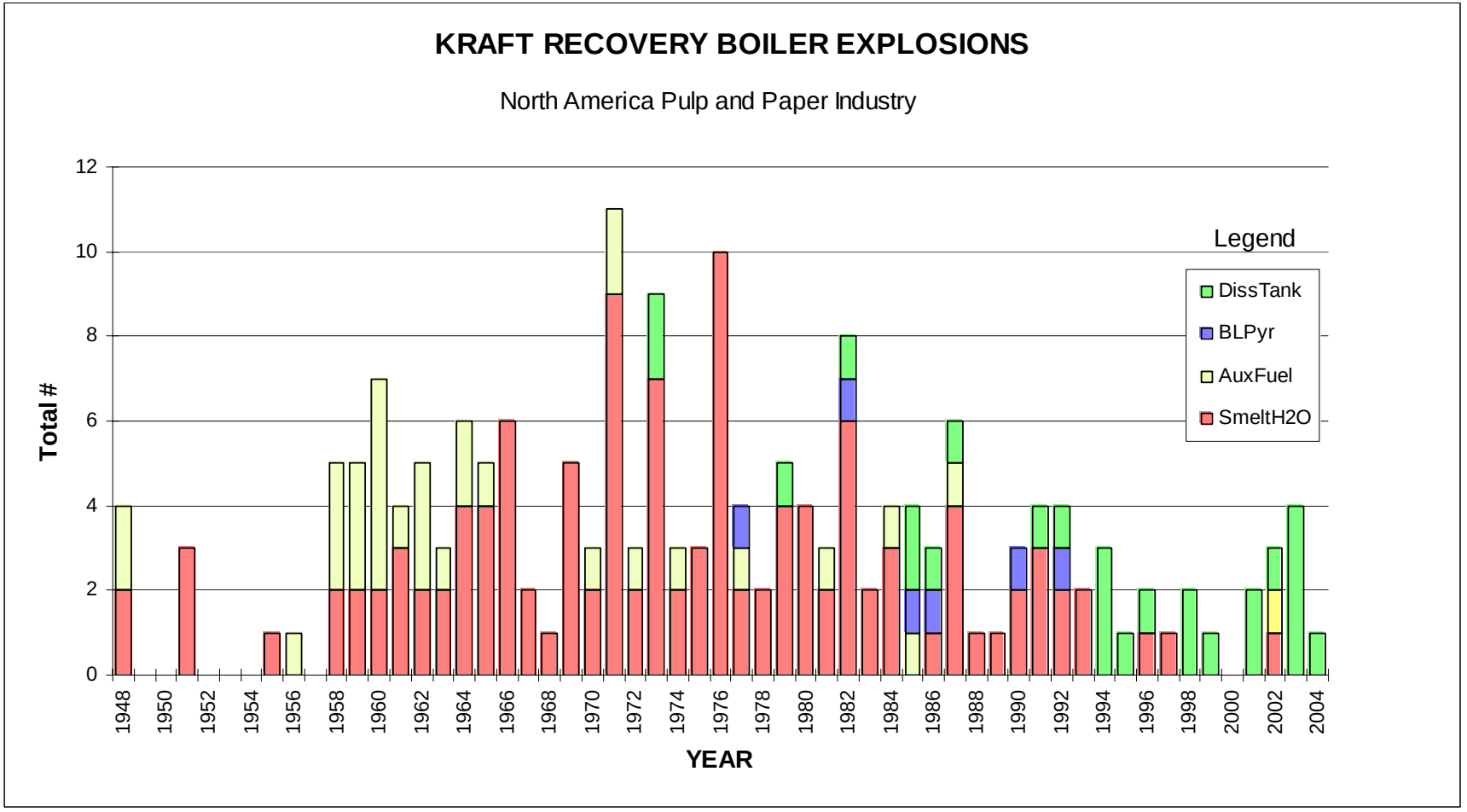

Figure 3

5. SUBCOMMITTEE REPORTS (Cont.)

5.1 ESP SUBCOMMITTEE REPORT (Cont.)

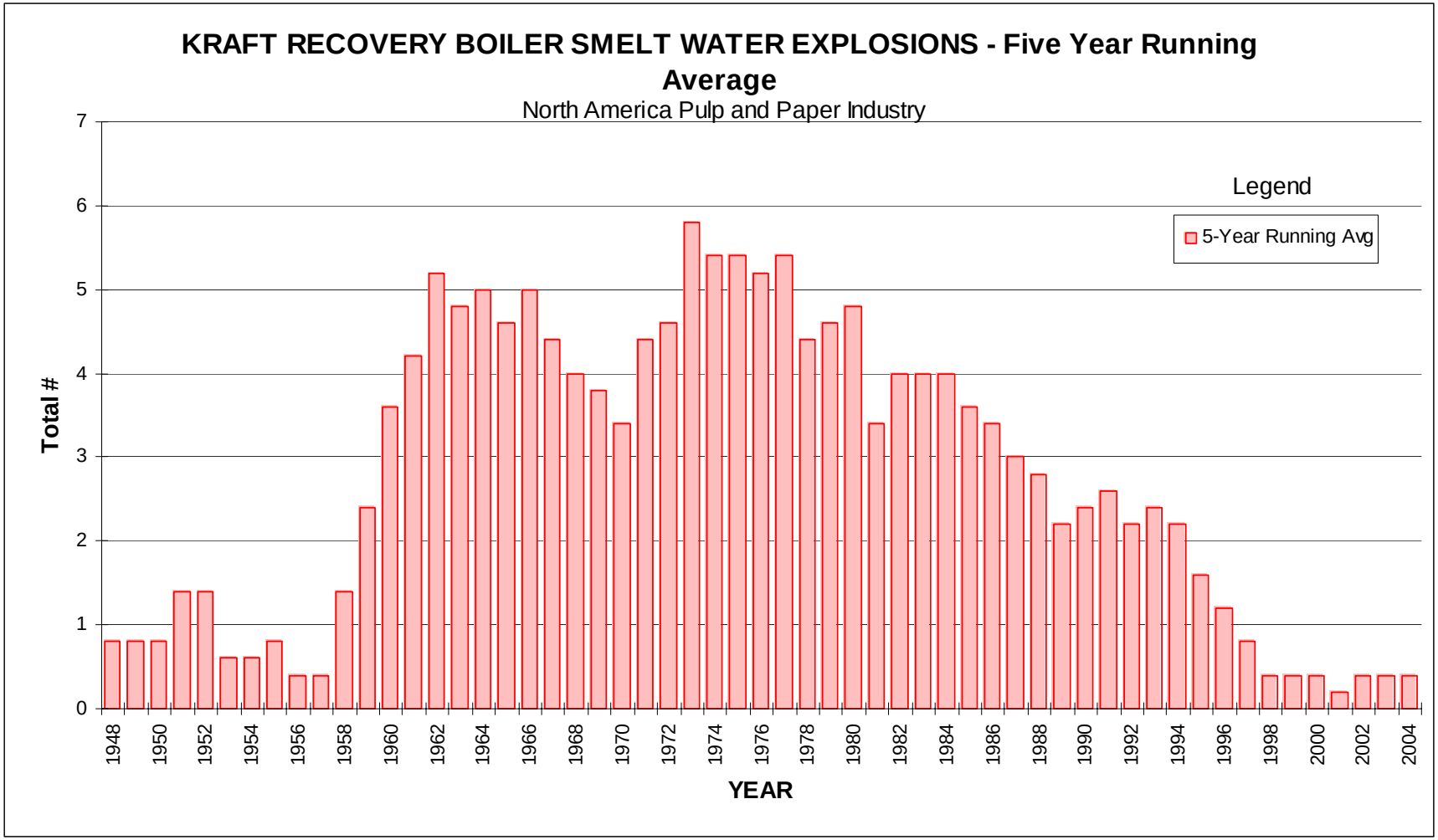

Figure 4

5. SUBCOMMITTEE REPORTS (Cont.)

5.1 ESP SUBCOMMITTEE REPORT (Cont.)

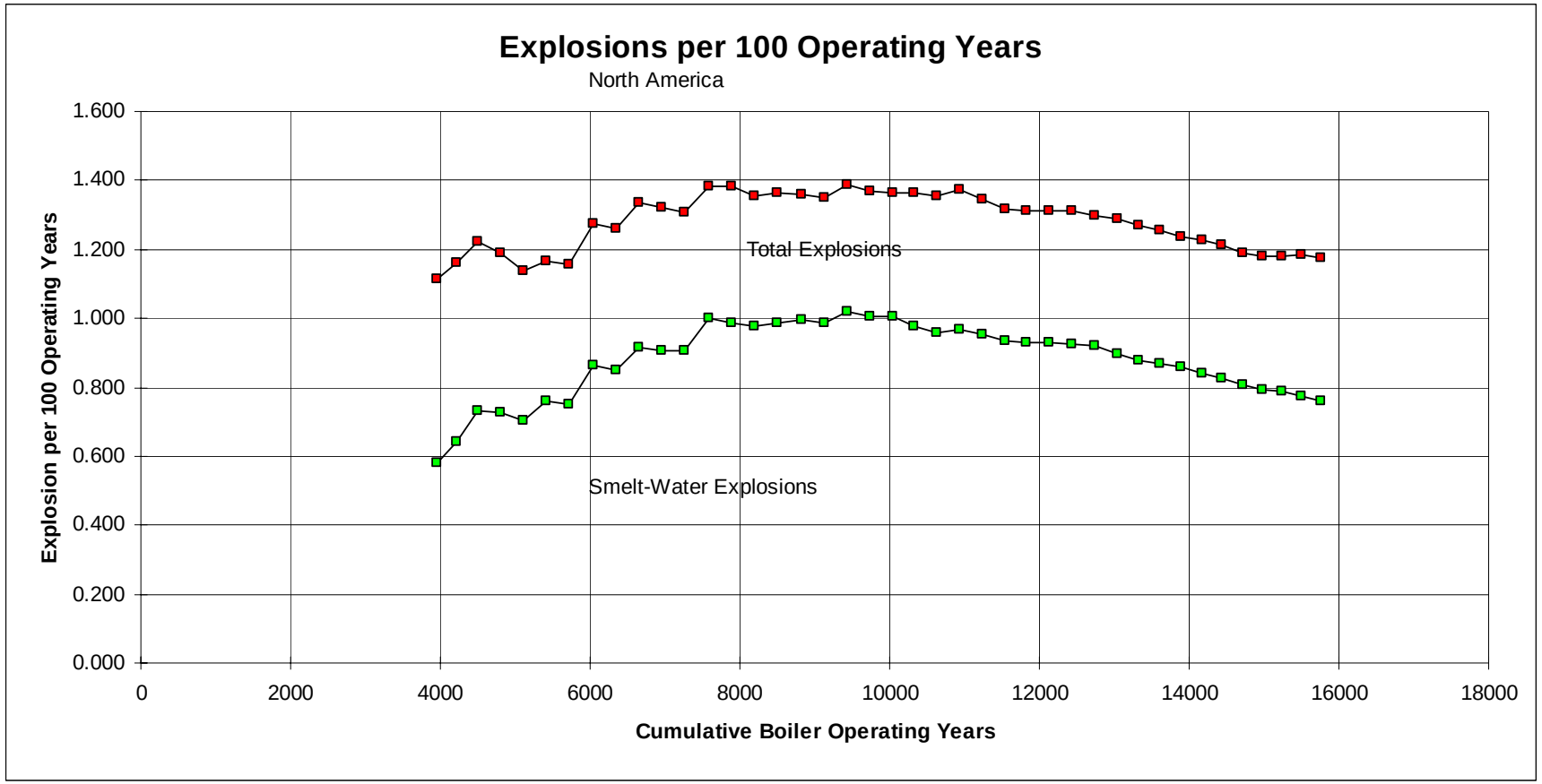

Figure 5

5. SUBCOMMITTEE REPORTS (Cont.)

5.2. INSTRUMENTATION SUBCOMMITTEE – Dave Avery

The Instrument Subcommittee met in two open sessions on Monday. Eleven members and eight guests were in attendance at the morning session. Work began with a review of current projects and their status for all members in attendance. The "Functional Testing" draft that is a revision for chapters one and three was submitted last fall to the Executive committee for posting and comments were reviewed. We discovered that the posted version on the web site for member comments was an incomplete unedited version. We have requested it be returned to subcommittee for revision.

The correct draft version was found and reviewed again for content and clarity:

Proposed changes:

"Chapter 1 page 5"

"All subsequent changes to the system should be authorized by at least the department superintendent or their designee and the documentation shall be upgraded. A hazard evaluation should be made prior to any system changes. **Functional testing should be done any time modification work has been performed."**

"Chapter 3.13 Functional Testing draft"

"Functional testing of safety instrumented systems is intended to provide the recovery boiler owners and operators with confidence that the system will operate as designed. Functional testing should be conducted within the scope and frequency outlined in the following recommended good practices: Emergency Shutdown Procedures, Safe Firing of Auxiliary Fuels, Safe Firing of Black Liquor and Thermal Oxidation of Waste Streams. Functional Logic test plans should be developed for each boiler based on the starting permissive and tripping interlock block diagrams from the recommended good practices referenced above. Functional testing should be done any time a modification or work has been performed on a safety-instrumented system that might reasonably affects its integrity. All testing should be documented and dated with detailed records maintained on file.

Functional testing should verify that the safety systems field devices, wiring, hardware and logic are in sound conditions (i.e. no jumpers, bridges or forces in place, no plugged sensing lines, no broken actuators nor stuck valves or dampers, no damaged instruments nor burnt or corroded wiring, no inadvertent undocumented and/or improper software changes, etc.)

A "complete" trip/interlock test incorporates a signal test from the sensing line (or initiating device for manual trips) through all associated circuitry and logic, and includes actuation of the final elements (valves, pumps, dampers, etc.) being interlocked. It should create or simulate, as safely as possible, the actual conditions being monitored at the sensing lines.

5. SUBCOMMITTEE REPORTS (Cont.)

5.2 INSTRUMENTATION SUBCOMMITTEE (Cont.)

Note: Provided that a complete test through a common output (e.g. MFT) is performed, a test of the remaining individual trip conditions, to just that common output, is acceptable.

While boiler start up, following a shutdown, provides the most feasible time for these tests, it is perfectly acceptable to conduct such tests throughout the year, when possible. This would be applicable for auxiliary fuel and waste stream systems and possibly others depending on operating arrangements of the unit. Any unscheduled trips occurring during boiler start-up or operation may be applied toward meeting the intent of testing for that particular trip or permissive, provided the event is properly documented and the first out system is provided verifies the source of the trip."

The editing review revealed that two new definitions were needed for inclusion in Chapter 2 Terms and Definitions of the "Instrumentation Checklist and Classification Guide". The definitions for 'Modification' and 'Functional Test' were deferred until the afternoon session.

The afternoon session had eleven members and three guests present. Work was completed for the two definitions:

Modification - "A change or alteration that results in a deviation from the original design specifications or criteria."

Functional Test - "A method of proving all elements of a system operate as designed."

A package containing the Chapters one and three addendums along with the new definitions has been submitted to the Executive Committee for review and posting for membership comments. Our goal is to have these changes ready for voting at the fall meeting. *{Secretary's note: The Executive Committee has approved the proposed changes for membership review and comment and a mark-up of the existing document showing these changes is posted on the BLRBAC Web site.}*

Additional work included a request for the "Safe Firing of Black Liquor Committee" to review their definition for 'Interlock':

(**Interlock:** A device that senses a limit or off-limit condition or an improper sequence of events. It causes shutdown of the offending or related piece of equipment, or it prevents proceeding in an improper sequence, to prevent a hazardous condition. Direct signals rather than transmitted signals shall be used wherever possible to actuate interlocks.)

We are proposing to remove the last sentence ("Direct signals rather than transmitted signals shall be used wherever possible to actuate interlocks") in that definition.

The sentence deletion would allow current reliable technology to be applied while maintaining original intent of the definition. Note: This does not reduce the number of devices required, i.e. if conditions now require a measurement and a separate interlock device then two devices are still required.

5. SUBCOMMITTEE REPORTS (Cont.)

5.2 INSTRUMENTATION SUBCOMMITTEE (Cont.)

Next fall our morning meeting will be closed to review desktop refractometers as a possible device for Off-Line Field Measurement Technique for routine checking of the continuous in-line refractometers. This is a request from the "Safe Firing of Black Liquor" Subcommittee. The subject will be reviewed with a written assessment returned to "Safe Firing of Black Liquor". The afternoon session will be open to the membership.

5.3 MATERIALS & WELDING SUBCOMMITTEE – Dan Phillips (new)

The Welding and Materials Subcommittee met in two separate sessions Monday. The morning session was a closed working session with approximately 14 members present (5 Recovery Owners, 3 Insurance Reps., and 6 Contractors/Vendors.) The afternoon meeting was an open session, with 10 additional guests. Total attendance was 24.

Meetings were opened with once-around-the-table introductions. Members reviewed which task groups they had been on, if any, and their areas of specialty and interest.

The morning session proceeded into review the current subcommittee status. With the passing of Joan Barna since the last meeting, the draft document and procedures and assignments were reviewed. An outline summary of the subcommittee morning session includes:

- Jim Dixon of Weyerhaeuser was asked to serve as Vice Chair of this committee, he accepted. Dan Phillips will serve as Chair.
- Reviewed assignments, task group participants, and contributors of guidelines to date.
- Fabian Henriques of Mead and Michael Welch of WSI will remain as editors and comment gathers. Technical review will include Max Moskal, Jim Young, and Dennis Hollenbach. Bob Sullivan, Dave Lang, and Mike Garfield will head code review.
- Collectively, the group wrote a General Forward for the Document. This will be reviewed and finalized by Jesse Worsham, Mike Welch, Dave Fuhrmann, and Dennis Hollenbach. This is to be sent to Fabian for review, editing, and subcommittee distribution.
- Established a task group for generating a "Forward" to the Welding portion of the document covering some of the common issues for many of the welding procedures guidelines. Dave Fuhrmann & Dave Lange will head up this with the help of Mike Welch, Fabian Henriques, Robert Sullivan, Jessie Worsham, and Max Moskal. This is to be sent to Fabian for review, editing, and subcommittee distribution.
- Consolidation and formatting of Section 10 "Welded Handhole Caps" by Dan Phillips and Jim Dixon, with Jim Young and Mike Garfield doing technical review. This will be the first guideline procedure submittal to the full Subcommittee at the next meeting.

5. SUBCOMMITTEE REPORTS (Cont.)

5.3 MATERIALS & WELDING SUBCOMMITTEE (Cont.)

Current status of the Draft Document:

The current 31-page draft document contains an index with 10 procedure guidelines. These have not received final approved by the subcommittee. It was agreed by the subcommittee not to submit this for Executive Committee review and approval at this time.

The goal for submittal to the Executive Committee for the upcoming October session includes:

1. Forward to Welding and Materials Document
2. General Welding Guidelines forward
3. Welded Handhole Caps Guidelines & Procedure(s).

Additional comments & general suggestions:

There were many guest and committee requests for a topic session or presentation "show and tell." Many suggested the topic period be approximately 15 minutes. This could be followed with discussion on specific welding or materials considerations. Several members also had interesting projects they would be able to summarize on rebuilds, specific repair welding, etc… This will be considered as a part of the agenda at each meeting, provided support efforts allow.

Max Moskal expressed interest in the Document Guidelines including an article on root cause analysis of failures.

Mike Welch expressed interest in continued surveys of the general membership on a regular basis with topics to be suggested.

Sage of America provided initial information on stud welding products and technical data they provide. Studded tube repairs are of obvious interest and will be included at some point as a guideline procedures section.

Robert Sullivan shared that the National Board has recently submitted a revised Section RB 5602, Black Liquor Recovery Boilers for inclusion in the next revision of the National Board Inspection (NBIC). Dave Parish has had a hand in this. The National Board is reaching out to the industries to identify unique industrial needs for Code Repair guidelines. They are trying to parallel those specific needs and solutions within the framework of the NBIC. He encourages this effort and offered continued support.

Karl Morency of Georgia Pacific attended a portion of the morning session. He offered input on the approach to writing this document and added that many times prior to making the repair, the initial consideration needs to be to decide whether to save the failed piece for analysis or repair weld it and save no sample. He also recommended that a list of references to related publications, i.e. TAPPI, AF&PA, EPRI, etc, be included at the end of the document. Both items will be considered.

5. SUBCOMMITTEE REPORTS (Cont.)

5.3 MATERIALS & WELDING SUBCOMMITTEE (Cont.)

Timetable for Submittals:

Introduction Forward – final draft	July 30, 2004
Forward to Welding "Welding General Guidelines"	August 30, 2004
Handhole Cap Consolidation	July 30, 2004
Review – comment – approval	September 15, 2004

Next Meeting:

For the next meeting, the aforementioned submittals will be made to the Executive Committee and the procedure guideline and format for a repair sections will be on the agenda. A welding related topic will be presented at the start of the open meeting, followed by general comments on the next procedure guideline draft.

It was agreed that the next several meeting will have a closed morning working session, and an open session in the afternoon, with a special topic related to one of the guideline procedures.

5.4 PERSONNEL SAFETY – Robert Zawistowski

The Personnel Safety Subcommittee met in an "open" session on Monday, April 5, 2004. There were nine members and 16 guests in attendance during the meeting.

Representation at our meeting by regular members and guests included original equipment manufacturers ALSTOM Power, Babcock & Wilcox, Diamond Power, and Kvaerner Power. Representation from insurance and insurance service companies included AXA Corporate Solutions, FM Global, and GE-GAP Services. Operating company representation included, Boise Paper, Georgia Pacific, Kimberly-Clark Nova Scotia, MeadWestvaco, Packaging Corporation of America, Rayonier, Smurfit-Stone, Teck Cominco, and Weyerhaeuser. Water treatment company representation included Buckman Laboratories International. Consultant representation included Brazilian Recovery Boiler Safety Committee and Power Specialists Associates, Inc.

We had one member change since the last meeting. Daryl Hoffman of FM Global is now serving on our subcommittee replacing Jimmy Onstead of FM Global who is now on the Executive Committee.

We had one request for information clarification since the last meeting. This inquiry was reviewed along with our responses.

5. SUBCOMMITTEE REPORTS (Cont.)

5.4 PERSONNEL SAFETY (Cont.)

The Personal Safety document was posted on the web site this past winter for membership review. Only a few comments were received between the time of the posting and spring meeting. These comments were reviewed and a final edit of the document was completed during our morning meeting. As the changes were minor, a final edited copy was submitted to the Executive Committee for review on Monday afternoon. The edits were accepted by the Executive Committee. The members took a vote Wednesday morning and the updated document was approved. It will be posted on the web shortly.

The Personal Safety document was posted on the web site this past winter for membership review. Only a few comments were received between the time of the posting and spring meeting. These comments were reviewed and a final edit of the document was completed during our morning meeting. As the changes were minor, a final edited copy was submitted to the Executive Committee for review on Monday afternoon. The edit was completed and accepted by the Executive Committee.

One committee member briefly discussed a boiler explosion that occurred recently. The boiler explosion was a recovery boiler that had been converted to a power boiler. The explosion was natural gas related. The root cause of the explosion is under investigation and very little information was available at this time. More information should be available by the fall meeting and this topic will be discussed in greater detail at that time.

In the Executive Committee meeting Monday afternoon we learned of an incident where a man was seriously burned by hot black liquor when disconnecting a hose from a ring header. Only one valve was closed and pressure had not been bled off the line. There was an incomplete transfer of information to the treatment facility (hospital), which resulted in improper treatment for a chemical burn. The resulting injury was more serious than if it had been treated differently at the hospital by neutralizing the chemical. This incident will be discussed in greater detail during the fall subcommittee meeting.

We received information that BLRBAC guidelines do not comment on normal water wash guidelines during the October 2003 meeting. The committee agreed that this was an important function that can have a direct impact on personnel safety at that time. As we were finalizing the updated draft of the Personnel Safety document during the spring 2004 session, I tabled this item until the Fall 2004 meeting.

During our meeting we discussed that it takes a significant amount of time for a bed to cool before molten smelt has solidified and there are many variables that affect the cooling process. There was discussion that there should be consideration given to clearing the building of personnel before water is first introduced into the furnace. This will be discussed further in our subcommittee meeting during the fall.

5. SUBCOMMITTEE REPORTS (Cont.)

5.4 PERSONNEL SAFETY (Cont.)

We have noted that there are a growing percentage of non-users on our subcommittee. Personnel Safety receives some of its best input from operating people in the development of our guidelines. We would like to encourage more users of recovery boilers to become involved in this and other subcommittees.

CHAIRMAN: As he noted, the subcommittee has rewritten the document and it has been posted on the WEB site. They made a few minor wording changes to it. The Executive Committee reviewed the changes and did not feel those were substantial. So what we would like to do is to put that document to a vote, but first does anyone have any comments on the document as posted? Could I have a motion to put the document to a vote by the members? Second? Okay. Thank you. All the members in favor of approving the Revised Personnel Safety Guidelines please raise your hand. Okay. Those opposed? The Motion is approved. We will post the new document on the WEB site for your use. *{Secretary's note: The new document has been posted.}*

Next we will have a report from Craig Cooke on Press Release & Publicity Subcommittee. He is the sole member of that committee.

5.5 PRESS RELEASE & PUBLICITY SUBCOMMITTEE REPORT – Craig Cooke

Yes, my committee met late into the night last evening. I'm responsible for providing news releases to ten trade magazines and newsletters. The most important issue is getting them to publicize future meeting dates. Most recently I was successful in getting BLRBAC on the TAPPI Calendar of Events. On the TAPPI WEB site there is a nice summary of BLRBAC as an organization, the latest meeting and information on how to register.

5.6 SAFE FIRING OF AUXILIARY FUEL REPORT – Dave Streit

The Auxiliary Fuel Subcommittee met in open session on Monday afternoon in the Valentino room. There were three members/alternates and six guests present at the meeting.

There was no meeting conducted during Fall 2003, therefore no agenda items carried over from the previous meeting.

One agenda item was listed for this meeting. This related to when the electrostatic precipitator should be energized when starting-up a cold recovery boiler using oil burners.

There was significant discussion regarding the subject from all present. Two of the guests present represented environmental equipment suppliers and had a number of comments regarding the risks involved in energizing the precipitators during cold start-up based on their unique knowledge and experience of precipitators.

5. SUBCOMMITTEE REPORTS (Cont.)

5.6 SAFE FIRING OF AUXILIARY FUEL REPORT (Cont.)

It is believed there is little risk of an explosion due to energizing the precipitator, as the amount of excess air from the 30% MCR minimum air flow requirement and the low firing rate during start-up would result in a very lean fuel concentration, even with relatively poor combustion, and would be below the lower explosive limit (LEL).

There is the possibility for high LOI/carbon ash being collected on the plates that could be a fire hazard, but most thought the risk to be low.

The manufacturers do not recommend the units to be energized during start-up, but recognize most do energize their units. It was stated that at one location, energizing the recovery boiler precipitator is an environmental permit requirement prior to firing the unit, and is included in the start-up permissives.

The performance of the precipitators will be negatively affected if a coat of soot residue is collected on the plates. This may result in higher than normal opacity when firing liquor. The plate area will clean itself over time, but this may require up to a week. It was suggested that during start-up only a limited number of fields be energized to limit this potential.

From a safety perspective, it was suggested that the power control to the fields be placed in manual vs. automatic, and the power level be limited to reduce the risk/amount of sparking. This would reduce the potential for a fire.

It was stated that there are many electrostatic precipitators successfully in use on oil fired utility boilers. These units are much larger the recovery boiler units for the same firing rate, and are not risk free. There are occasional issues, but issues are not the norm.

It was stated there is no loss history for recovery boiler precipitators due to fire or explosion caused by oil firing.

It was the opinion of the members and guest present that the risk of fire and/or explosion due to energizing precipitators during cold start-up of recovery boilers is not significant risk and does not need to be addressed in the auxiliary fuel document. Each plant should evaluate its own risk relative to environmental requirements and decide how to operate their unit.

5.7 SAFE FIRING OF BLACK LIQUOR REPORT – Len Erickson

On Monday, April 5th, a closed morning meeting was held with eight of eleven members present. An additional 35 guests attended the open afternoon meeting. The following items were discussed and acted on during the sessions:

5. SUBCOMMITTEE REPORTS (Cont.)

5.7 SAFE FIRING OF BLACK LIQUOR REPORT (Cont.)

a) The Fall 2003 minutes were reviewed and approved.

b) A proposed change to Chapter 6 that would allow the use of a bench top refractometer for field solids determination was reviewed. The Safe Firing Subcommittee is concerned that "similar physical principles" would be used to verify an online measurement. The proposed language was reviewed and is being forwarded to the Instrumentation Subcommittee for further evaluation and comment.

- Note: this change would allow the use of a bench top refractometer as an acceptable method in addition to a solids cook and microwave test.

c) Logic had been proposed to add the black liquor pumps and steam sources as items that also trip in addition to closing the black liquor header valve and opening the divert valve in SFBL Figure 4 "Black Liquor Tripping Logic". The subcommittee reviewed the proposed logic change and decided to include it in the revision being worked on for a lower furnace wash switch rather than submitting as a separate item for membership vote.

- Note, the revised Figure 4 had been previously approved by the subcommittee and submitted to the Executive Committee. It was out for membership review. No comments had been received from the membership.

d) The Revision to SFBL providing for the use of a keyed interlock switch for water washing the lower furnace has been combined with a review of the SFBL starting & tripping logic diagrams, (Figures 2 & 4). A new figure 2A will be added. Figure 2A will be titled "Black Liquor header Wash and Lower Furnace Wash Permissives". Figure 2A includes both the ring header wash and the lower furnace wash logic.

The proposed revision will also include:

- A revision to Fig 2 showing the opening of the black liquor header valve and closing of the divert valve to be an operator initiated action. This is stated in the document, however it has not been shown as such in the logic.

- A requirement for an automatic closing valve in the recirculation line to "***pressurized storage tanks***". This is to prevent systems with pressurized storage tanks from back feeding the ring header in the case of a divert.

- The inclusion of a requirement for a dissolving tank level and smelt spout cooling water flow permissive.

- The addition of a definition of the lower furnace wash switch

5. SUBCOMMITTEE REPORTS (Cont.)
5.7 SAFE FIRING OF BLACK LIQUOR REPORT (Cont.)

d) Cont.

- The removal of a sentence from chapter two, *"Direct signals rather than transmitted signals shall be used wherever possible to actuate interlocks"*. This is at the request of the Instrumentation Subcommittee to make the documents consistent.

(Secretary's Note: A mark-up of the March 2004 version of the document showing the above proposed changes has been reviewed by the Executive Committee and has been approved for membership review and comment. It is posted on the BLRBAC Web site.}

e) Since the Fall 2003 meeting, the SFBL Subcommittee was advised that several errors had been found in the on-line version of SFBL. The document revisions were checked, corrected, proofed & has been reposted on the BLRBAC web page. The Document on the web page that has a date of "March 2004" is the correct current version. Previous versions are incorrect & should be discarded.

f) No requests for clarifications were received since the Fall 2003 meetings.

g) The subcommittee received a report of an operator injury that resulted from a failed Ball-valve stem. (Twisted). The membership is encouraged to review their SOP's to ensure the ring header isolation valve and the liquor gun valves are closed and the drain valve and pressure gauge valves are open. The intent of this design is to ensure all pressure is relieved from the liquor gun assembly.

h) The subcommittee is looking for an E&I person to add to the subcommittee membership. Please contact Len Erickson or Mark Sargent.

i) In light of the increase in dissolving tank explosions being reported, operating locations are encouraged to review Chapters 9 & 10 of Safe Firing of Black Liquor. These sections were recently updated. Had the recommendations in Chapters 9 & 10 been followed, some of the dissolving tank incidents may have been prevented.

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

5. SUBCOMMITTEE REPORTS (Cont.)

CHAIRMAN: As Len noted, they are reviewing and will be proposing again some changes to the safety logic and I know most of you, hopefully all of you, have safety systems set up based on BLRBAC logic. Just be aware that we are making some proposed changes that will hopefully cause you to change your logic. We encourage you to look at those. If you feel we shouldn't be doing this, now would be the time to get your thoughts to Len and his subcommittee. One of the changes being posted includes tripping the black liquor firing pumps as part of a black liquor trip. I got some verbal feedback on why would we want to do that. Again, the Subcommittee had been reviewing this and they believe there are safety reasons to consider this. If you have input otherwise, I encourage you to provide it to Len and the subcommittee.
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5.8 FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS REPORT – Chris Jackson

The Subcommittee held an open session Monday morning with three members and ten guests present.

Currently there are eight active members of the subcommittee. This spring we welcomed a new member, Nick Merriman, of SAPPI's Tugela mill in South Africa. He is one of only four who represent the owners and users. It is a concern of the subcommittee that we do not have more representation by the owners and users of the equipment we are writing guidelines for.

If you own and operate Cyclone or Cascade Evaporators, we would ask that you consider participating as a member of our committee. I have had people come up and say, I won't be attending regularly, but someone from our mill will be. I would suggest that you consider designating a permanent member, and an alternate. The member's designee will be more than welcome to sit and deliberate with the subcommittee.

Last October we proposed a change to the guideline that allows more latitude in the design of steam suppression systems. That change has been posted on the web for comments and is now ready for vote by the membership. We will get to that right after this report.

Since October, we have received reports of two fires, both in Cascade Evaporators. Craig Cooke and I will each present one of these reports to you. Even if you do not have any responsibility for a Direct Contact Evaporator, I hope you will still find these incidents interesting.

2004-APRIL-DCE Incident 01

On December 4th, 2003 International Paper's Roanoke Rapids mill was preparing to restart the No. 6 Recovery boiler after an outage. This boiler has two Cascade Evaporators with liquor flow in series and flue gas flow in parallel. They had been washed during the outage.

The length and scope of the outage was not reported. The boiler was lit-off on No. 6 oil at 11 PM on the 4th. Sometime thereafter, a paper machine line shaft broke and the decision was made at 1 PM on December 5th to shut down the boiler.

5. SUBCOMMITTEE REPORTS (Cont.)

5.8 FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS REPORT (Cont.)

The boiler was re-lit on oil at 4:40 PM on December 6th, and ran for four hours and twenty minutes before a High Temperature trip. The trip took down the boiler and activated the automatic steam suppression system. The operators manually closed the dampers at the inlet and the outlet of the precipitator. They also flooded the Cascades with water and the precipitators with dilute black liquor. Fire damage was confined to the upper part of the Cascades and the inlet to the precipitator.

It was reported that no liquor had been put into the Cascades since the time that they had been washed during the outage. They only lost 17 hours and 40 minutes due to the need to replace expansion joint material. No other damage was reported.

The response of the automated suppression system and perhaps the low volume of combustibles kept the damage to a minimum.

2004-APRIL-DCE Incident 02

The No. 2 Recovery Boiler at Stora Enso's Wisconsin Rapids Pulp Mill was built in 1976 with a single Cascade Evaporator equipped with an automatic steam suppression system. The ID fan is located between the Cascade and the Precipitator.

On June 22nd, 2002 the mill was going into an outage. The No. 2 Recovery Boiler was under load burning black liquor when a power outage tripped off the entire mill. All instrumentation and control of the recovery unit was lost as there was no electricity or steam. All fuels tripped and the Cascade wheel stopped turning. Thirty minutes later someone noticed black smoke coming from the recovery boiler stack and alerted the control room.

Immediately the operators covered the FD fan inlets and closed the precipitator dampers. Mill personnel used small hose streams to fight the fire and received backup from the local Fire Department. A hole was opened in the side of the Cascade near where the fire was presumed to be most intense. It required one and a half hours to extinguish the fire.

A hot smelt bed and a natural draft dried out the Cascade wheel and unwashed casing. The fire appeared to have originated at the outlet of the cascade, adjacent to the right wall above the rear shelf. The fire intensified and appeared to spread up the duct, igniting liquor deposits on the duct walls and at the ID fan. Liquor deposits downstream of the ID fan were reported to be minimal, but indications were that severe overheat was experienced between the ID fan discharge and the precipitator inlet dampers.

The power outage hamstrung the steam suppressions system. Without any source of steam, manual fire fighting was the only option.

5. SUBCOMMITTEE REPORTS (Cont.)

5.8 FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS REPORT (Cont.)

The need for reliable suppression media or back up water supplies that are expected to be available under all plant conditions was reinforced by these incidents. These incidents were reviewed by the subcommittee and it was determined that the current document addressed the root causes of both these fires.

INCIDENT QUESTIONNAIRE

At the last meeting Craig Cooke was asked to lead a Task Group to redesign the incident reporting form. Presently, this form is the last nine pages of the guideline and is not a separate document. The goal is to make information about incidents as easy as possible to report to the membership. This includes:

- Shortening the form.
- Making it a discrete document that will be posted in the same way the ESP Incident form is posted on the BLRBAC Web site.
- Making it more intuitive to complete.

Craig brought a three-page version of the new questionnaire to the subcommittee that was reviewed and additional changes were discussed. This document will be sent to the subcommittee members not present during this meeting and it is expected that we will submit it to the Executive Committee in October for review and consideration. *{Secretary's note: The incident questionnaire will not need Executive Committee review and can be posted when ready by mailing to the Secretary.}*

That constitutes the work done by the subcommittee this meeting. With a new document, and reports of incidents starting to come in, the subcommittee expects to have its hands full in the months ahead. Just today I heard an anecdotal report about a Cyclone fire. I look forward to documenting that incident and discussing it at the next meeting. We encourage owners and users of Direct Contact Evaporators to let us know of any other incidents involving their DCE fire protection systems and to send us their questions and concerns. Thank you for your attention. Before we vote on the proposed change, are there any questions?

5. SUBCOMMITTEE REPORTS (Cont.)

5.8 FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS REPORT (Cont.)

PROPOSED CHANGE

The subcommittee reviewed and discussed the installation of steam nozzles as part of an automatic steam suppression system, and decided upon the following revision to the Fire Protection for DCE document:

Proposed Wording Change to Section 4.2.2 Steam, Fourth Bullet:

Delete **"Provide one nozzle for every 10-ft. length of enclosure or duct."**

Insert **"Steam nozzles should be sized and positioned in order to assure proper distribution of steam throughout the volume to be protected."**

This change was reviewed by the Executive Committee, and posted for review last October. No comments were sent to the Subcommittee Chair, and the change is offered to the membership for vote.

CHAIRMAN: Chris, can you briefly review again what we are going to be voting on.

CHRIS: Yes. Our document was taken by SAPPI Fine Paper as a guide to revamp their own steam suppression system at a mill and they came across this requirement to provide one nozzle of steam dispersion for every ten feet length of duct and because of the long ductwork they had, this was going to put a real burden on them. They came back to the Subcommittee and asked us if this was truly a value added effort. After review, we decided that this was too restrictive. So currently the words say in Section 4.2.2, "Provide one nozzle for every 10-ft. length of enclosure or duct." We propose that we remove that and insert instead, "Steam nozzles should be sized and positioned in order to assure proper distribution of steam throughout the volume to be protected."

CHAIRMAN: Thank you. Could I have a motion to vote on the changed wording? Thank you. Second? All those in favor please raise your hand. Opposed? Thank you. The change has been approved.

{Secretary's note: The revised document is posted on the BLRBAC Web site with an April 2004 revision date.}

5. SUBCOMMITTEE REPORTS (Cont.)

5.9 WASTE STREAMS REPORT – John Lewis -- Co-Chairman for John Rickard

The Waste Streams Subcommittee met in closed session Monday morning, April 5, with 12 members present and in open session Monday afternoon with 12 members and 11 guests present. One new member joined our subcommittee on Monday—Jerry Pate of Smurfit-Stone.

In our closed meeting on Monday morning we worked on finalizing Chapter 6 of our "Recommended Good Practice for the Thermal Oxidation of Waste Streams in a Black Liquor Recovery Boilers." Chapter 6 addresses liquid waste streams blended into black liquor. The subcommittee gave its final input to the document including adding logic diagrams for the blending of methanol, soap, tall oil and spent acid with black liquor after the point of final concentration. Chapter 6 will be submitted to the executive committee within the next couple of weeks and with their approval will be submitted to the BLRBAC membership for comments. *{Secretary's note: The Executive Committee did not approve this proposal for review and comment by the membership. Executive Committee comments will be forwarded to the subcommittee for their consideration.}*

In our open meeting on Monday afternoon we began work on Chapter 7, which will address thermal oxidation of liquid waste streams in dedicated burners in recovery boilers. Two of our members, Olli Kujanpaa and Bentley Sherlock, had done some preliminary work for this chapter and this was reviewed. A table of contents for the chapter was developed, and several members will be working on the different sections in the coming months. They will submit their sections to our subcommittee chairman John Rickard by August 15, and he will compile the sections to be reviewed at the October meeting. The meeting on Monday afternoon had almost as many guests as members present, and the input of our guests was very helpful and appreciated.

6. AMERICAN FOREST & PAPER ASSOCIATION REPORT – Tom Grant

The AF&PA Recovery Boiler Program is continuing in its efforts to produce greater awareness of safe practices and improvement in the operation, maintenance, safety and efficiency of recovery boilers.

Membership

Currently, we have 28 companies in the Program including three non-AF&PA member companies. 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.

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

Operational Safety Seminars

In 2002 we had the lowest attendance at the Operational Safety Seminars. In 2003 we almost reached a record high of 148 operators for the three seminars held. Was that due to the two explosions that occurred in 2002? The Risk Management presenter at the Annual Conference pointed out the need for the continued attention to training and cited the seminars as a very good tool. In 2004 we had 44 people at the March 23 - 24th seminar in Atlanta. We had 44 people at the Portland OR seminar March 29 - 30th. We have one seminar remaining for the year, that is May 25 - 26th here in Atlanta. As of today, 55 registrations have been received which leaves us with about 11 spots open.

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.

Training Program

The Organization and Training Subcommittee is reviewing the uses of the AF&PA Recovery Boiler Training Program. At its February meeting, proposals were reviewed from two vendors to consider converting the AF&PA Training Program to use for computer-based training (CBT). The Subcommittee will decide whether to go forward on this.

Recovery Boiler Char Bed Cooling following an ESP

The final report on the **Recovery Boiler Char Bed Cooling following an ESP** project was completed and copies were distributed to Program members.

Damage Mechanism

The "**Damage Mechanism"** project sponsored by the R&D Subcommittee through the Pressure Vessel Research Council (PVRC) of the Welding Research Council (WRC) to create a document on damage mechanisms for fitness-for-service has been finalized. This document defines and describes various damage mechanisms for API-579. We have been informed that copies of the report will soon be published and distributed to the Program members. (We have been waiting for this completion date for a while.)

Overheat Floor Tube Failures

The R&D Subcommittee is evaluating the need for further research into the **Overheat Floor Tube Failures in Chemical Recovery Boilers**. You may recall that the study to investigate the experiences into the failures was completed earlier this year. Work had been done in this area by various sources, but had not been published. The Subcommittee has been encouraging the publication of those studies to further the project.

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

Non-Destructive Technologies for Detecting Waterside Deposits

Phase 1 of the study to identify potential **non-destructive technologies for detecting waterside deposits in recovery boiler furnace wall tubes**, sponsored by the R&D Subcommittee, was completed and distributed to the Program members. Mr. Evans of International Paper and Mr. Clark of BWXT presented this report at the Annual Conference. The Subcommittee is reviewing the recommendations to investigate 9 technologies in Phase II of the study and will work with EPRI and/or a consortium to move forward. Plans are to possibly have a vendor in the project to take it to commercialization. The AF&PA Advisory Group of members, vendors and manufacturers will oversee this project.

Chemical Cleaning

The survey conducted by AF&PA of the members concerning decisions as to the timing of chemical cleaning was discussed in the study of the "Non-Destructive Technologies for Detecting Water-Side Deposits in Recovery Boiler Furnace Wall Tubes." This information will be reviewed further.

Joint Seminar with AF&PA and BLRBAC Planned

We are in the planning stages for a joint seminar for AF&PA and BLRBAC for water treatment. It is scheduled following the Spring 2004 meeting of BLRBAC. Mr. Conley of Bowater is heading up the Task Group for the seminar. Details will be distributed when we have more information.

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 with funding from DOE including gasification.

Study for Review Analysis of Economizer Tube Failures

With the increased number of economizer tuber leaks reported, AF&PA decided to sponsor a study of these. The R&D Subcommittee is reviewing a proposal from Jack Clement and Tom Grace to study this situation. The BLRBAC reports of these failures may not be complete enough to indicate the reasons for the economizer leaks. They will try to best qualify the major causes of these leaks, i.e., design, expansion, etc. The investigators are requested to point out ways to locate the root causes of the leaks. The investigators may need to visit some mills and manufacturers to obtain detail information. We ask for cooperation from our members to help them in the study. We anticipate that the study will be underway shortly and will take about a year to complete. All funding for this study will be from AF&PA.

7. AMERICAN FOREST & PAPER ASSOCIATION REPORT (Cont.)

Other Research Projects Under Review

The Committee is also reviewing a proposal to study "High Temperature Protective Coatings to Simplify Inspection of Wall Tubes in Chemical Recovery Boilers." The Committee is looking at various sources to avoid overlap and/or possible additional funding.

The Committee is also considering the possible study on smelt spouts and testing of ribbed tubes. We hope to have further information on these studies later this year.

Annual Meetings and Conference

AF&PA's annual Recovery Boiler meetings and Conference was held February 3rd and 4th in Atlanta. The Conference is open to all operating companies, insurers and manufacturers. Presentations included reports on the projects currently sponsored by the AF&PA Recovery Boiler Program and subcommittee reports on their accomplishments. The object of the Conference is to keep not only the members advised, but also the remainder of the recovery boiler community, as well. We had good attendance and we hope that many of you will plan to attend next year's Conference.

CHAIRMAN: As Tom noted, almost all of us from the operating companies, are supporting the AF&PA effort on recovery boilers, so we are spending your money. It is funded by a system of dues based on production. If your company is a supporting member, all the information Tom has referred to, the reports published, etc. is going to someone in your company. So, if you can't find it and you think you need it, see Tom. He can tell you who in your company might actually be receiving the material. If you wish to participate on any of our subcommittees in AF&PA, you are certainly welcome to attend and participate.

7. TAPPI RECOVERY BOILER SUBCOMMITTEE REPORT – Karl Morency

No report given.

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

As with most organizations, the National Board has been quite busy in the past few months. A driving force is communications with all whom we serve and, to reach as many with as much information as possible. This, of course, reeks of the Internet. Hopefully, you have been served by our attempt to increase information availability. I'm told the National Board is in the top 10% of the most visited web site worldwide. We thank you.

I had mentioned last October that we were developing another web-based training course. An informational course on "Controls and Safety Devices for Automatically Fire Boilers" (CSD-1) has been completed and is now available on our web site. CSD-1 is an ASME standard for boiler input of less than 12,500,000 Btu/hr. Registration can be made on-line by opening the National Board web site, clicking on "Register for CSD-1" in the gold block to the right and completing the requested information. By the way, we have a big sale on this course until the end of May!

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

A new edition of the "Rules and Recommendations for the Design and Construction of Boiler Blowoff Systems" will be published by July 2004. The new edition will provide the blowoff system designer more detailed information, such as expanded tables for various pipe size flows and formulas. This should prove to be clearer and easier to use. The work is being reviewed and final touches made. I expect the title will be simplified.

The next meeting is scheduled for August 17-19, 2004 in Milwaukee, Wisconsin, at the Wyndham Milwaukee Center. Subcommittee meetings will be held the 17th and 18th followed by the NBIC Committee on August 19th. Details of the meeting location and hotel will be on the National Board web site.

NBIC Committee Action

The following items, which I feel are of the most interest to BLRBAC members, were approved by the NBIC Committee at their January 15, 2004 meeting. All changes will be published on the National Board web site by May 1, 2004 for comments. The final approved addendum will be published in December 2004.

- As mentioned in October 2003, the inspection section of NBIC included a proposal to rewrite the paragraph on Recovery Boilers. RB-5062 has been revised. It addresses inspection of Black Liquor Recovery Boilers. References to inspection procedures of American Forest & Paper Association Reference Manual, BLRBAC Recommended Practices, and TAPPI Guidelines have been added. The NBIC Committee thanks those who submitted comments.

- Revision of RB-1030 – Stamping - Provides a reasonable method for authorization to restamp or replace damaged or illegible information on the Code stamped nameplate. This separates the data contained in the stamping from the Code symbol stamp. I have copies of these changes.

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

Interpretations
The following interpretations are those I felt have the most interest to BLRBAC members. All interpretations have been published or are listed on the National Board web site under “NBIC”.

Interpretation 01-30

Subject:

RC-1050(c)

Fabrication and Installation by “R” Stamp Holder

2001 Edition with 2002 Addendum

Question 1:

When ASME is the original code of construction, does RC-1050(c) permit an owner holding an "R" Stamp to fabricate replacement parts and have the parts installed in the owner’s boiler by another “R” Stamp holder?

Reply 1:

No. RC-1050(c) requires these replacement parts to be fabricated by an ASME Certificate Holder.

Question 2:

When ASME is the original code of construction, does RC-1050(c) permit an owner holding an “R” stamp to fabricate replacements parts and document those parts by stamping with the owner’s “R” symbol, a unique serial number, and complete a Form R-3?

Reply 2:

No. RC-1050(c) requires replacement parts to be documented on an ASME Manufacturer’s Partial Data Report by an ASME Certificate Holder.

Interpretation 01-32

Subject:

Introduction

2001 Edition with 2002 Addendum

Question:

Does reference of a code or standard in the Introduction to the National Board Inspection Code (NBIC) imply it is always acceptable for use?

Reply:

No. The jurisdiction retains the responsibility to decide which codes or standards to adopt for use.

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

Interpretation 01-36

Subject:

RC-1020(b)

Requirement to know code of construction prior to repair

2001 Edition with 2002 Addendum

Question:

In order to apply the "R" stamp to a vessel that was repaired or altered, must that vessel first be constructed in accordance with the ASME code or some other recognized code or standard?

Reply:

No.

9. WESTERN CANADA BLRBAC REPORT – Bob Norton

The fall meeting was held in Vancouver on November 5, 2003. There were 30 people in attendance for the meeting. This was the 40th anniversary of the WCBLRBAC committee. Four incidents were reviewed,

September 10/03
Floor tube adjacent to #12 sidewall tube in RH rear corner. The boiler was ESP'd.
The operator inspecting port rodder operation noticed unusual burning condition in the area
Root cause; the leak was on the crown of the floor tube adjacent to the right rear sidewall. It appears to have been initiated by an impact-chipping hammer. The sidewall seal (scallop bar) was replaced 2 years prior and chipping hammers had been used at times to remove the smelt bed in this area.

May 26,2003
Tube 17 row 3 above the lower header left hand side rear economizer.
Water was observed in the ash hopper conveyor. The boiler operator did not perform an ESP.
Root cause: 1/16" pinhole at butt-weld approximately 24' above the bottom header. This was replaced by a 26" pup.

September 17,2003
Leak at top of the bull nose. A pinhole leak had wash two adjacent tubes creating a leak in both of them. The boiler was not ESP'd.
The operator making a round noticed water and steam leaking from the casing. The boiler was on fossil fuel at the time of the incident.
Root Cause: Weld on seal block behind the baffle had cracked. Leak developed and washed out baffle plate and two adjacent tubes and seal blocks. Three pinhole leaks as well as wash of one lower superheater bend.

9. WESTERN CANADA BLRBAC REPORT (Cont.)

October 22, 2003
Economizer handhole crack
Leak noticed on an operator walk down of the boiler.
Handhole was ground out and replaced.

Technical Papers presented

- Aker Kvaerner, Electric Port Rodders.
  - No external moving parts, providing a safe work environment
  - Operation costs are low compared to pneumatic port rodders.
- Alstom,
  - Enhancing boiler floor tube protection with smelt guard tiles
  - Igniters
  - Nozzles
- Andritz, Envirocare
  - Scrubber upgrades for a dissolving tank
- Babcock and Wilcox, Air system upgrades
  - Comparing air systems in today's industry

The spring meeting was held in Duncan, B.C. on April 6 and 7, 2004.

10. ACTIVITIES OUTSIDE NORTH AMERICA REPORTS

10.1 REPORT FROM BRAZIL – Guido Schreiber
(See **Appendix B** – PowerPoint Slide Presentation)

11. OPERATING PROBLEMS SESSION REPORT – Karl Morency

a) Energizing Electrostatic Precipitator during start-up and shutdown when burning oil for auxiliary fuel. Many mills energize the precipitator before firing the oil burners. Washington State requires energization before the fans are started. Energizing the precipitator eliminates opacity excursions during start-up/shut-down and normally does not affect collection efficiency when firing liquor. This may not work as well on older precipitators. The concern with doing this is the potential for fire and the potential for loss of collection efficiency when firing black liquor because of oil soot coating the electrodes. An alternative procedure to minimize the potential for oil soot reducing collection efficiency is to only energize one or two fields when firing auxiliary fuel. To reduce the potential for having a fire, the energization level can be reduced to prevent arcing. There were no reports of any significant problems with energizing the precipitator to control opacity when firing auxiliary oil burners.

b) If not all precipitator fields are energized, which ones should be used?: One mill advised that they used the outlet field(s). Another mill preheats the oil to 170 F to reduce incomplete combustion and soot information; then sequentially brings up six of 12 fields that are operated at reduced voltage.

11. OPERATING PROBLEMS SESSION REPORT (Cont.)

c) Black Liquor burn/chemical hazard: While disconnecting a liquor gun hose, an operator got sprayed with hot black liquor even though he was wearing the appropriate personnel protective equipment. The incident was due in part to the fact that the stem on the 316SS isolation (ball) valve had been over-torqued and twisted 45° so that the valve was actually half open when the handle was in the closed position. The problem with the valve stem was corrected by changing metallurgy of the stem from 316SS to higher strength 17-7 SS material. The mills SOP for changing out the liquor guns was also revised to reduce the potential for a recurrence. The operator that was burned was taken to a local hospital, treated for burns and released. The hospital did not recognize that he had suffered chemical burns and the burns were not neutralized. The burns continued to get worse and the operator had to readmit himself to the hospital for additional treatment.

d) Use of ball valves for rapid drain valves: No code issues were identified that would prevent use of ball valves for rapid drain valves. The choice of actuator should take into account the need for controlling the rate of valve opening and closing in order to prevent problems with water/steam hammer. Various questions were asked regarding conformance to BLRBAC, need for tight seal, opening torque, and manual operation, but no significant issues were identified.

e) Burning of NCGs in BLRB: 7 of the approximately 30 mills represented burn NCGs in their recovery boiler. One boiler (now shut down) had 25 years experience. During that time, they did experience an explosion as the result of air in-leakage into the CNCG system but explosion vents in the system were sufficient to relieve the force of the explosion. Knockout pots are required to remove condensate – failure to remove presents a serious explosion hazard. Steam stripper fouling resulted in frequent steam stripper flooding and siphoned water into the decanter and NCG line. An intermediate drain back to condensate tank collected condensate because of 30' vertical in the air duct. Separate nozzles were used to inject CNCGs and SOGs. The current BLRBAC guideline addresses these design issues.

f) Average bed burnout time and methods to speed up process: 4-10 hours is typical. No advice on how to speed up process, but shutting off primary air and raising liquor supply temperature will help.

g) On-line green liquor density analyzers: On one boiler the analyzer was moved to the recirculation line to reduce scaling problems and there has been good success with only monthly cleaning required. On another boiler it's right in the main line and there have been no issues. It has been in use for over a year. An in-line refractometer device is being used.

h) Unplugging spouts: How to control rod when using a sledgehammer? Some use natural gas torches instead and is much safer – would not go back to rod. Can use a 4 ft. wrench to hold driven end in place. Another mill has a custom device with handles to hold rod in place, but doesn't allow use of sledgehammers. They use a weighted section of pipe with handles to drive the rods.

i) ESP Test of pre-1980 unit: BLRBAC recommends a one-time test to verify drain time is a maximum of 15 – 20 minutes. The specific issue of doing to an older unit is not addressed by BLRBAC.

j) Ring Header or Nozzle Pluggage: Two mills advised that they had problems. Use of a gorator may solve the problem. It can be caused by solubility limits of salts in liquor tank.

11. OPERATING PROBLEMS SESSION REPORT (Cont.)

k) Where is salt cake from ClO2 generator added to cycle: Weak black liquor tank; suction of weak liquor pump to multiple-effect evaporators; oxidation tank.

l) Anything being done to neutralize the salt cake: Caustic or white liquor added to raise the pH. Base-load caustic addition regardless of pH value

m) At what level should chlorides in the black liquor be controlled to in order to minimize boiler pluggage: Six report purging precipitator salt cake to control chlorides and others report the ability to run a full year without controlling chlorides. Mills that control chlorides generally limit them to ½% or less in the as fired liquor. One mill reported running at 2% without plugging. Cost of purging can be a deterrent. One method of reducing chloride input to the system is to buy a higher grade caustic. If purging is used, it is done most effectively at the precipitator where chloride concentration is highest.

n) Choice of material for floor tubes and lower sidewalls: For high-pressure boilers, the general standard is to use Sanicro-38 (825 material) composite or weld-overlaid Inconel 625 for the lower walls to above the primary air ports and then 304 SS composite to at least the tertiary level. Choice of material for the floor will depend on whether it is a sloped or decanting bottom. Sanicro 38, weld-overlaid 625 or carbon steel with chromized studs are common options for sloped floors. One of these materials or bare carbon steel are options for decanting hearths. Chromized tubing is another option for corrosion protection. Multi-lead ribbed tubes are sometimes used in combination with weld-overlaid 625 to provide extra circulation margin in floor tube applications although there isn't general consensus on the benefit of MLR.

o) Best method for unplugging insertable spouts: A propane torch is considered the best and safest method.

p) Use of computer modeling to improve performance of direct contact evaporators: Modeling of cascades has been done but the proposed changes have not been implemented yet.

q) Suggestions for eliminating steam hammer from steam coil air heater condensate collection systems: Each coil should be individually trapped. An orificed bypass directly from the high pressure steam supply to the flash tank worked at one location.

r) Regulating steam header pressure for oil atomization: Use a valve specifically designed for controlling atomizing steam differential pressure.

s) Bearing failures in dry-bottom precipitators – mean time between failures: One mill reported good success using graphiloy bearings.

t) Use of lubrication systems for precipitator sleeve-type bearings: One mill that used it reported that it is easy to over-lubricate. They reported that they didn't think it worked as well as graphiloy bearings and is not very forgiving. It works okay if carefully controlled.

11. OPERATING PROBLEMS SESSION REPORT (Cont.)

u) Smelt-spout restrictor designs: One mill reported designing their own spout restrictor consisting of an arm on a pivot point with a head that fills a good part of the opening. It is suspended from a cable and swings down into opening when needed. A modification of the mini-hood was needed to accommodate, but mill seems pleased with it. It is operated from the floor above the spouts.

v) Predicting full pressure rapid drain from a partial pressure test: Calculations used by the manufacturers must be fairly reliable because there have been no/few reports of re-work as a result of failed test. One of the main restrictions is the rapid drain valve, so valve port diameter and number of valves in series is a major factor.

w) Flexible hoses for oscillating liquor gun nozzles: This is currently being done by at least two mills and a number of mills have done it in the past. No one could come up with the name of a supplier or a brand name. The hose should have a stainless steel outer braid and a good PM program is necessary to monitor hose condition. Make sure purpose and the fact of steam out is known to supplier. Other mills reported that they continue to use OEM type joints for full oscillation. The majority of the mills reported using stationary firing.

x) Corrosion of roof tubes near steam drum: One mill has found significant rapid corrosion/thinning. Can only be checked by internal NDE/UT. Source/cause not known, but loose tube seats can spray and cause this. Can also be the result of wetness during shutdowns or air in-leakage during operation.

y) Problems with keeping primary air ports open and use of automatic port rodders vs. injury with manual rodding: Two-thirds or the mills have automatic port rodders. Injuries with manual rodding can be a real concern especially with an aging work force. Port rodders require high maintenance, but they do prevent injuries and do work well provided they are maintained. Electric drives seem to give best service but have highest first cost.

z) Lighting off auxiliary fuel burners from the control room: BLRBAC recommends that an operator be present at the burner front to light off the burners.

aa) Which type of drum level trips work best – level gauge or conductivity probe? Aquarians work well most of the time. Clark-Reliance Eye-Highs have proven effective and have no fouling issues with weekly blowdown of water columns.

bb) Stacked Air System: One mill converted to a stacked air system a year ago. It has eliminated the need for monthly chill & blow and water washes and both reduction efficiency and boiler efficiency have increased. It also improved turndown and increased throughput. They gave it a rave review! Anthony-Ross did the upgrade.

cc) Experience operating smelt spouts longer than one year: Dry spouts have been operated up to two years. One mill increased spout life by lowering cooling water temperature and pulled more air into doghouse to reduce humidity. Another mill reported operating chromized spouts for 3 ½ years. Annual NDE is used to confirm remaining thickness. Another mill has gone to two-year change-out with chromized spouts. If chromized layer wears off in a local area, galvanic corrosion causes quite rapid thinning.

CHAIRMAN'S CLOSING COMMENTS: To make sure I didn't miss anything, do we have anyone else with an offshore report? We were not made aware of any, but I want to be sure. Well, that then concludes our main committee meeting. As Karl noted, after the break we will be picking back up with a technical session. We will probably try for a 15-minutes break. Again, we thank you for your attendance. There is a handout here from the National Board if you want a copy.

TIME & PLACE OF NEXT MEETING: The next meeting will be held on October 4, 5, & 6, 2004, at the Crowne Plaza Hotel/Atlanta Airport, in Atlanta, Georgia.

ADJOURNMENT:

CHAIRMAN: 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 and we hope to see you all in the fall!

TECHNICAL SESSION:

"Site-Specific Recovery Boiler Leak Detection Training Using Scenario Simulation"

presented by Ron Bernard of Power Specialists Association, Inc.

"A Detailed Study of Recovery Boiler Waterside Deposition"

presented by George Totura of Nalco Company

2004 April - 1	**Critical Incident No. 582**
Location:	**Western Pulp Ltd., Squamish, British Columbia**
Unit:	CE Contract No. 84101. Startup 1986
Size:	3.4 million ppd solids. 550,000-lb/hr steam flow. Operating @ 600 psig & 750F. Design @ 800 psig. 2 drum boiler/large economizer/cross flow economizer with no baffles.
Incident Date:	December 2, 2003
Leak/Incident Loc:	**Economizer –** hole 1" x 1/8" on furnace side of tube 17 at 1/2" below upper header. Tube thickness surrounding hole 0.170" and no evidence of a crack
Downtime hrs due to leak/total:	Total outage time – 35 hours
ESP?	ESP performed**.**
Classification:	**Critical Incident**
How discovered:	Operator walkdown of the Unit
Leak detection:	None installed
Sequence of events:	Operator noticed discoloration of hopper ash. Sootblowers stopped and condensation observed on side of the hopper. Started going off liquor when a loud sound was heard on the 9th floor. Door opened and water spraying everywhere including toward the boiler bank. ESP initiated.
Bed cooling:	No cooling enhancement used
Wash adjacent tube:	No
Repair procedure:	Tube x-rayed and thickness checked before and after repair. Repair area preheated to 300F and overlaid with 7018 rod
Root cause:	No information
Future prevention:	Failure area thoroughly checked by Canspec. No other findings of concern.
Last full inspection:	Inspected April 2003. No information on chemical cleaning.

2004 April – 2	
Location:	**Weyerhaeuser, Hawesville, Kentucky**
Unit:	No. 4 recovery boiler. Ahlstrom Contract No. 400019. Startup 1997
Size:	2.7 million ppd solids. 422,600-lb/hr steam flow. Operating @ 1250 psig & 850F. Design @ 1550 psig. Single drum boiler/large economizer.
Incident Date:	January 30, 2004
Leak/Incident Loc:	**Economizer –** circumferential crack ~ 3/4" long x 1/8" wide in west most feeder tube to lower header of last platen in No. 2 economizer (feedwater inlet). Leak ~ 3" from main distribution header (not in a weld or heat affected zone).
Downtime hrs due to leak/total:	Total downtime 23.5 hours
ESP?	No ESP
Classification:	**Non-critical Incident**
How discovered:	Recovery helper on boiler walkdown found water running out of the ash hopper. DCS instrumentation did not show other signs of a leak.
Leak detection:	None installed
Sequence of events:	Operator found water running out of No. 2 economizer hopper. Considering location well removed from furnace, boiler operated from Friday to Sunday and then shutdown in normal fashion.
Bed cooling:	Not applicable
Wash adjacent tube:	No
Repair procedure:	Crack ground out and welded
Root cause:	No information
Future prevention:	
Last full inspection:	Last inspection May 2003. Boiler acid cleaned with HCl in September 1997.

2004 April – 3	
Location:	**MeadWestvaco, Mahrt Mill, Phenix City, Alabama**
Unit:	No. 2 Recovery Boiler. Tampella Contract No. 337. Startup 1990.
Size:	3.5 million ppd solids. Steam Flow-561, 000 lb/hr. Operating @ 890 psig & 790F. Design @ 1100 psig. Single drum boiler/large economizer
Incident Date:	November 15, 2003
Leak/Incident Loc:	**Economizer –** ~ 1/4" circumferential crack at termination weld of square-cut fin on Tube No. 1 in rear bank (tube at top of inclined header, 4th element from left wall, ~ 1" from header.)
Downtime hrs due to leak/total:	Total downtime – 30.4 hours/30.4 hours due to leak.
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Operator discovered water in conveyor during walkdown
Leak detection:	No leak detection system.
Sequence of events:	Water was dripping from hopper conveyor onto collection conveyor. Bed was burned out and fire pulled. Leak observed with mirror. Boiler cooled and economizer section washed for repair.
Bed cooling:	Not applicable
Wash adjacent tube:	No
Repair procedure:	Crack repaired and dye penetrant tested
Root cause:	Mechanical stress resulting from original design as well as vibration of tubes due to failed stitch weld at fins. 5 leaks in Economizer I since startup.
Future prevention:	
Last full inspection:	Last NDT inspection September 2003. Chemically cleaned with inhibited HCl in 1990 when started up.

2004 April – 4	
Location:	**MeadWestvaco, Mahrt Mill, Phenix City, Alabama**
Unit:	No. 2 Recovery Boiler. Tampella Contract No. 337. Startup 1990.
Size:	3.5 million ppd solids. Steam Flow-561, 000 lb/hr. Operating @ 890 psig & 790F. Design @ 1100 psig. Single drum boiler/large economizer
Incident Date:	January 19, 2004
Leak/Incident Loc:	**Economizer –** ~ ¼" circumferential crack at fin 1.5 in. below roof in Front Economizer Bank II, from which FW discharges to the steam drum. Tube 7 from front of bank, 23rd element from left wall.
Downtime hrs due to leak/total:	Total downtime – 51 hours/ 29.7 hours due to leak
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Boiler was being shut down for a chill and blow and very little bed remained. During inspection, a door was opened in sootblower lane of Economizer II and water observed spraying. There has been no previous indication of a leak
Leak detection:	No leak detection system.
Sequence of events:	Walkdowns during operation heard no unusual noises and no moisture in ash conveyors. Boiler walkdowns are every two hours; IKs are shut off once a day during a walkdown
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Tube removed by cutting near headers and plugging at the headers.
Root cause:	Mechanical stress resulting from original design when the economizer tubes supported ash hopper. Believe broken stitch welds between fins permits vibration during sootblowing. 27 leaks in front bank (Economizer II) since startup; 10 in the last 4 years.
Future prevention:	Support had been modified earlier.
Last full inspection:	Last NDT inspection September 2003. Chemically cleaned with inhibited HCl in 1990 when started up.

2004 April - 5	
Location:	**MeadWestvaco, Mahrt Mill, Phenix City, Alabama**
Unit:	No. 2 Recovery Boiler. Tampella Contract No. 337. Startup 1990.
Size:	3.5 million ppd solids. Steam Flow-561, 000 lb/hr. Operating @ 890 psig & 790F. Design @ 1100 psig. Single drum boiler/large economizer
Incident Date:	January 23, 2004
Leak/Incident Loc:	**Economizer –** leak at crack in plug used during repair of Economizer II on January 19 shutdown. Tube No. 7, 23rd element from left wall.
Downtime hrs due to leak/total:	Total downtime – 36.5 hours due to leak
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Boiler was being inspected after the boiler tripped due to a loss of instrument air
Leak detection:	No leak detection system.
Sequence of events:	During outage inspection, water was observed through an open door to be running down the economizer (Economizer II) tube. No unusual noises and no moisture in ash conveyors during boiler walkdowns preceding incident. Boiler walkdowns are every two hours; IKs are shut off once a day during a walkdown
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Plug was replaced
Root cause:	Poor plug quality
Future prevention:	Type of plugs being used were not exactly like the OEM plug. Mill has changed to OEM style plug.
Last full inspection:	Last NDT inspection September 2003. Chemically cleaned - inhibited HCl in 1990 when started up.

2004 April - 6	
Location:	**MeadWestvaco, Mahrt Mill, Phenix City, Alabama**
Unit:	No. 2 Recovery Boiler. Tampella Contract No. 337. Startup 1990.
Size:	3.5 million ppd solids. Steam Flow-561, 000 lb/hr. Operating @ 890 psig & 790F. Design @ 1100 psig. Single drum boiler/large economizer
Incident Date:	February 11, 2004
Leak/Incident Loc:	**Economizer -** ~ ½" circumferential crack at fin 1.5 in. below roof in Economizer II. Tube No. 9, 23rd element from left wall.
Downtime hrs due to leak/total:	Total downtime – 42.4 hours
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Boiler was being inspected after the boiler was shutdown for water wash
Leak detection:	No leak detection system.
Sequence of events:	During outage inspection, water was observed through an open door to be spraying across the sootblower cavity of Economizer II. No unusual noises and no moisture in ash conveyors during boiler walkdowns preceding incident. Boiler walkdowns are every two hours; IKs are shut off once a day during a walkdown
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Tube removed by cutting the tube near the headers and plugging at the headers through a window in the header wall.
Root cause:	Mechanical stress resulting from original design when the economizer tubes supported ash hopper. Also, vibration of tubes due to failed stitch weld at fins. 29 leaks in front bank (Economizer II) since startup; 12 in the last 4 years.
Future prevention:	Support had been modified earlier for support by the sidewall casing. Plant considering removing a row of economizer tubes to provide access into the sootblower cavity for repair of stitch welds and tube repairs. Sootblower poppet valve pressure reduced to 200 psig in this area.
Last full inspection:	Last NDT inspection September 2003. Chemically cleaned - inhibited HCl in 1990 when started up.

2004 April – 7	
Location:	**MeadWestvaco, Mahrt Mill, Phenix City, Alabama**
Unit:	No. 2 Recovery Boiler. Tampella Contract No. 337. Startup 1990.
Size:	3.5 million ppd solids. Steam Flow-561, 000 lb/hr. Operating @ 890 psig & 790F. Design @ 1100 psig. Single drum boiler/large economizer
Incident Date:	February 17, 2004
Leak/Incident Loc:	**Economizer –** 3 pinholes at the top of a window weld on the bottom bottle header of the 50th element from the left wall in the front economizer bank. Leak was behind where the 11th tube connected to the header; the tube had been cut and plugged in 1996.
Downtime hrs due to leak/total:	Total downtime – 34.2 hours
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Operator observed water leaking out of ash conveyor
Leak detection:	No leak detection system.
Sequence of events:	Boiler C Technician making a normal round observed water coming out of the bottom of the Economizer II ash conveyor. Area A Technician and supervisor called to 4th floor and sootblowers put on hold. Doors opened but no water observed nor noise heard. Bed burned out and boiler shutdown.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Area ground out and dye penetrant tested. Lots of slag observed in original weld of window from 1996. Area ground, welded and penetrant tested. Hydrostatic tested.
Root cause:	Slag in 1996 window weld
Future prevention:	Support had been modified earlier for support by the sidewall casing. Plant considering removing a row of economizer tubes to provide access for repair of stitch welds and tube repairs.
Last full inspection:	Last NDT inspection September 2003. Chemically cleaned - inhibited HCl in 1990 when started up.

2004 April – 8	
Location:	**MeadWestvaco, Charleston, South Carolina**
Unit:	B&W Contract PR-206. Startup 1984.
Size:	4.5 million ppd solids. Steam flow 691,000 lb/hr. Operating @ 1450 psig & 880F. Design @ 1725 psig. Two drum/large economizer
Incident Date:	June 20, 2003
Leak/Incident Loc:	**Economizer-** longitudinal crack in the weld of the 7th tube from rear wall to the 10th platen header from the right hand sidewall.
Downtime hrs due to leak/total:	Total downtime 44.22 hours
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Operator on routine walkdown found wet saltcake in the economizer ash conveyor.
Leak detection:	Acoustic leak detection system in operation did not detect the leak
Sequence of events:	After finding leak, oil burners placed in operation and liquor guns removed. Doors at economizer opened for inspection and leak observed. Boiler then shutdown.
Bed cooling:	None used
Wash adjacent tube:	No
Repair procedure:	Repair by grinding crack and welding the defect
Root cause:	Crack showed some indication of corrosion but appeared to be caused primarily by fatigue propagated from the internal surface of the tube. Investigation in progress to evaluate whether root cause of initial crack formation in the header is a result of manufacturer not following specified weld detail.
Future prevention:	Continue to evaluate tube and header measurements in rear economizer bank, cost of replacing all rear economizer lower headers, or replacing at bottom of economizer the lower elevation of headers and plugging the higher elevation of headers. A change in startup procedure seems to have resulted in a decrease in frequency of welds compared to previous procedure of "burping" SH to clear condensate from loops.
Last full inspection:	Inspection March 20, 2003. Last chemical cleaning September 25, 2002, with HCl

2004 April – 9	
Location:	**MeadWestvaco, Charleston, South Carolina**
Unit:	B&W Contract PR-206. Startup 1984.
Size:	4.5 million ppd solids. Steam flow 691,000 lb/hr. Operating @ 1450 psig & 880F. Design @ 1725 psig. Two drum/large economizer
Incident Date:	August 8, 2003
Leak/Incident Loc:	**Economizer-** longitudinal crack in each of two welds of the 13th tube from rear wall in the 36th and 38th platen header from the right hand sidewall.
Downtime hrs due to leak/total:	Total downtime 45.5 hours
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Operator on routine walkdown found wet saltcake in the economizer ash conveyor.
Leak detection:	Acoustic leak detection system in operation did not detect the leak
Sequence of events:	After finding leak, oil burners placed in operation and liquor guns removed. Doors at economizer opened for inspection and leak observed. Boiler then shutdown.
Bed cooling:	None used
Wash adjacent tube:	No
Repair procedure:	Repair by grinding crack and welding the defect
Root cause:	Crack showed some indication of corrosion but appeared to be caused primarily by fatigue propagated from the internal surface of the tube. Investigation in progress to evaluate whether root cause of initial crack formation in the header is a result of manufacturer not following specified weld detail.
Future prevention:	Continue to evaluate tube and header measurements in rear economizer bank, cost of replacing all rear economizer lower headers, or replacing at bottom of economizer the lower elevation of headers and plugging the higher elevation of headers
Last full inspection:	Inspection March 20, 2003. Last chemical cleaning September 25, 2002, with HCl

2004 April – 10	
Location:	**International Paper Company, Texarkana, Texas**
Unit:	Recovery Boiler 2. B&W Contract PR-186. Startup 1976.
Size:	4.55 million ppd solids. Steam flow 763,000 lb/hr. Operating @ 1050 psig & 813F. Design @ 1200 psig. Two drum boiler/large economizer
Incident Date:	November 28, 2003
Leak/Incident Loc:	**Economizer** – 1/2 " crack in hand hole weld on lower header of primary economizer located at a lower elevation than the mud drum
Downtime hrs due to leak/total:	Total downtime 46 hours
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Liquor solids to burners at 72% noticed to drop to 68% and then recover to 72%. Investigation found water gurgling out of the cleanout for the south hopper ash discharge line that was plugged
Leak detection:	None installed
Sequence of events:	Boiler shutdown in normal manner. The line had unplugged to allow some water to enter the mix tank and drop the solids, and then the line plugged up again
Bed cooling:	Not applicable
Wash adjacent tube:	No
Repair procedure:	Old cap removed, seat repaired and new hand hole cap welded in place
Root cause:	
Future prevention:	Economizer scheduled for replacement in 2005.
Last full inspection:	Last inspection April 2003. Boiler acid cleaned with HCl in 1996

2004 April – 11	**Critical Incident No. 583**
Location:	**Smurfit-Stone Container Corporation, Missoula, Montana**
Unit:	No. 4 Recovery Boiler. B&W Contract PR-147. Startup 1972.
Size:	3.0 million ppd solids. Steam flow 485,000 lb/hr. Operating @ 600 psig & 750F. Design @ 950 psig. Two drum/ large economizer
Incident Date:	December 29, 2003
Leak/Incident Loc:	**Economizer** – Tube sheared completely (jagged circumferential tear) 3 to 4 inches below upper header. Tube was 2nd row of 6-row module and 25th row from LHSW. Generating bank is crossflow with no baffles.
Downtime hrs due to leak/total:	Total downtime 43.1 hours.
ESP?	ESP performed. Minimum waiting period to enter building of 5 hours for incident with no water-entering furnace.
Classification:	**Critical Incident**- the leak location could result in water entering the furnace as there were no baffles between sheared tube and the furnace
How discovered:	Control room indication of severe positive furnace draft followed by increased feedwater flow and loss of drum level.
Leak detection:	None installed
Sequence of events:	Drum level decrease caused low drum level alarm. Operator immediately initiated ESP. Post ESP re-entry to building confirmed leak at top of economizer. Wash pattern from leak confirmed water did not enter the furnace.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Removed tube and plugged header
Root cause:	Undetermined. Two areas around the circumference at the failure appeared to have considerable thinning of tube wall. No indication of blistering, swelling or fish mouth rupture
Future prevention:	
Last full inspection:	Last inspection September 2003. Acid cleaned in August 1981 with 65% HCl acid

2004 April – 12	
Location:	**Eastern Paper, Lincoln, Maine**
Unit:	No. 2 Recovery Boiler. B&W Contract PR-151. Startup 1972. Furnace rebuilt by B&W 1995
Size:	1.6 million ppd solids. Steam flow 235,000 lb/hr. Operating @ 600 psig & 650F. Design @ 750 psig. Two drum boiler/large economizer
Incident Date:	October 31, 2003
Leak/Incident Loc:	**Economizer** – crack on top of 2" drain line from center lower header
Downtime hrs due to leak/total:	Total downtime 33.5 hours
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	1st Assistant Operator discovered leak during rounds when he opened the hopper door to check for pluggage and noticed a small amount of water running down the hopper wall
Leak detection:	None installed
Sequence of events:	Operator notified Liquor Cycle Foreman & supervisor. Observation determined feedwater/steam differential & refractometer solids unaffected. At bottom economizer, water coming from inside insulation. Doors opened, but salt cake and fume prevented observation. As a precaution, mix tank bypassed. Over ~ 2 hrs, liquor flow reduced and oil guns inserted for bed burndown. Leak could then be observed.
Bed cooling:	Not applicable
Wash adjacent tube:	No
Repair procedure:	Crack ground and NDT'd. No propagation found. Area ground full circle around elbow & rewelded.
Root cause:	Seal of pipe penetrating casing did not allow sufficient expansion, and caused stress on pipe as economizer expanded. Over time, pipe installed in1995 cracked. Seal enlarged for proper expansion.
Future prevention:	Seal on other side modified also.
Last full inspection:	Boiler and economizer inspected 9/5/2003. Acid cleaned 1999 with Inhibited Intensified HCl, Chelant passivation

2004 April – 13	
Location:	**International Paper Company, Vicksburg, Mississippi**
Unit:	B&W C0ntract PR-105. Startup 1967. B&W supplied economizer in 1985
Size:	3.0 million ppd solids. 509,700-lb/hr steam. Operating @ 1020 psig & 825F. Design @ 1200 psig. Two drum boiler/DCE.
Incident Date:	Leak discovered August 31, 2003. Shutdown September 3, 2003
Leak/Incident Loc:	**Economizer** – leak in a lower header handhole cap seal weld. Handhole in north end of southwest module of the six modules.
Downtime hrs due to leak/total:	Total downtime 32 hours.
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Leak discovered by routine operator walkdown
Leak detection:	None installed
Sequence of events:	Management considered leak location and decision made to operate until a scheduled outage was planned. The planned and orderly shutdown took place two days after the leak was verified.
Bed Cooling:	No
Wash adjacent tube:	No
Repair procedure:	Leak repaired per ASME Section I using WPS RMR-11212
Root cause:	The original 1986 seal weld of the cap to the header was determined to be defective because only two weld passes were applied. Manufacturer recommends three passes.
Future prevention:	All economizer hand hole cap welds will be visually and dye penetrant tested during the April 2004 yearly maintenance outage
Last full inspection:	Last inspection 2003. Boiler acid cleaned in 2000 using standard process

2004 April – 14	
Location:	**International Paper Company, Kaukauna, Wisconsin**
Unit:	No.8 Recovery Boiler. B&W Contract S-9759. Startup 1952
Size:	0.75 million ppd solids. 128,000-lb/he steam flow. Operation @ 600 psig & 700F. Design @ 650 psig. Two drum boiler/economizer/tubular air heater. Boiler bank is two pass with a rear wall baffle, followed by integral economizer.
Incident Date:	December 3, 2003
Leak/Incident Loc:	**Economizer** – First leak a 1.5" circumferential crack at rear wall buckstay attachment at the rear row of tubes, 3rd tube from right sidewall. Second leak observed when boiler filled with demineralized water. This 0.75" circumferential attachment crack was in the rear row, tube 22 from left hand sidewall, ¾" above lower header.
Downtime hrs due to leak/total:	Total downtime 26 hours
ESP?	No
Classification:	**Non-critical Incident (both leaks)**
How discovered:	Leak discovered during shutdown when water observed on exterior of boiler casing
Leak detection:	None installed
Sequence of events:	Boiler operating staff determined no evidence that water was reaching the furnace and noted the baffles between the leak area and the furnace cavity. The leak appeared to be in the economizer right sidewall section & was spraying on tubes above the tubular air heater. The bed had been burned out prior to discovering the leak to complete planned repairs. Fire was now removed from the boiler 35 minutes after leak discovery.
Bed cooling:	Not applicable
Wash adjacent tube:	No
Repair procedure:	Welds were repaired.
Root cause:	1st leak believed to be fatigue failure. 2nd appeared to be result of tube thinning from tube expanding during construction. These were 1st attachment leaks on rear wall; several earlier sidewall leaks
Future prevention:	Economizer on capital list for replacement within two years.
Last full inspection:	Last inspection October 2003. Acid cleaned October 2002

2004 April – 15	**Critical Incident No. 584**
Location:	**Smurfit-Stone Container Corporation, Brewton, Alabama**
Unit:	B&W Contract PR-32. Startup 1957. Economizer installed 1957
Size:	1.2 million ppd solids. Steam flow 184,000 lb/hr. Operating @ 880 psig & 830F. Design @ 975 psig. Two drum boiler/small horizontal tube economizer/direct contact evaporator
Incident Date:	October 9, 2003
Leak/Incident Loc:	**Economizer** – small fish mouth failure about 3" to 4" long at a support hanger in middle of section of economizer, 5th platen from front wall, 2nd row down in direction of gas flow. 2nd leak discovered in furnace on hydro after repair at a buckstay attachment weld to wall tube. Buckstay is at the nose arch header.
Downtime hrs due to leak/total:	Downtime due to leaks 25 hrs 41 min/ total downtime 28 hrs 35 min
ESP?	No
Classification:	**Critical Incident** (by virtue of 2nd leak. ESP Subcommittee believes this leak probably was present when boiler shutdown for economizer repair as no undue stress placed on pressure parts, such as could occur with an ESP)
How discovered:	Operator noticed the difference between feedwater and steam flow.
Leak detection:	None installed
Sequence of events:	0915 - Feedwater flow 20k above steam (normal 8k to 12k). Boiler walked down with sootblowers off; no sign of leak. 2300 hrs – solids dropping in cascade. Delta at 25k – 30k. Walkdown found nothing. 0100 hrs – Solids dropping. Boiler walked down; No noises heard & hoppers dry. 0130 – solids meters drifting apart. 'A' meter wrong. 0230 – 'B' meter down to 62% solids. Search for a water source found nothing. 0330 hrs – walkdown opening doors with delta 25k. Solids continuing to slowly fall with no source of water discovered. 0500 hrs – Liquor pulled & bed burn out started. Doors on economizer opened & leak observed; no sound. 0600 – delta at 30k – 32k. 0645 hrs – drum level dropped & tripped on low level. Feedwater flow increased and valve closed. Boiler cooled for repairs.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Tube plugged at headers
Root cause:	Pitting corrosion under the support hanger due to water washing
Future prevention:	
Last full inspection:	Last inspection June 2003. Chemical cleaning in 1983.

2004 April – 16	
Location:	**International Paper Company, Roanoke Rapids, North Carolina**
Unit:	No. 7 Recovery Boiler. B&W Contract PR-168. Startup 1973.
Size:	2.6 million ppd solids. Steam flow 460,000 lb/hr. Operating @ 850 psig & 825F. Design @ 1000 psig. Two drum boiler
Incident Date:	August 20, 2003
Leak/Incident Loc:	**Economizer** – small pinhole in the rear lower header handhole cap weld
Downtime hrs due to leak/total:	Total downtime due to leak 27.25 hours
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Worker noticed water around the lower economizer header handhole cover
Leak detection:	Champion Intl Mass Balance System in operation neither detected nor confirmed leak
Sequence of events:	At 7:59 AM, boiler taken down for ID fan maintenance. At ~ 2:15 PM, the leak was noticed by a worker. The fireside was locked out and the leak confirmed. Waterside locked out to make repair
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Weld ground out and repaired
Root cause:	Porosity in an old weld
Future prevention:	Examine all remaining handholes during December 2003 outage
Last full inspection:	Last inspection June 2003

2004 April – 17	
Location:	**International Paper Company, Roanoke Rapids, North Carolina**
Unit:	No. 7 Recovery Boiler. B&W Contract PR-168. Startup 1973.
Size:	2.6 million ppd solids. Steam flow 460,000 lb/hr. Operating @ 850 psig & 825F. Design @ 1000 psig. Two drum boiler
Incident Date:	November 12, 2003
Leak/Incident Loc:	**Economizer** – 1" crack in the rear lower header handhole cap weld (not the same cap as Incident 16)
Downtime hrs due to leak/total:	Total downtime due to leak 34.5 hours
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	First helper saw water in the 5th floor economizer hopper
Leak detection:	Champion Intl Mass Balance System in operation neither detected nor confirmed leak
Sequence of events:	Close examination indicated water probably coming from a handhole. Sootblowers stopped and exact location pinpointed. Bed burned out and organized outage conducted.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Weld ground out and repaired
Root cause:	Porosity in an old weld at the point where it started and stopped.
Future prevention:	Kvaerner replacement economizer installed April 2004. Look into reliability of mass balance system
Last full inspection:	Last inspection June 2003. Acid cleaned in 1998 with 7.5% inhibited HCl/traditional method of soak and surge with alkaline pre-flush

2004 April – 18	
Location:	**Georgia Pacific, Palatka, Florida**
Unit:	No. 4 Recovery Boiler. ABB-CE Contract CE22974. Startup 1976. Alstom revamp Contract 22974 V2R in 1993.
Size:	4.6 million ppd solids. Steam flow 740,000 lb/hr. Operation @ 1250 psig & 850F.
Incident Date:	December 6, 2003
Leak/Incident Loc:	**Superheater** – tube sheared off just above the high crown seal and adjacent tube had a circumferential crack in a previous weld repair. These were 2 of 4 tubes in a section of crossover tubes from drum to element #17 of rear superheater bank. This is original superheater
Downtime hrs due to leak/total:	Total downtime 58 hours
ESP?	ESP was performed. Irrevocable policy is to stay out of recovery area 12 hours
Classification:	**Non-critical Incident**
How discovered:	Vapor observed venting from penthouse on November 30.
Leak detection:	Boiler water chemistry system did not detect a leak in the superheater
Sequence of events:	. Observation with doors removed and of different methods for leak determination did not confirm a leak and operation continued with every shift inspection. Vapor showed each night & cleared up about noon. On Dec. 6, considerable vapor observed coming from a 9th floor wall opening & DCS indicated beginnings of feedwater/steam separation with steam flow dropping. Liquor diverted & feedwater valve was closed. Because of history of roof tube failures, ESP was initiated.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Section of both tubes replaced and welded from inside penthouse and from below the roof
Root cause:	Tube fatigue. Tube sent off for additional analysis
Future prevention:	Tubes to be replaced during major shutdown in April and May 2004. Incident reviewed with all boiler operators to emphasize vapor from penthouse indicative of probable SH leak. Indicators of other types leaks also reviewed.
Last full inspection:	Inspected May 2003. Acid cleaned May 2003.

2004 April – 19	
Location:	**International Paper Company, Augusta, Georgia**
Unit:	B&W Contract PR-89. Startup 1965
Size:	1.79 million ppd solids. Original design 1.2 million ppd solids. Steam flow 185,000 lb/hr. Operating @ 850 psig & 900F. Design @ 875 psig. Two drum boiler/direct contact evaporator
Incident Date:	September 28, 2003
Leak/Incident Loc:	**Superheater** – ¼" by ½" hole in bottom of 180 bend to secondary SH outlet tube. This is innermost loop of 4 loops at front of 2nd bank in superheater.
Downtime hrs due to leak/total:	Total downtime 62 hours.
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Operator hearing noise during walkdown
Leak detection:	None installed.
Sequence of events:	Operator on rounds at the 6th floor level heard a noise from the secondary superheater. Liquor was diverted and a door opened to confirm the leak location. Bed burned out and oil fire pulled.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Loop replaced
Root cause:	Corrosion related to tube temperatures and high carryover rate.
Future prevention:	SH loops are NDT'd annually. As failure off-center at 3 o'clock position, testing may have missed it. Stationary firing trials have lowered carry-over but resulted in unstable operation (severe blackouts)
Last full inspection:	Last inspection 2003 Chemical cleaned in April 1999

2004 April – 20	
Location:	**International Paper Company, Roanoke Rapids, North Carolina**
Unit:	No. 6 Recovery Boiler. CE Contract 17455. Startup 1956
Size:	1.286 million ppd solids. Steam flow 188,000 lb/hr. Operation @ 820 psig & 760F. Design @ 1000 psig. Two drum boiler/ Direct Contact Evaporator
Incident Date:	August 8, 2003
Leak/Incident Loc:	**Superheater** – 2" circumferential crack in 4th pendant from left wall of primary superheater inlet tube just below the penetration through flat studs of roofline. SH loops have no support.
Downtime hrs due to leak/total:	Total downtime 45 hrs 50 minutes
ESP?	ESP performed
Classification:	**Non-critical Incident**
How discovered:	Operator heard a noise in generating bank ash hopper when walking boiler down and opening hopper door
Leak detection:	An in-house mass balance system in operation did not detect leak. System noted as unreliable
Sequence of events:	Operator did not observe water when opening other doors to verify location & there was no indication of leak by boiler feedwater test or by FW/steam differential. Unable to identify source, boiler was ESP'd.
Bed cooling:	Cooling with sodium bicarbonate and nitrogen attributed with 6 to 8 hours time savings
Wash adjacent tube:	No
Repair procedure:	Dutchman installed
Root cause:	Fatigue resulting from tubes swinging during sootblowing.
Future prevention:	Gemini nozzles installed 2001. Poppet valve pressure at 200 psig lowered to 175 psig after observing swinging of pendants with camera. Other leak in same area in 2001. Boiler will be retired in June 2004.
Last full inspection:	Last inspected May 2003. Unit has never been chemically cleaned.

2004 April – 21	
Location:	**International Paper Company Franklin, Virginia**
Unit:	No. 6 Recovery Boiler. B&W Contract PR-185. Startup 1977
Size:	3.6 million ppd solids. Steam flow 600,000 lb/hr. Operating @ 1500 psig & 875F. Design @ 1700 psig. Two drum boiler/large economizer
Incident Date:	May 19, 2003
Leak/Incident Loc:	**Superheater** – fishmouth failure on bottom of primary superheater loop at primary SH inlet 105' above floor. PSH inlet is at the flue gas inlet to superheater.
Downtime hrs due to leak/total:	Total downtime 73 hours
ESP?	ESP performed
Classification:	**Non-critical Incident**
How discovered:	Operator heard leak blowing during a normal walkdown
Leak detection:	Mass balance system in operation at time of incident did not detect but did confirm a leak.
Sequence of events:	Roaring noise heard by operator was accompanied by substantial feedwater/steam differential, without loss of drum level. Boiler immediately ESP'd.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Replaced superheater loop.
Root cause:	Bottom of loop thinned by smelt corrosion at a smelt drip point. Ash is high in potassium. Higher sulfidity levels have increased water wash frequency to every 6 weeks and corrosion is more active with clean tube.
Future prevention:	Initiated purging some ash to reduce chloride and potassium and plan to implement a purge system for a larger volumetric quantity. Started sewering some spent acid to lower sulfidity. Water wash frequency has improved to every 3 months. Program is to determine by NDT bends requiring replacement and install chromized tube bends.
Last full inspection:	Last inspection November 2002. Acid cleaned with HCl February 2000.

2003 April – 22	
Location:	**International Paper Company, Franklin, Virginia**
Unit:	No. 6 Recovery Boiler. B&W Contract PR-185. Startup 1977
Size:	3.6 million ppd solids. Steam flow 600,000 lb/hr. Operating @ 1500 psig & 875F. Design @ 1700 psig. Two drum boiler/large economizer
Incident Date:	August 26, 2003
Leak/Incident Loc:	**Superheater** – fishmouth failure on bottom of primary superheater loop at primary SH inlet 105' above floor. PSH inlet is at flue gas inlet to SH.
Downtime hrs due to leak/total:	Total downtime 86 hours
ESP?	ESP performed
Classification:	**Non-critical Incident**
How discovered:	Operator heard leak blowing during a normal walkdown
Leak detection:	Mass balance system in operation at time of incident did not detect but did confirm a leak.
Sequence of events:	Roaring noise heard by operator was accompanied by substantial feedwater/steam differential, without loss of drum level. Boiler immediately ESP'd.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Replaced superheater loop.
Root cause:	Bottom of loop thinned by smelt corrosion at a smelt drip point. Ash is high in potassium. Higher sulfidity levels have increased water wash frequency to every 6 weeks and corrosion is more active with clean tube.
Future prevention:	Initiated purging some ash to reduce chloride and potassium and plan to implement a purge system for a larger volumetric quantity. Started sewering some spent acid to lower sulfidity. Water wash frequency has improved to every 3 months. Completed program to NDT bends and replace bends as required.
Last full inspection:	Last inspection November 2002. Acid cleaned with HCl February 2000.

2004 April – 23	
Location:	**Smurfit-Stone Container Corporation, Brewton, Alabama**
Unit:	Recovery Boiler No. 2. B&W Contract PR-79. Startup 1963.
Size:	1.2 million ppd solids. Steam flow 184,000 lb/hr. Operating @880 psig & 830F. Design @ 975 psig. Two drum boiler/small horizontal tube economizer/direct contact evaporator. This boiler operates with all air admitted below the liquor guns; there is no tertiary air.
Incident Date:	October 13, 2003
Leak/Incident Loc:	**Superheater** – primary SH tube (adjacent to sootblower path through cavity) in 16th platen from right sidewall. Break about 4' below roof was just below a weld line in the bent tube that bridges the sootblower cavity.
Downtime hrs due to leak/total:	Downtime due to ESP 31 hrs 5 min steam to steam. /Total downtime 32 hr 10 min liquor to liquor
ESP?	ESP performed. Mill has a standard 8-hour waiting period to stay out of boiler house.
Classification:	**Non-critical Incident**
How discovered:	Recovery Operator observed upward swing in drum level and heard a blowing sound.
Leak detection:	None installed
Sequence of events:	On hearing the noise, an ESP was immediately initiated.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Installed a 2' long Dutchman
Root cause:	Stress fatigue due to cyclic stress caused by sootblowers in the area. This is general location of earlier failures.
Future prevention:	
Last full inspection:	Inspected April 2003. Chemical cleaned in 1983

2004 April – 24	
Location:	**Smurfit-Stone Container Corporation, Brewton, Alabama**
Unit:	Recovery Boiler No. 2. B&W Contract PR-79. Startup 1963.
Size:	1.2 million ppd solids. Steam flow 184,000 lb/hr. Operating @880 psig & 830F. Design @ 975 psig. Two drum boiler/small horizontal tube economizer/direct contact evaporator. This boiler operates with all air admitted below the liquor guns; there is no tertiary air.
Incident Date:	November 30, 2003
Leak/Incident Loc:	**Superheater** – primary SH tube adjacent to sootblower path through cavity in 2nd tube from south wall separated about 1 ft below roof. Break was just below a weld line in the bent tube that bridges the sootblower cavity.
Downtime hrs due to leak/total:	Downtime due to ESP 32 hrs 55 min steam to steam. /Total downtime 34 hr 7 min liquor to liquor
ESP?	ESP performed. Mill has a standard 8-hour waiting period to stay out of boiler house.
Classification:	
How discovered:	Recovery Operator observed upward swing in drum level and a downward swing in steam flow rate, and heard a blowing sound.
Leak detection:	None installed
Sequence of events:	On hearing the noise, an ESP was immediately initiated.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Installed a 4' long Dutchman
Root cause:	Stress fatigue due to cyclic stress caused by sootblowers in the area. This is general location of earlier failures.
Future prevention:	Vibration bar added to link the repaired tube to adjacent superheater tubes.
Last full inspection:	Inspected April 2003. Chemical cleaned in 1983

2004 April – 25	
Location:	**Smurfit-Stone Container Corporation, Brewton, Alabama**
Unit:	Recovery Boiler No. 2. B&W Contract PR-79. Startup 1963.
Size:	1.2 million ppd solids. Steam flow 184,000 lb/hr. Operating @880 psig & 830F. Design @ 975 psig. Two drum boiler/small horizontal tube economizer/direct contact evaporator. This boiler operates with all air admitted below the liquor guns; there is no tertiary air.
Incident Date:	December 30, 2003
Leak/Incident Loc:	**Superheater** – 3rd primary SH tube from south wall adjacent to sootblower path through cavity sheared off about 4 ft below roof. Break was just above a weld line in the bent tube that bridges the sootblower cavity. Break above weld on "new tube" side; loops bridging cavity replaced in 2001 to 4 ft below roof
Downtime hrs due to leak/total:	Downtime due to ESP 26 hrs 30 min steam to steam. /Total downtime 29 hr 8 min liquor to liquor
ESP?	ESP performed. Mill has a standard 8-hour waiting period to stay out of boiler house. One drain line required alternate means to open rapid drain valves.
Classification:	**Non-critical Industry**
How discovered:	Recovery Operator observed upward swing in drum level and blowing sound.
Leak detection:	None installed
Sequence of events:	On hearing the noise, an ESP was immediately initiated.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Installed a 4' long Dutchman
Root cause:	Stress fatigue due to cyclic stress caused by sootblowers in the area. This is general location of earlier failures.
Future prevention:	Those tubes bridging the cavity not previously replaced will be replaced in May 2004. The steam cooled spacer tube removed in 1980 will be replaced to restrain tube movement.
Last full inspection:	Inspected June 2003. Chemical cleaned in 1983

2004 April – 26	
Location:	**International Paper Company, Pine Bluff, Arkansas**
Unit:	No. 3 Recovery Boiler. B&W Contract PR-60. B&W Superheater Revamp (new superheater) Contract 546-1383 in 1998. Startup 1960.
Size:	1.5 million ppd solids. Steam flow 202,000 lb/ hr. Operating @1275 psig & 900F. Design @ 1425 psig. Two drum boiler/direct contact evaporator
Incident Date:	September 26, 2003
Leak/Incident Loc:	**Superheater** – rupture of SA213-T22 secondary SH outlet tube at an area of wastage on leading edge of 2nd platen from left sidewall at IK elevation. Fish mouth shaped opening approx 9" long and the full width of tube, with thin edges. Localized thinning of tube for almost total length roof to bottom loop
Downtime hrs due to leak/total:	Total downtime 50.07 hours
ESP?	ESP was performed. Current irrevocable policy is to stay out of recovery area for 4 hours
Classification:	**Non-critical Incident**
How discovered:	Operator heard sound of failure in the control room
Leak detection:	None installed
Sequence of events:	Outlet tube failed and caused high furnace pressure and rapid loss of drum level. Operator heard the roar of the failure in the control room and observed the furnace pressure/drum level changes. ESP actuated immediately. .
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	. Installed straight length of tube from just below roof to 3' above loop, plus installed hairpin loop with 3' of straight.
Root cause:	Tube wall thinning by high temperature sulfidation
Future prevention:	Chromizing of leading edge tube in platen, air system upgrades to reduce mechanical carryover and additional sootblowers to clean primary superheater. PSH plugging and unbalancing gas flow.
Last full inspection:	Last inspection June 2003. Cleaned with HCl (bromate stage canceled) in May 2001

2004 April - 27	
Location:	**International Paper Company, Pine Bluff, Arkansas**
Unit:	No. 3 Recovery Boiler. B&W Contract PR-60. B&W Superheater Revamp Contract 546-1383 in 1998. Startup 1960.
Size:	1.5 million ppd solids. Steam flow 202,000 lb/ hr. Operating @1275 psig & 900F. Design @ 1425 psig. Two drum boiler/direct contact evaporator
Incident Date:	November 19, 2003
Leak/Incident Loc:	**Superheater** – small ¼" hole in secondary SH outlet bank on trailing edge of a tube that is the rearmost tube in the bank
Downtime hrs due to leak/total:	Total downtime 30.67 hours
ESP?	ESP was performed. Current irrevocable policy is to stay out of recovery area for 4 hours
Classification:	**Non-critical Incident**
How discovered:	Operator making his rounds heard the failure. An ESP was immediately initiated because the sound was not located to the rear if the generating bank.
Leak detection:	None installed
Sequence of events:	Liquor flow diverted requiring operators to fire auxiliary gas to maintain steaming rate. Outlet tube failed and fuels tripped caused high furnace pressure and drum level swing. ESP actuated.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Repaired by pad welding. Tube section will be installed during next outage.
Root cause:	Sootblower chaffing of tube. The Secondary SH outlet tube that supports the front of the pendant is lengthening due to sulfidation attack causing platen to swing back into the sootblower.
Future prevention:	Chromizing of leading edge of tube, air system upgrades and more sootblowers
Last full inspection:	Last inspection June 2003. Cleaned with HCl (bromate stage canceled) in May 2001

2004 April – 28	
Location:	**International Paper Company, Pine Bluff, Arkansas**
Unit:	No. 3 Recovery Boiler. B&W Contract PR-60. B&W Superheater Revamp (new superheater) Contract 546-1383 in 1998. Startup 1960.
Size:	1.5 million ppd solids. Steam flow 202,000 lb/ hr. Operating @1275 psig & 900F. Design @ 1425 psig. Two drum boiler/direct contact evaporator.
Incident Date:	December 24, 2003
Leak/Incident Loc:	**Superheater** – large fishmouth rupture approx 7.5" in length & extending one-third of way around the tube. Vertical edges of failure very thin; leading edge noticeably thinned by external metal loss. 3rd secondary SH pendant from left wall.
Downtime hrs due to leak/total:	Total downtime 26.13 hours.
ESP?	ESP was performed. Current irrevocable policy is to stay out of recovery area for 4 hours
Classification:	**Non-critical Incident**
How discovered:	Rupture caused over pressurization of the furnace and a rapid loss in drum level. Fuels (gas and liquor) tripped immediately. ESP was immediately initiated
Leak detection:	None installed
Sequence of events:	See "How Discovered"
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Tube section installed
Root cause:	High steam and flue gas temperatures causing tube wastage
Future prevention:	Chromizing of leading edge of tube, air system upgrades and more sootblowers
Last full inspection:	Last inspection June 2003. Cleaned with HCl (bromate stage canceled) in May 2001

2004 April - 29	
Location:	**International Paper Company, Pine Bluff, Arkansas**
Unit:	No. 3 Recovery Boiler. B&W Contract PR-60. B&W Superheater Revamp Contract 546-1383 in 1998. Startup 1960.
Size:	1.5 million ppd solids. Steam flow 202,000 lb/ hr. Operating @1275 psig & 900F. Design @ 1425 psig. Two drum boiler/direct contact evaporator
Incident Date:	January 7, 2004
Leak/Incident Loc:	**Superheater** – large fishmouth rupture approx 5.5" in length & extending three quarters of way around the tube. Vertical edges of failure very thin; leading edge noticeably thinned by external metal loss. Failure in outlet tube of 25th secondary SH pendant from left wall (3rd from right wall). Tube material SA 213-T22
Downtime hrs due to leak/total:	Total downtime 98.05 hours.
ESP?	ESP was performed. Current irrevocable policy is to stay out of recovery area for 4 hours
Classification:	**Non-critical Incident**
How discovered:	Rupture caused over pressurization of the furnace and a rapid loss in drum level. An ESP was immediately initiated
Leak detection:	None installed
Sequence of events:	Outlet tube failed caused high furnace pressure and drum level swing. Gas and liquor fuels tripped immediately. ESP actuated.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Failed tube repaired by installing a straight section. NDT identified 17 additional thinned tubes and sections were replaced
Root cause:	High steam and flue gas temperatures causing wastage. High level of mechanical carryover creates localized reducing condition.
Future prevention:	Chromizing of leading edge of tube, air system upgrades and more sootblowers upstream of Primary SH. (Ash pluggage in PSH results in steam temperature in tubes 2 and 3 from both sides of SSH outlet to be "couple hundred degrees" higher
Last full inspection:	Last inspection June 2003. Cleaned with HCl (bromate stage canceled) in May 2001

2004 April – 30	
Location:	**International Paper Company, Pine Bluff, Arkansas**
Unit:	No. 3 Recovery Boiler. B&W Contract PR-60. B&W Superheater Revamp Contract 546-1383 in 1998. Startup 1960.
Size:	1.5 million ppd solids. Steam flow 202,000 lb/ hr. Operating @1275 psig & 900F. Design @ 1425 psig. Two drum boiler/direct contact evaporator
Incident Date:	February 11, 2004
Leak/Incident Loc:	**Superheater** – large fishmouth rupture approx 5.5" in length & extending three quarters of way around the tube. Vertical edges of failure very thin; leading edge noticeably thinned by external metal loss. Failure in outlet tube of 26th secondary SH pendant from left wall (2nd from right wall). Tube material SA 213-T22
Downtime hrs due to leak/total:	Total downtime 72.53 hours.
ESP?	ESP was performed. Current irrevocable policy is to stay out of recovery area for 4 hours
Classification:	**Non-critical Incident**
How discovered:	Rupture caused over pressurization of the furnace and a rapid loss in drum level. Gas and liquor fuels immediately tripped. An ESP was immediately initiated
Leak detection:	None installed
Sequence of events:	See "How discovered".
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Failed tube repaired by installing a straight section and a 180-degree lower bend. NDT identified 5 additional thinned tubes and sections were replaced
Root cause:	High steam and flue gas temperatures causing wastage. High level of mechanical carryover creates localized reducing condition.
Future prevention:	Chromizing of leading edge of tube, air system upgrades and more sootblowers
Last full inspection:	Last inspection June 2003. Cleaned with HCl (bromate stage canceled) in May 2001

2004 April - 31	**Critical Incident No. 585**
Location:	**International Paper Company, Pine Bluff, Arkansas**
Unit:	No. 4 Recovery Boiler. B&W Contract PR-113. B&W Revamp Contracts SC-1174 and SC-1248 in 1990. Startup 1967.
Size:	4.19 million ppd solids. Steam flow 514,000-lb/ hr. Operating @1275 psig & 925F. Design @ 1450 psig. Two drum boiler /direct contact evaporator
Incident Date:	February 16, 2004
Leak/Incident Loc:	**Boiler Bank** – 39th tube from right wall in the 5th row from bank outlet (cold side) sheared at lower drum. The 38th tube in the same row was leaking and washed the failed tube.
Downtime hrs due to leak/total:	Total downtime 55.98 hours
ESP?	ESP initiated. Current irrevocable policy is the stay out of recovery area 4 hours.
Classification:	**Critical Incident**
How discovered:	Operator heard sound of failure and observed loss of drum level and furnace back pressure
Leak detection:	None installed
Sequence of events:	On basis of sound and observations, operator tripped gas and liquor fuels immediately and actuated the ESP
Bed cooling:	No
Wash adjacent tube:	Tube failure resulted from washing from an adjacent tube that failed due to near drum corrosion
Repair procedure:	Failed tube plugged at both drums. NDT identified 10 additional tubes, which were plugged.
Root cause:	Near drum corrosion
Future prevention:	Reduced lower generating bank sootblower pressures. Longer-term response included installing leak detection, weekly ash sampling, combustion tuning and scheduling a partial tube bank replacement during the next annual outage.
Last full inspection:	Last inspection June 2003. Near drum NDT in 1999. Acid cleaned September 2003 with HCl and Bromate

2004 April – 32	
Location:	**Smurfit-Stone Container Corporation, Brewton, Alabama**
Unit:	No. 1 Recovery Boiler. B&W Contract PR-32. Startup 1957.
Size:	1.2 million ppd solids. Steam flow 184,000 lb/hr. Operating @ 880 psig & 830F. Design @ 975 psig. Two drum boiler / 3 pass boiler bank/small horizontal tube economizer/DCE
Incident Date:	January 18, 2004
Leak/Incident Loc:	**Boiler Bank** – 6th tube in row 12 sheared off next to steam drum.
Downtime hrs due to leak/total:	Downtime due to ESP 50 hrs 52 min steam to steam. /Total downtime 55 hr 25 min liquor to liquor
ESP?	ESP Performed
Classification:	**Non-critical Incident** (the tube that sheared was to the rear of a flat stud baffle reported to extend to the drum shell plate leaving no gap. The baffle is tube row 13, counting from outlet)
How discovered:	Helper noticed that the steam flow and the drum level dropped, and the boiler began to blow back.
Leak detection:	None installed
Sequence of events:	Helper observing the level and flow drops called for the operator and the boiler was ESP'd
Bed cooling:	No
Wash adjacent tube:	The 5th tube in the 11th row, which blistered and cracked, restrained the failed tube. Two additional tubes were found damaged on hydro.
Repair procedure:	Tubes were plugged in steam and mud drums
Root cause:	Bank is with original tubes from 1957 and no appreciable wear has been noticed in the past. The area will be checked closely on next outage.
Future prevention:	
Last full inspection:	Last inspection June 2003. Chemically cleaned in 1983.

2004 April – 33	
Location:	**Norske Canada, Crofton, British Columbia**
Unit:	No. 4 Recovery Boiler. CE/ABB Contract CA-88105. Startup 1991.
Size:	4.0 million ppd solids. Steam flow 588,700 lb/hr. Operating @ 600 psig and 750F. Design @ 800 psig. Single drum/large economizer
Incident Date:	December 29, 2003
Leak/Incident Loc:	**Boiler Bank** – cracks in two ESP drain lines from bottom header of generating bank
Downtime hrs due to leak/total:	Total downtime 55 hours
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Water noticed in ash conveyor
Leak detection:	Trasar leak detection system
Sequence of events:	Mill had been down for Christmas curtailment. Boiler was warming up on oil and near line pressure when water was noticed running from generating bank conveyor
Bed cooling:	No
Wash adjacent tube:	Not applicable
Repair procedure:	Cracks were ground out and welded
Root cause:	Expansion joints on ash hopper were binding causing drain lines to stress
Future prevention:	Check expansion guides on all drains from headers
Last full inspection:	Acid fill and soak in 1996

2004 April – 34	**Critical Incident No. 586**
Location:	**International Paper Company. Pine Bluff, Arkansas**
Unit:	No. 4 Recovery Boiler. B&W Contract PR-113. B&W Revamp Contracts SC-1174 and SC-1248 in 1990. Startup 1967. Tubes installed this area in 1980 (SA178C, 0.165" wall)
Size:	4.19 million ppd solids. Steam flow 514,000-lb/ hr. Operating @1275 psig & 925F. Design @ 1450 psig. Two drum boiler /direct contact evaporator
Incident Date:	January 11, 2004
Leak/Incident Loc:	**Boiler Bank** – ¾" hole in the tube at the lower drum surface. 6th row from the bank gas outlet, 26th tube from the right sidewall
Downtime hrs due to leak/total:	Total downtime 55.25 hours
ESP?	No. Operators believed water was not entering the furnace because of the leak location (confirmed to be correct after shutdown)
Classification:	**Critical Incident**
How discovered:	Operator looking for cause of a MFT found the leak.
Leak detection:	None installed
Sequence of events:	Boiler tripped on high furnace pressure; all 3 FD fans shutdown. Shortly thereafter, low drum level alarmed and drum level indication went below range. Feedwater valve closed, liquor guns removed. SH drains opened & sootblowers retracted. Inspection found water running down rear of boiler bank hopper; nose arch determined to be dry. Boiler was secured
Bed cooling:	Not applicable
Wash adjacent tube:	Four additional tubes were thinned
Repair procedure:	Failed tube and the four thinned tubes were plugged.
Root cause:	Near drum corrosion
Future prevention:	Reduced sootblower pressures in the generating bank. Partial retube scheduled for June 2004.
Last full inspection:	Last inspection June 2003. Acid cleaned with HCl and Bromate September 2003

2004 April – 35	**Critical Incident No. 587**
Location:	**International Paper Company, Pine Bluff, Arkansas**
Unit:	No. 4 Recovery Boiler. B&W Contract PR-113. B&W Revamp Contracts SC-1174 and SC-1248 included lower furnace replacement in 1990. Startup 1967.
Size:	4.19 million ppd solids. Steam flow 514,000-lb/ hr. Operating @1275 psig & 925F. Design @ 1450 psig. Two drum boiler /direct contact evaporator
Incident Date:	September 6, 2003
Leak/Incident Loc:	**Upper Furnace** – irregular shaped hole ¾" long and ¼" wide in the right sidewall just above the tertiary airport level (54' – 2" above floor) 9" above the composite tube weld line
Downtime hrs due to leak/total:	Total downtime 242 hours
ESP?	ESP initiated. Current irrevocable policy is to stay out of area 4 hours minimum
Classification:	**Critical Incident** – Note that this incident occurred prior to Incidents No. 31 and 34)
How discovered:	Operator found the failure while looking for cause of a boiler water chemistry imbalance that operators suspected was caused by a leak.
Leak detection:	None installed
Sequence of events:	Gas burners put in service to shutdown boiler to determine location of a suspected boiler bank leak. When burners shutdown, detailed walkdown began. Moisture observed on furnace wall and ESP initiated because there was a small char/salt cake accumulation in one corner of furnace
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Failed and thinned furnace wall tubes (20) identified by NDT to extend to approx 4 feet above the composite to carbon steel weld line and were replaced with sections of length as required. Some wastage under arch.
Root cause:	Internal under deposit caustic corrosion
Future prevention:	Boiler acid cleaned. Water treatment will be changed to coordinated phosphate
Last full inspection:	Last inspection June 2003. Acid cleaned with HCl and Bromate October 1999.

2004 April – 36	
Location:	**Georgia-Pacific, Leaf River Pulp Operations, New Augusta, Mississippi**
Unit:	Gotaverken Contract No. 551-992. Startup 1984.
Size:	6.3 million ppd solids. Steam flow 898,000 lb/hr. Operating @ 1250 psig & 900F. Design @ 1490 psig. Single drum/large economizer
Incident Date:	November 8, 2003
Leak/Incident Loc:	**Upper Furnace (cold side of lower side of nose arch)** – 4" longitudinal split in the center of the outer radius of tube bend where lower side of arch joins the furnace wall. Arch tube in the corner along the left sidewall.~ 96 ft above the centerline of floor header
Downtime hrs due to leak/total:	Total downtime 107.67 hours
ESP?	ESP was performed.
Classification:	**Non-critical Incident**
How discovered:	Operator on walkdown noticed steam coming out from behind insulation of dead space area inside the nose arch.
Leak detection:	?
Sequence of events:	---
Bed cooling:	Southland started 10 hours after ESP to apply sodium bicarbonate to a bed height several feet above the bottom of primary air ports. Application for 30 hours credited with saving 24 hours
Wash adjacent tube:	No
Repair procedure:	Tube sectioned and replaced with new tubing.
Root cause:	Water side stress assisted corrosion at site of a very heavy field weld
Future prevention:	Plan x-ray selected bends during 2004 annual outage to look for possible defects and linear indications
Last full inspection:	Last inspection January 31, 2003. Chemical cleaned in 1999.

Note: Flash-to-the-sky system did not have a positive drain to assure water draining to 8' level. Feedwater flow was only partially stopped and water backfilled-raising level to 40'.

2004 April – 37	
Location:	**International Paper Company, Texarkana, Texas**
Unit:	Recovery Boiler No. 2. B&W Contract PR-186. Startup 1986
Size:	4.55 million ppd solids. Steam flow 763.000 lb/hr. Operating @ 1050 psig & 813F Design @ 1200 psig. Two drum boiler/large economizer
Incident Date:	January 2, 2004
Leak/Incident Loc:	**Upper furnace (above tertiary level)** – ¼" longitudinal crack at front wall penthouse scallop bar attachment weld (tack weld) external to membrane wall furnace. Tube 16 from right sidewall.
Downtime hrs due to leak/total:	Total downtime 22.5 hours
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Sootblower mechanic saw steam escaping from under the insulation
Leak detection:	None installed
Sequence of events:	Mechanic called assistant operator and they removed insulation and lagging to determine that the steam was from an external tube leak.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Crack ground and weld repaired
Root cause:	To be determined.
Future prevention:	
Last full inspection:	Last inspection April 2003. Cleaned in 1996 with HCl.

Note: ESP Subcommittee questions that this should have been a continuous weld. A bar tack welded to the face of each tube can result in high stresses

2004 April – 38	**Critical Incident No. 588**
Location:	**International Paper Company, Roanoke Rapids, North Carolina**
Unit:	No. 6 Recovery Boiler. CE Contract No. 17455. Startup 1956
Size:	1.286 million ppd solids. Steam flow 188,000 lb/hr. Operating @ 820 psig & 760F. Design @ 1000 psig. Two drum boiler/direct contact evaporator
Incident Date:	September 1, 2003
Leak/Incident Loc:	**Upper Furnace** – 1-½" linear indication at bottom of membrane weld on 2nd sidewall tube from rear wall at screen tube header just below arch
Downtime hrs due to leak/total:	Total downtime 50 hours
ESP?	ESP performed. Current irrevocable policy is to stay out of recovery area for 4 hours following ESP.
Classification:	**Critical Incident**
How discovered:	Operator making scheduled rounds of boiler noticed water coming from under the insulation at corner of boiler
Leak detection:	Mass balance system in operation did not detect nor confirm leak. System noted as unreliable
Sequence of events:	Water source traced to next higher floor. No evident external source. Inspection covers in insulation removed and insulation found wet. Door closest to water opened and whistling sound heard. Boiler was ESP'd.
Bed cooling:	Sodium bicarbonate with nitrogen used and estimated to save 6-8 hours
Wash adjacent tube:	No
Repair procedure:	Crack ground out and welded/ Membrane welded completely around the end.
Root cause:	Stress crack resulting from improper modification of membrane weld to tube when weld removed at an earlier time; leak occurred where weld terminated
Future prevention:	Emphasize procedures that weld must be terminated properly at end of membrane bar
Last full inspection:	Last inspection May 2003. Unit indicated as never chemically cleaned

2004 April – 39	
Location:	**Smurfit-Stone Container Corporation, Florence, South Carolina**
Unit:	No. 2 Recovery Boiler. B&W Contract PR-159.
Size:	3.8 million ppd solids. Steam flow 560,000 lb/he. Operating @ 650 psig & 750F. Design at 950 psig. Two drum boiler/large economizer
Incident Date:	December 21, 2003
Leak/Incident Loc:	**Upper Furnace** – ½" circumferential crack at welded attachment for insulation on mud drum level wall tube at dead air space formed by nose arch. Leak external to membrane wall enclosure
Downtime hrs due to leak/total:	Total downtime 19.5 hours
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Weekend mechanic checking equipment in 7th floor area noticed steam and water coming from under insulation near the mud drum
Leak detection:	None installed
Sequence of events:	Leak was on exterior of membrane wall furnace so orderly shutdown and bed burnout performed
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Ground out crack and repaired with carbon steel TIG wire.
Root cause:	Improper attachment weld for insulation
Future prevention:	Last inspection November 2003. Unit indicated as never chemically cleaned.
Last full inspection:	

2004 April – 40	**Critical Incident No. 589**
Location:	**Pope & Talbot, Harmac Pulp Operations, Nanaimo, British Columbia**
Unit:	Site Unit ID PV-S005. CE Contract No. CA 48108. Startup 1949
Size:	1.0 million ppd solids. Steam flow 120,000 pph. Operating @ 600 psig & 750F. Design @ 675 psig. Three drum boiler/large horizontal tube economizer with water coil air heater
Incident Date:	January 6, 2004
Leak/Incident Loc:	**Upper Furnace** – 1-½" longitudinal crack in 1" OD left sidewall tube No. 1 at approx 8 inches below the intermediate header located at approximately mud drum elevation. Boiler center supported by mud drum & intermediate headers. Header supports are cantilevered off of horizontal I – beams connected to boiler columns.
Downtime hrs due to leak/total:	Total downtime 96 hours
ESP?	ESP was performed. Area cleared for ~ 6 hrs.
Classification:	**Critical Incident**
How discovered:	Operator and Shift Supervisor walking down the boiler.
Leak detection:	None installed
Sequence of events:	Vapor noticed coming out of left sidewall header intermediate header cover. Cover opened and vapor noted as coming from behind casing. Operator and Supervisor returned to control room and ESP'd boiler. Bed cooled to "well below 1000F" before water washing started.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Both sidewall tubes were replaced with a new section formed to clear the header.
Root cause:	~~Waterside stress assisted corrosion~~. (ESP Subcommittee suggests more likely fatigue failure) as The header had shifted over the years into the furnace approx 1 ½" forcing the 1st sidewall tubes out of line, thereby causing stress on the tube surface. The top flange of I-beam has tilted and header support plated bent and cracked allowing the header to move inward.
Future prevention:	Front wall header supports repaired to prevent further header movement. Plan to replace header and supports in the future.
Last full inspection:	Last inspection June 2003. Acid cleaned in 1997.

2004 April – 41	**Critical Incident No. 590**
Location:	**Bowater, Thunder Bay, Ontario, Canada**
Unit:	"B" Recovery Boiler. CE Contract No. CA-74102. Startup 1976. Modifications 1999 & 2001.
Size:	3.5 million ppd solids. Steam flow 500,000 lb/hr. Operating at 850 psig & 900F. Design @ 1050 psig. Two drum boiler/small economizer/direct contact evaporator
Incident Date:	Mat 1, 2003
Leak/Incident Loc:	**Upper Furnace** – ½" wide by 3 ¼" fish mouth rupture of front wall tube (48th from left wall) at 54' above the floor. 16 ft length of tube affected by overheat
Downtime hrs due to leak/total:	Total downtime 80 hours
ESP?	ESP initiated. Current policy is to stay out of recovery area 12 hours
Classification:	**Critical Incident**
How discovered:	Investigation by Shift Engineer of the noise of steam blowing discovered a leak
Leak detection:	None installed
Sequence of events:	Operator instructed Assistant to check for a failed sootblower or one with bad packing. Boiler walkdown found no problem, so Operator shutdown sootblowers; noise continued. Another walkdown revealed sound of blowing steam to be internal to boiler. There were no problems with drum level, furnace pressure, boiler water, etc. Liquor was pulled & gas guns put in service. Inspected boiler starting in SH and working down. Leak identified in front wall tube above tertiary.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	16 ft tube section replaced
Root cause:	Short term overheat. Circulation interrupted due to a 4" can lid blocking the tube at the lower header.
Future prevention:	Review incident with all outside contractors and with all recovery area O and M employees. Meetings with operators on 'Indication of a Pressure Part Failure". Better design of downcomer covers.
Last full inspection:	No information

2004 April – 42	**Critical Incident No. 591**
Location:	**Weyerhaeuser Company, Marlboro Mill, Bennettsville, South Carolina**
Unit:	No. 1 Recovery Boiler. Ahlstrom Contract No. 5904. Startup 1990. Upgrade 1996.
Size:	4.4 million ppd solids. Steam flow 635,000 lb/hr. Operating @ 1080 psig & 850F. Design @ 1550 psig. Single drum boiler/large economizer. 1996 upgrade from 32. to 4.4 M ppd
Incident Date:	March 3, 2004
Leak/Incident Loc:	**Upper Furnace** – ½" long circumferential crack with 2 tangential runners. Crack in the rear bent tube of lower crotch plate weld below #11 sootblower in superheater. Tube bent to form sootblower opening.
Downtime hrs due to leak/total:	Time from ESP to first fire 56 hours. /Total downtime 68 hours
ESP?	ESP initiated as orderly shutdown was progressing. Re-entry after 17 ½ hours (less than 24 requires Mill Manager approval)
Classification:	**Critical Incident**
How discovered:	Operator on rounds saw vapor coming from sootblower wall box
Leak detection:	None installed
Sequence of events:	Operator found no audible or visual signs of internal leak & instrumentation looked normal. Maintenance called to remove lagging. Vapor coming from refractory vent hole on wall box face. No signs of an internal leak and Manger cleared building and orderly shutdown started. Vapor flow increased even though pressure reduced. Mirror showed water entering the furnace and ESP initiated.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Membrane removed and crack located with dye penetrant. Crack ground out, checked with dye penetrant, and TIG pad welded. Membrane was not replaced; filled with refractory.
Root cause:	Crack in crotch plate membrane propagated into tube
Future prevention:	Continue to inspect and repair per manufacturer's and inspectors' recommendations.
Last full inspection:	Inspected April 2003. Acid cleaned with HCl during 1990 startup

Note: Report includes data for ESP initiation when pressure was 170 psig on boiler with flash-to-the-sky system to which low point drains were added in 2003. Water boiled for 27 hrs before level stabilized.

2004 April – 43	**Critical Incident No. 592**
Location:	**International Paper Company, Franklin, Virginia**
Unit:	No. 4 Recovery Boiler. ABB-CE Contract No. 1263. Startup 1964
Size:	1.75 million ppd solids. Steam flow 273,500 lb/hr. Operating @ 600 psig & 750F. Design @ 700 psig. Two drum boiler/small economizer/direct contact evaporator. Tangent tube furnace.
Incident Date:	December 4, 2003
Leak/Incident Loc:	**Lower Furnace** – pinhole leak in the cold side of a front wall tube at the bend on the lower corner of a secondary airport 25 feet above the furnace floor.
Downtime hrs due to leak/total:	Total downtime 142 hours
ESP?	ESP initiated
Classification:	**Critical Incident**
How discovered:	An operator saw steam and water dripping on a buckstay at the lower burner elevation on the front wall of the furnace
Leak detection:	Mass Balance System installed in 1998 was in operation but neither detected nor confirmed leak
Sequence of events:	Due to the presence of water and the tangent tube wall construction, the decision was made to ESP
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Tested leak area for cracks; none found. Area ground out and welded. Area again tested.
Root cause:	Waterside pitting (as there were no cracks, this was not believed to be SAC)
Future prevention:	Inspect lower furnace at buckstay locations for stress cracking at next annual outage.
Last full inspection:	Last inspection June 2003. Acid cleaned with HCl January 2000

2004 April – 44	
Location:	**International Paper Company, Riverdale Mill, Alabama**
Unit:	No. 2 Recovery Boiler. CE Contract No. 28679. Startup 1980.
Size:	2.7 million ppd solids. Steam flow 425,000 lb/hr. Operating @ 1500 psig & 900F. Design @ 1720 psig. Two drum boiler/large economizer
Incident Date:	August 4, 2003
Leak/Incident Loc:	**Smelt Spout** – damage sustained over the course of a year from rodding at the spout discharge
Downtime hrs due to leak/total:	Total downtime 31.5 hours
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Boiler Tender noticed a thin stream of water spraying from the smelt discharge end of the No. 2 smelt spout during a normal round
Leak detection:	Not applicable
Sequence of events:	Water stream was not contacting smelt. Cooling water was shutoff and liquor removed from the boiler. Char burned out and boiler taken down normally
Bed cooling:	Not applicable
Wash adjacent tube:	Not applicable
Repair procedure:	Second spout also damaged. Both spouts replaced
Root cause:	Behavioral training issue. Physical damage from blunt trauma force when rodding the spout and knocking frozen smelt from the discharge.
Future prevention:	All tenders shown damaged spouts and instructed on not beating the end of the spout with the rod and alerted to importance of inspecting spouts for damage
Last full inspection:	

2004 April – 45	**Dissolving Tank Explosion No.26**
Location:	**International Paper Company, Vicksburg, Mississippi**
Unit:	B&W Contract PR-105. Startup 1967.
Size:	3.5 million ppd solids. Steam flow 550,000 lb/hr. Operating @ 1000 psig & 825F. Design @ 1200 psig. Two drum boiler/direct contact evaporator
Incident Date:	August 12, 2003
Leak/Incident Loc:	**Dissolving Tank** – smelt rush lifted deck plate, which fell into tank.
Downtime hrs due to leak/total:	Not applicable
ESP?	Not applicable
Classification:	**Dissolving Tank Explosion**
How discovered:	
Leak detection:	
Sequence of events:	Chill & blow had been carried out as scheduled based on superheater plugging. The events that follow were over an approx 10-hour period starting at 11:40 AM. Boiler startup with gas fire and saltcake level between primary and secondary air levels. Boiler warmed up with No. 3 spout of four open; others blocked by salt cake. A dam of salt cake ran parallel to spout wall at 2/3rds of the boiler depth with a salt cake trough running from No. 3 spout up to the dam. Recovery boiler tripped on drum level; fire was back on in 15 min. Smelt pool developed behind dam; difficult to judge size with location on high side of floor slope. Mill considered options. Decision made to slowly burn down the dam. No. 3 spout plugged intermittently for 2-1/2 hours and then froze for ½ hr. Spout unplugged and a crack in dam released smelt that surged into tank, and then flow ceased. 3 hours later, rodding opened spout and personnel evacuated from spout area. During a flow surge of ~ 5 min, in the last 2 min, salt cake began to flow with surging smelt. Reaction in tank lifted 3 of 5 explosion plates (3' x 5' laying flat on top of tank) allowing them to fall into tank. Damage confined to plates. There was no more smelt pool. After repairs were made, startup continued uneventfully.
Bed cooling:	
Wash adjacent tube:	
Repair procedure:	
Root cause:	105 tons of salt cake were removed from the SH by the chill & blow as indicated by strain gauge measurements. A cleaning strategy will be developed dictating when a water wash should be utilized. Note: Boiler has no provision for smelt shattering.
Future prevention:	
Last full inspection:	

2004 April – 46	**Critical Incident No. 593**
Location:	**Canadian Forest Products Ltd., Northwood Pulp, Prince George, British Columbia**
Unit:	No. 1 Recovery Boiler. Alstom/CE Contract No. CA-64127. Startup 1966.
Size:	3.3 million ppd solids. Steam flow 428,000 lb/hr. Design Pressure 750 psig. Two drum boiler/Direct contact evaporator
Incident Date:	December 16, 2003
Leak/Incident Loc:	**Furnace Screen** – longitudinal hole ~ 1-5/8" long x 3/8" wide starting at a cut line weld in last tube of 12 tubes in the first platen from left wall. Tube wall had been thinned.
Downtime hrs due to leak/total:	Total downtime liquor to liquor 63 hours
ESP?	ESP initiated.
Classification:	**Critical Incident**
How discovered:	Operator on walkdown with sootblowers off heard unexplained noise and observed vapor when a door was opened.
Leak detection:	None installed
Sequence of events:	Boiler water residuals had been dropping for 2 days and walkdowns with sootblowers off and doors opened revealed no leak indication. Plant boiler trips revealed side-to-side drum level fluctuating differences and a noise on 7th floor was confirmed to not be sootblowers. ESP was initiated.
Bed cooling:	No
Wash adjacent tube:	Yes. The opening faced the 2nd platen where 2 tubes were eroded. 2 adjacent tubes in platen #1 also thinned
Repair procedure:	3 sections of tube replaced in screen platen # 1 and 2 in platen #2. Welds 100% x-rayed.
Root cause:	Corrosion caused by water washing without firing to dry of an area where wet salt cake was not removed during cleaning and there was not drying procedure
Future prevention:	Inspect and repair any other damaged tubing. Conduct firing for drying
Last full inspection:	Inspected October 2003. Last chemical cleaning date unknown

2004 April – INTL 1	**International Incident No. 1088**
Location:	**Sappi Forest Products-Utusu, Swaziland-Bhunya**
Unit:	Local Unit ID SB 10035. CE/ICAL Contract No. 38634. Startup September 29, 1961. Kvaerner revamp in 1996.
Size:	516 t/d solids (1,138,000 ppd). Steam flow 60 t/h (132,000 lb/hr). Operation @ 620 psig. Design @ 750 psig. Two drum boiler/direct contact evaporator
Incident Date:	November 3, 2003
Leak/Incident Loc:	**Lower Furnace** – several pinholes in an area 1 cm long in the rear wall at 1.8 meters (6 feet) above the floor
Downtime hrs due to leak/total:	Total downtime 151.75 hours
ESP?	ESP was performed. Current irrevocable policy is to stay out of recovery area for 24 hours.
Classification:	
How discovered:	Poking rod came out of furnace wet from airports after observing local high bed. (Water was later observed spraying out onto and boiling on bed.)
Leak detection:	No special system.
Sequence of events:	The char bed (estimated as 8 ft high) collapsed on the right rear corner blocking the air ports. Firing reduced to one-half and control restored two hours later. Bed collapse in the same corner occurred on the next shift and when ports were rodded, the port was wet. Boiler was ESP'd
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	AF-IPK experts from Sweden flown in to do a UT scan of furnace tubes. 280 insert sections totaling 400 meters (1300 ft) were installed.
Root cause:	Overheating due to a tube blockage by a foreign object
Future prevention:	NDT contractor told to equip themselves with UT equipment if they want to continue doing business with the mill. Believe paper toweling used by welders to enhance weld quality caused the partial blockage. Paper will not be permitted for future use.
Last full inspection:	Last inspection May 2003. Acid washed over 15 years past.

2004 April – INTL 2	**International Incident No. 1089**
Location:	**Carter Holt Harvey, Kinleith, Tokoroa, New Zealand**
Unit:	Recovery Boiler No. 5. CE Canada Contract No. CE 8402. Startup 1985. Andritz Revamp Contract No. 782000 in 2002.
Size:	1450 metric t/d (3.2 million ppd) solids. Steam flow 206 t/h (454,200 lb/hr). Operating @ 650 psig & 750F. Design at 870 psig. Two drum boiler/large economizer
Incident Date:	June 10, 2003
Leak/Incident Loc:	**Economizer** – Two pinholes on supply header stub at 5-10 mm from the weld between header and stub. Stubs are 6.41" long and connected to element supply tubes. Internal surface eroded & full of cavities.
Downtime hrs due to leak/total:	Total downtime 87 hours
ESP?	No
Classification:	
How discovered:	Operator inspection of economizer ash hopper found water.
Leak detection:	None installed
Sequence of events:	Cold restart after 3-month outage. On finding water, feedwater/steam differential indicated 10-t/h leakage rate. Inspection failed to find location; operators confident was in lower end of economizer. Liquor firing continued due to RB4 not yet firing & difficulties getting RB5 "on liquor" RB5 taken off liquor approx 40 hours later. Leak determined to be on lower supply header.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Header feed 9 elements through individual supply tubes. Full length of the 9 tubes was UT examined. Another 4 found below minimum wall. Also damage found to header. Five stubs cut off header. Seats prepared and new, longer stubs installed. Header welds stress relieved. Flow damage to header opening ground smooth.
Root cause:	Flow assisted corrosion
Future prevention:	More frequent UT inspection. Next shutdown UT lower & upper headers and tubes.
Last full inspection:	Last inspection July 2002. Chemically cleaned July 2002 – HCl Fill & Soak.

2004 April – INTL 3	**International Incident No. 1090**
Location:	**Votorantim Celulose e Papel – Jacareí, São Paulo State, Brazil**
Unit:	CBC Industrias Pesadas SA. Startup 2002
Size:	5.5 million ppd solids (2500 MT/d). Steam flow 862,400 lb/hr (392 MT/hr). Operation at 1316 psig (92,5 Kgf/cm2) & 896F (480C). Single drum/large economizer.
Incident Date:	May 3, 2003
Leak/Incident Loc:	**Cable tray fire & convection bank tube leaks at hydro**
Downtime hrs due to leak/total:	Total downtime 305 hours
ESP?	No
Classification:	**Non-critical Incident** (Classified by BRBSC-Brazilian Recovery Boiler Safety Committee)
How discovered:	Instruments failed, boiler was tripped, and local inspection was made.
Leak detection:	Acoustic leak detection installed but not applicable in this area.
Sequence of events:	After repairs of boiler shutdown, while getting ready for the hydro, a suspicious area was found at the convection bank hopper at the lower header. With 85 Kgf/cm2 leaks were detected at the welded plugs of panel 01 and 02.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Area at the two welded plugs was ground, cleaned and rewelded by CBC.
Root cause:	Weld cracks at plugs.
Future prevention:	Next shutdown all insulation plates covering the plugs will be removed, refractory as well, and dye check in all welds will be made. CBC will check the welding procedures used during erection.
Last full inspection:	June 2002

2004 April – INTL 4	**International Incident No. 1091**
Location:	**Celulose Nipo-Brasileira S/A – CENIBRA – Belo Oriente, Minas Gerais State, Brazil**
Unit:	CBC – Industrias Pesadas S/A . Startup 1992
Size:	4.5 million ppd solids (2050 MT/d). Steam flow 807,400 lb/hr (367 MT/hr). Operation at 924 psig (65 Kgf/cm2) & 842F(450C). Two-drums/large economizer.
Incident Date:	June 9, 2003
Leak/Incident Loc:	**Economizer –** tube No. 94 of 4th panel of No.2 economizer, exit gas direction, presented an air bubble pore.
Downtime hrs due to leak/total:	Total downtime 37 hours.
ESP?	No
Classification:	**Non-critical Incident** (Classified by BRBSC- Brazilian Recovery Safety Committee).
How discovered:	Operator noticed wet ash in the economizer hopper during inspection.
Leak detection:	None installed.
Sequence of events:	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.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Weld was cleaned, dye check performed, new weld made and last dye checked.
Root cause:	Weld porosity.
Future prevention:	More detailed inspection at welds next shutdown.
Last full inspection:	May 2003

2004 April – INTL 5	**International Incident No. 1092**
Location:	**Votorantim Celulose e Papel – Jacareí, São Paulo State, Brazil**
Unit:	CBC Industrias Pesadas S/A. Startup 2002
Size:	5.5 million ppd solids (2500 MT/d). Steam flow 862,400 lb/hr (392 MT/hr). Operation at 1316 psig (92,5 Kgf/cm2) & 896F (480C). Single drum/large economizer.
Incident Date:	July 27, 2003
Leak/Incident Loc:	**Economizer -** inspection plug at upper header of No.1 economizer.
Downtime hrs due to leak/total:	Total downtime 33 hours
ESP?	No
Classification:	**Non-critical Incident –** (Classified by BRBSC-Brazilian Recovery Safety Committee).
How discovered:	Local inspection by Operator detected wet ash.
Leak detection:	Acoustic leak detection installed, but not applicable in this area.
Sequence of events:	After detecting the leak, reduction procedures to reduce the liquor were started, bed was reduced, and reduction of pressure was started in a coordinated way.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Area at the welded plug was grinded, cleaned and rewelded again. Three more plugs showed penetration after dye check, found pores and cracks, grinded and rewelded.
Root cause:	Weld cracks at inspection plugs.
Future prevention:	Next shutdown all plugs, 96 total, will be dye checked. Other similar points will be discussed with CBC in areas like convection bank, drum, etc. Install an inspection door at the top of economizers. Clean the plugs with hydro jets. Maintenance is studying better tools to optimize repair procedures.
Last full inspection:	June 2002.

2004 April – INTL 6	**International Incident No. 1093**
Location:	**Votorantim Celulose e Papel. – Jacareí, São Paulo State, Brazil.**
Unit:	CBC Industrias Pesadas S/A. Startup 2002.
Size:	5.5 million ppd solids (2500 MT/d). Steam flow 862,400 lb/hr (392 MT/hr. Operation at 1316 psig (92,5 Kgf/cm2) & 896F (480C). Single drum/large economizer.
Incident Date:	December 7, 2003
Leak/Incident Loc:	**Evaporator (Convector or Boiler Bank)–** Small leaks followed by rupture of tube No. 9, 1st row of tubes from left to right side wall, elevation 42,100 mm, lower part of evaporator.
Downtime hrs due to leak/total:	Total downtime 65.5 hours
ESP?	No
Classification:	**Critical Incident –** (Classified by BRBSC- Brazilian Recovery Boiler Safety Committee)
How discovered:	Sudden variation of drum pressure and drum level. Boiler tripped by logic system. In the field, Operator noticed abnormalities.
Leak detection:	Acoustic leak detection installed but not applicable in this area.
Sequence of events:	Boiler was burning only liquor, level and pressure variations started in the drum tripping the unit. Operator detected water at the feeding screw of convector. No water in the furnace was noted. Reduction of pressure was significant. Level was difficult to maintain because of the great loss of water. Boiler was cooled in order to start repairs.
Bed cooling:	No
Wash adjacent tube:	Leak of tubes No. 8 and 10 washed tube No.9 that ruptured.
Repair procedure:	A total of 14 adjacent tubes were inspected. Seven (7) tube nipples were cut and changed. Hydro with 135 Kgf/cm2 was applied and given as OK by official inspection company.
Root cause:	Bad field welding job caused fatigue cracks in tubes No.8 and 10, which leaked and ruptured tube No. 9.
Future prevention:	Welding procedures will be checked at first opportunity and some changes at the original project will be made to avoid new incidents in this area. Repairs will be made in all 61 panels. Welds shall be inspected by dye-check and visually.
Last full inspection:	July 2003

2004 April – INTL 7	**International Incident No. 1094**
Location:	**Votorantim Celulose e Papel – Luis Antonio, São Paulo State, Brazil**
Unit:	CBC Indústrias Pesadas S/A . Startup 1991.
Size:	3.1 million ppd solids (1400 MT/d). Steam flow 473,000 lb/hr (215 MT/h). Operation at 959 psig (67 Kgf/cm2) & 842F (450C). Two-drums/large economizer.
Incident Date:	August 13, 2003
Leak/Incident Loc:	**Tertiary Superheater –** Pit corrosion of 8 tubes at straight length of last tube.
Downtime hrs due to leak/total:	No downtime.
ESP?	No
Classification:	**Non-critical Incident –** (Classified by BRBSC-Brazilian Recovery Safety Committee)
How discovered:	During local inspection at annual shutdown.
Leak detection:	No
Sequence of events:	Inspection company noted pit corrosion at the tertiary SH. Hydrostatic test was made and the tubes were leaking. Repair was made, another hydro was performed and given OK.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Replacement of tubes: one curve of No.13 SH coil; 18-ft straight parts of last tubes of SH coil No.10 to 16, and 6-ft of SH coil No.23.
Root cause:	Corrosion of deposits at hottest coil of SH. Analysis of deposits should indicate a possible cause.
Future prevention:	More intense inspection of corroded tubes during next outage.
Last full inspection:	May 2002

2002 April – INTL 8	**International Incident No. 1095**
Location:	**Klabin Papeis SC – Otacílio Costa, Santa Catarina State, Brazil**
Unit:	CBC Industrias Pesadas S/A . Startup 1998.
Size:	2.4 million ppd solids (1100 MT/d). Steam flow 374,000 lb/hr (170 MT/h). Operation at 1262 psig (87 Mpa) & 901F (483C). Single drum/large economizer
Incident Date:	August 11, 2003
Leak/Incident Loc:	**Economizer –** Crack at tube No° 20C in the upper header “D” high temperature coil.
Downtime hrs due to leak/total:	Total downtime 39-hours
ESP?	No
Classification:	**Non-critical Incident.** (Classified by BRBSC – Brazilian Recovery Boiler Safety Committee)
How discovered:	Operator noted wet ash in the sulfate screw at bottom of economizer and steam-water relation changed in the DCS at control room.
Leak detection:	None installed.
Sequence of events:	After finding wet ash, oil burners were lighted and liquor was stopped. Local inspection showed leak area, and boiler was taken off line and cooled.
Bed cooling:	No
Wash adjacent tube:	Yes. Tube N° 21C at header C.
Repair procedure:	Tubes No. 20C and 21C that leaked were welded at header D. Tube 22B header D, cracked and was welded. Tube 26D header D, had small crack, also welded. Rewelded tubes 44B header E and 55A at header F. CBC followed their welding procedure. Dye check was performed.
Root cause:	Possible excessive vibration between tubes developed stress that caused the leaks.
Future prevention:	Inspection at next shutdown, considering addition of extra clamps to lower vibration factor.
Last full inspection:	September 2002

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BRAZILIAN RECOVERY BOILER SAFETY COMMITTEE

5 years of activities

Chairman 2004: Guido Schreiber

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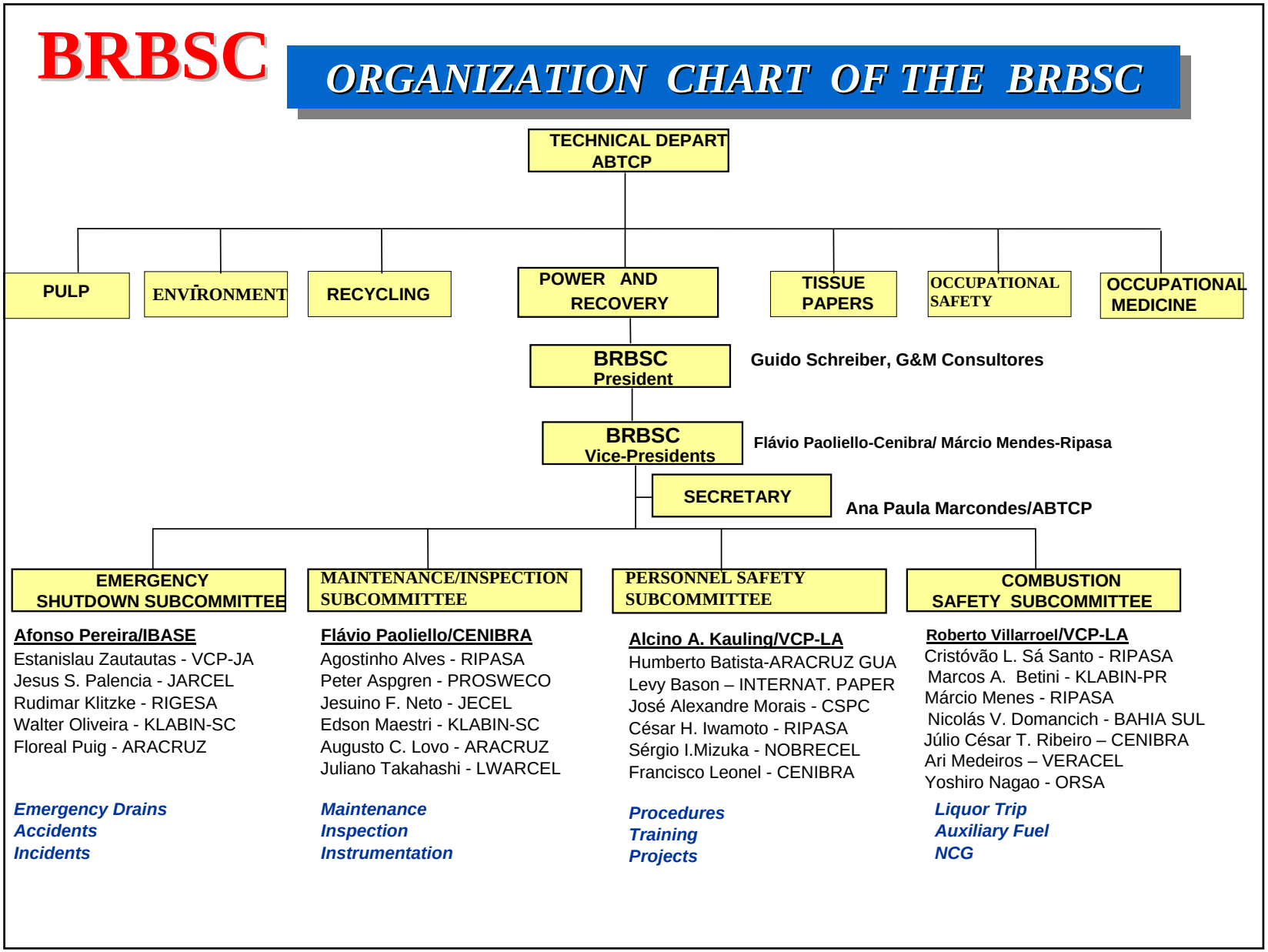
OBJECTIVES OF THE BRAZILIAN RECOVERY BOILER SATETY COMMITTEE (BRBSC)

The main objective of the Committee is to increase the safety of the chemical recovery boilers by interchanging technical information, experiences and statistical data in order to optimize the boiler installations, its operating practices and maintenance procedures.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ORGANIZATION CHART OF THE BRBSC
TECHNICAL DEPART ABTCP
PULP
ENVIRONMENT
RECYCLING
POWER AND RECOVERY
TISSUE PAPERS
OCCUPATIONAL SAFETY
OCCUPATIONAL MEDICINE
BRBSC President
Guido Schreiber, G&M Consultores
BRBSC Vice-Presidents
Flávio Paoliello-Cenibra/ Márcio Mendes-Ripasa
SECRETARY
Ana Paula Marcondes/ABTCP
EMERGENCY SHUTDOWN SUBCOMMITTEE
Afonso Pereira/IBASE
Estanislau Zautautas - VCP-JA
Jesus S. Palencia - JARCEL
Rudimar Klitzke - RIGESA
Walter Oliveira - KLABIN-SC
Floreal Puig - ARACRUZ
Emergency Drains
Accidents
Incidents
MAINTENANCE/INSPECTION SUBCOMMITTEE
Flávio Paoliello/CENIBRA
Agostinho Alves - RIPASA
Peter Aspgren - PROSWECO
Jesuino F. Neto - JECEL
Edson Maestri - KLABIN-SC
Augusto C. Lovo - ARACRUZ
Juliano Takahashi - LWARCEL
Maintenance
Inspection
Instrumentation
PERSONNEL SAFETY SUBCOMMITTEE
Alcino A. Kauling/VCP-LA
Humberto Batista-ARACRUZ GUA
Levy Bason – INTERNAT. PAPER
José Alexandre Morais - CSPC
César H. Iwamoto - RIPASA
Sérgio I.Mizuka - NOBRECEL
Francisco Leonel - CENIBRA
Procedures
Training
Projects
COMBUSTION SAFETY SUBCOMMITTEE
Roberto Villarroel/VCP-LA
Cristóvão L. Sá Santo - RIPASA
Marcos A. Betini - KLABIN-PR
Márcio Menes - RIPASA
Nicolás V. Domancich - BAHIA SUL
Júlio César T. Ribeiro – CENIBRA
Ari Medeiros – VERACEL
Yoshiro Nagao - ORSA
Liquor Trip
Auxiliary Fuel
NCG

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EMERGENCY SHUTDOWN

SUBCOMMITTEE

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ACCOMPLISHED ACTIVITIES

- **Updated List of Recovery Boilers in Brazil; (*)**
- **Incidents in 2002, 2003/04; (*)**
- **Classification of Incidents;**
- **Statistics; (*)**
- **Questionnaire of Incidents. (*)**

(*) Available for download on ABTCP site: www.abtcp.org.br

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CHEMICAL RECOVEY BOILERS IN BRAZIL

LIST OF RECOVERY BOILERS IN BRAZIL - Brazilian Recovery Boiler Safety Committee - Emergency Shutdown Subcommittee

#	Company	Supplier	Start up year	Revamp year	Size Mppd solids	Pressure psig	Temp °F	Steam tons/h	Observations
1	Aracruz Celulose	Kvaerner	2001		8.14	910	842	576	
2	Aracruz Celulose	Gotaverken	1991	2002	8.14	910	842	576	
3	Aracruz Celulose	Ahlstrom	1997	2000	6.82	910	842	500	
4	Aracruz - Guaíba	Gotaverken	1972		2.64	1010	860	176	out of operation
5	Aracruz - Guaíba	Babcock & Wilcox	2002		4.29	910	860	330	
6	Bacell	CBC	1995		1.98	896	842	119	
7	Bahia Sul Celulose	Gotaverken	1992	2001	7.04	1209	903	462	
8	CENIBRA	CBC	1977	2003	3.96	924	842	275	
9	CENIBRA	CBC	1992		6.16	924	842	462	
10	COCELPA	Gotaverken	1988		.48	634	797	33	
11	Iguacu	São Caetano	1972		.23	228	399	26	
12	International Paper	B&W	1976		.69	412	662	38	
13	International Paper	B&W	1985		2.31	412	662	154	
14	IPB	Conservit	1981		.62	299	421	44	out of operation
15	Itapagé Artefatos	CBC	1972		.39	597	752	16	
16	Jarí Celulose	B&W/Gotaverken	1979	1988	3.41	924	842	231	
17	Klabin-Correa Pinto	CBC	1987		1.76	1209	896	105	
18	Klabin-Telemaco Borba	Gotaverken	1977	2000	3.74	654	806	146	
19	Klabin-Otacílio Costa	Gotaverken	1987		.92	584	752	59	
20	Klabin-Otacílio Costa	CBC	1998		2.20	1240	901	159	
21	Lwarcel	CBC	2002		.99	1209	896	61	
22	Nobrecel		1999						Informations being sent
23	Orsa	Gotaverken	1982		.57	270	392	33	
24	Rigesa	B&W	1987		.55	597	698	39	
25	Rigesa	Ahlstrom	1999		1.87	597	860	139	
26	Ripasa	Gotaverken	1972		1.14	597	752	79	
27	Ripasa	Gotaverken	1981	2001	1.16	597	752	79	
28	Ripasa	CBC	2002		2.42	597	752	198	
29	Suzano	Gotaverken	1973		1.65	711	788	110	
30	Suzano	CBC	1987	2002	2.11	711	788	159	
31	Trombini	BW/Orcepa	1989	2000	.41	299	752	28	
32	VCP- Luiz Antonio	CBC	1991	1995	3.30	910	842	245	
33	VCP- Jacarei	CBC	1994		3.74	1251	896	270	
34	VCP- Jacarei	CBC	2002		6.07	1251	896	431	
35	Veracel Celulose	Kvaerner	2005		8.80	1337	914	682	Project Phase

Obs.: - Boilers no. 11 and 19 are out of operation
-Updated in March 2004

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STATUS OF REC BOILERS

- **35 Recovery Boilers;**
  - **32 in operation**
  - **02 not in operation**
  - **01 in project phase**
- **13 new boilers or overhauled in the last 2 years;**
- **Average age of boilers : 14 years;**
- **Average production per boiler: 2.84 million ppd solids**

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INCIDENTS IN 2002

Company	Incident number	Date of event	Incident questionnaire	Presented in session	Incident description
Klabin Bacel	1	Jan 1,02	yes	yes	Screen tube rupture
CENIBRA	2	Jan 23,02	yes	yes	Crack in superheater
Rigesa	3	Apr 4,02	yes	yes	Crack in superheater
VCP-Jacarei	4	Apr 4,02	yes	yes	Dissolving tank explosion
Orsa	5	Jun 27,02	yes	yes	Dissolving tank explosion
Bahia Sul	6	Aug 26,02	yes	yes	Economizer leak
VCP-LA	7	Jul 20,02	yes	yes	Superheater leak
Aracruz	8	Sep 10,02	yes	yes	Economizer leak- Boiler A
CENIBRA	9	Oct 20,02	yes	yes	Superheater leak

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INCIDENTES IN 2003/04

Company	Incident Number	Date of Incident	Incident Questionnaire	Presented in session	Incident Description
VCP - Jacarei	1	May 2,03	yes	yes	fire in cable tray and convector tube leak
CENIBRA	2	Jun 6,03	yes	no	leak in economizer (weld pore)
VCP - Jacarei	3	Jul 20,03	yes	no	leak in economizer (inspection plug)
KLABIN - OC	4	Aug11,03	yes	no	economizer tube crack
VCP - Luis A	5	Aug13,03	yes	no	pit corrosion in economizer (leak during hydro)
VCP - Jacarei	6	Dec7,03	yes	no	evaporator tube rupture

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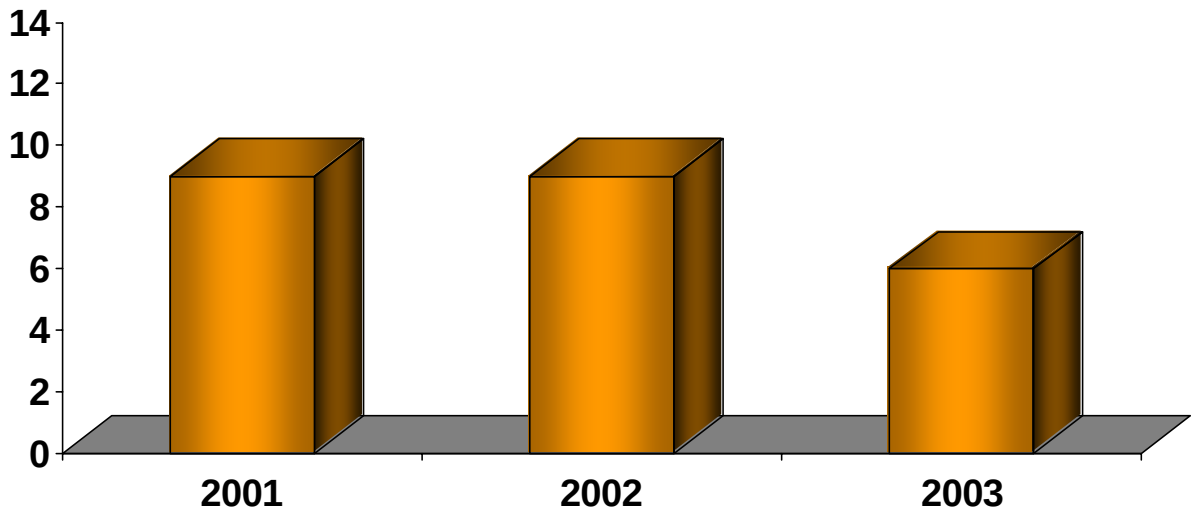
STATISTICS

No. of incidents per year in Brazil



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PERFORMED ACTIVITIES

Recovery Boiler Operator Seminars in Brazil

Year Mill

2000- CENIBRA

2001- ARACRUZ

2002- VCP -Luiz Antônio

2003- RIPASA

2004- LWARCEL (set for Nov/04)

Objective: Interchange of informations and experiences related to the day-a-day operation of a Recovery Boiler.

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THANK YOU!