

BLACK LIQUOR RECOVERY BOILER

ADVISORY COMMITTEE

MINUTES OF MEETING Crowne Plaza Hotel/Atlanta Airport Atlanta, Georgia April 7, 8 & 9, 2008

OBJECTIVE

BLRBAC's objective 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.

OFFICEDS

Bylaws - 2.1

	UFFICERS	
Chairman:	Len Erickson	Tel: 208-384-4933
	Boise. Inc.	Fax: 208-384-7637
	P. O. Box 50	lenerickson@boiseinc.com
	Boise, ID 83728-0001	
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Chairman:	Georgia Pacific	Mobile: 386-227-8991
	P. O. Box 919	scott.moyer@gapac.com
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Secretary:	Mike Polagye	Tel: 781-255-4730
-	FM Global	Fax: 781-762-9375
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	Norwood, MA 02062	
Treasurer:	Ron Hess	Tel: 706-484-1723
	HSB Forest Products Group	Fax: 706-485-5267
	110 Cedar Cove Court	ronald hess@hsb.com
	Buckhead, GA 30625-3300	_

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. Bylaws - 3.1

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

EXECUTIVE COMMITTEE

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Secretarial Services

Page - 3 BLRBAC SUBCOMMITTEES

	BLKBAC SUBCOMMITTEES		
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	Perry, FL 32348	Loveland, OH 45140-7910	
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	PROCEDURES	CONTACT EVAPORATORS	
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	jda6@meadwestvaco.com	Chris.jackson	
		@globalriskconsuiltants.com	
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	Somera CT 06071	Oconomonico WI 52066	
	Soliters, C1 $000/1$ Tal. 960 762 2241 Ext 126	T_{a1} , 262,567,7270	
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Fall	October	6, 7 & 8	 2008
Spring	April	6, 7 & 8	 2009
Fall	October	5,6&7	 2009
Spring	April	12, 13 & 14	 2010
Fall	October	4, 5 & 6	 2010

BLRBAC MEETING SCHEDULE

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

Past Chairman Lon Schroeder

BLRBAC has established its own website which is:

www.blrbac.org

At this website you will find a copy of past Meeting Minutes and the next Meeting Notice. Therefore, each Representative and Associate Representative is asked to inform their people of this website. This is where they can obtain the following BLRBAC documents:

BLRBAC MEETING NOTICE

COVER LETTER	General Information
REGISTRATION FORM	Print and mail to Said & Done with appropriate fees before the posted cut-off date.
<u>CROWNE PLAZA HOTEL</u>	Blocked room dates, pricing, address, hotel phone numbers, alternate hotel information, etc.
<u>SCHEDULE</u>	List of Subcommittee activities on Monday & Tuesday
<u>AGENDA</u>	Reports given to Joint BLRBAC Meeting on Wednesday
<u>OPERATING PROBLEMS</u> <u>QUESTIONNAIRE</u>	Mail/e-mail completed questionnaires to Barbara Holich. These will be given to the Vice Chairman and he will see that your concerns are brought up and discussed during the Operating Problems session at the next meeting.

Mrs. Barbara Holich BLRBAC Secretarial Services 1005 59th Street Lisle, IL 60532

Phone: 630-512-0144 Fax: 630-512-0155 <u>fhholich@aol.com</u> Below is the current status of the BLRBAC publications. These are available at the **BLRBAC INTERNET ADDRESS**: <u>www.blrbac.org</u>

Recommended Practices by BLRBAC

Safe Firing of Black Liquor in Black Liquor Recovery Boilers (Dated: April 2008)

Personnel Safety & Training (Dated: October 2007)

Fire Protection in Direct Contact Evaporators and Associated Equipment (Dated: April 2008)

Safe Firing of Auxiliary Fuel in Black Liquor Recovery Boilers (Dated: April 2007)

Safe Firing of Black Liquor in Black Liquor Recovery Boilers (Dated: October 2006)

Waste Stream Incineration (Dated: April 2008)

Emergency Shutdown Procedure (ESP) (Dated: October 2006)

<u>Application of Rotork Actuators on Black Liquor Recovery Boilers</u> (Dated: October 2005)

Post ESP Water Level (Dated: January 2005)

<u>Checklist and Classification Guide for Instruments and Control Systems</u> (Dated: October 2004)

Post ESP Guidelines (Dated: October 2002)

If you have any questions, contact:

Mike Polagye BLRBAC Secretary FM Global P. O. Box 9102 Norwood, MA 02062 Phone: 781-255-4730 Fax: 781-762-9375 michael.polagye@fmglobal.com

Page - 6 AUXILIARY FUEL SUBCOMMITTEE **‡Dave Streit – Chairman** Buckeye Florida One Buckeye Drive Perry, FL 32348 Tel: 850-584-1402 Fax: 850-584-1717 dave streit@bkitech.com

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‡ = Denotes attendance at meeting April 7, 2008

NOTE: Auxiliary Fuel Subcommittee will not meet in the fall of 2008. Their next meeting is scheduled for the spring of 2009 starting at 1:00 PM as an "open" meeting.

EMERGENCY SHUTDOWN PROCEDURES SUBCOMMITTEE

‡ John Andrews – Chairman

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FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS AND ASSOCIATED EQUIPMENT SUBCOMMITTEE

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Subcommittee did not meet April 2008

Note: Next Fire Prot. For Dir. Contact Evaporators Meeting will be in the fall of 2008.

INSTRUMENTATION SUBCOMMITTEE

‡David Avery – Chairman

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‡ = Denotes attendance at meeting April 7, 2008

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SAFE FIRING OF BLACK LIQUOR SUBCOMMITTEE

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WASTE STREAMS 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 P. O. Box 5000 Westbrook, ME 04098-1597 Tel: 207-238-3177 Fax: 207-856-3675 <u>craig-aderman@sappi.com</u>	 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. CooperFM GlobalKey Center601 108 th Avenue, NE, Ste.1400Bellevue, WA 98004Tel: 425-709-5084Fax: 425-454-7847mark.cooper@fmglobal.com
‡Wendy Coyle Weyerhaeuser Postal Bag 1020 Grande Prairie, Alberta Canada T8V 3A9 Tel: 780-539-8183 Fax: 780-539-8344 wendy.coyle@weyerhaeuser.com	Arnie Iwanick Harris Group, Inc. 1750 NW Naito Parkway Portland, OR 97209-2530 Tel: 503-345-4516 Fax: 503-228-0422 <u>arnie.iwanick@harrisgroup.com</u>	Olie Kujanpaa Andritz 10745 Westside Parkway Alpharetta, GA 30004 Tel: 770-640-2571 Fax: 770-640-2455 olli.kujanpaa@andritz.com
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‡ Michael D. SidesGE GAP ServicesA member of XL Capital group1360 Olympia Park CircleOcoee, FL 34761Tel: 407-656-4275Mobile: 407-462-4622Fax: 888-964-7348michael sides@xlgroup.com	‡ Arie Verloop Jansen Combustion and Boiler Technologies 12025 115 th Avenue N.E., Suite 250 Kirkland, WA 98034-6935 Tel: 425-952-2825 Fax: 425-825-1131 <u>arie.verloop@ansenboiler.com</u>	‡ Marla WeinbergInternational PaperCorporate Technology Center6285 Tri-Ridge Blvd.Loveland, OH 45140Tel: 513-248-6789Fax: 901-214-0894marla.weinberg@ipaper.com

Registered for the meeting were:

ABITIBI BOWATER

Guy, Karen Jane, Childersburg, AL Reynolds, Vaughan, Childersburg, AL

ALABAMA RIVER PULP

Browning, John, Perdue Hill, AL Sims, Sandi, Perdue Hill, AL Standridge, Tim, Perdue Hill, AL

ALSTOM POWER

Gibowski, Steve, Pensacola, FL Harbach, Paul, Suwanee, GA Hitchins, Mary, Lafayette, GA LeBel, Mark, Windsor, CT Young, Frederick, Chattanooga, TN

AMEC KAMTECH

Wilson, Steve, Tucker, GA

AMERICAN FOREST & PAPER ASSOC.

Grant, Thomas, Yonkers, NY

ANDRITZ, INC.

Collins, Peter, Roswell, GA Corvalan, Pablo, Roswell, GA Davis, Joe, Roswell, GA Grace, Todd, Roswell, GA Kaila, Jarmo, Helsinki Finland Martin, Jim, Roswell, GA Phillips, John, Roswell, GA Sopanen, Jari, Roswell, GA

ANTHONY ROSS COMPANY

Adams, Wayne, Clinton, NC

AUSTIN FIRE EQUIPMENT

Ritchie, Russell, Prairieville, LA Tourres, Jack, Prairieville, LA

AXA CORPORATE SOLUTIONS Abel, Fred, Lyon, France

BABCOCK & WILCOX

Blazer. Phil, Charlotte, NC Dickinson, Jim, Barberton, OH Hicks, Tim, St. Marys, GA Hiner, Larry, Barberton, OH Krekeler, Daniel, Cincinnati, OH Kulig, John, Barberton, OH Osborne, Steve, Barberton, OH Pon, Ronald, Napa, CA Sherlock, Bentley, Atlanta, GA Yash, John, Atlanta, GA

BE&K CONSTRUCTION

Dean, Jerry, Gainsville, GA Cotton, Kelly, Birmingham, AL Darnall, Bill , Birmingham, AL Darnall, Glenn , Birmingham, AL

BLUE RIDGE PAPER PRODUCTS

Holland, Brook, Canton, NC Shope, David, Canton, NC

BOISE, INC.

Bazarow, Jeff, DeRidder, LA Bethune, Larry, Jackson, AL Blaylock, Tommy, Jackson, AL Breaux, Bob, Jackson, AL Erickson, Leonard, Boise, ID Heritage, Johnny, Jackson, AL Hill, Wes, Saint Helen's, OR Schlieff, Scott, Wallula, WA

BOWATER

Hornsby, John, Catawba, SC

BRITT'S INC.

Elam, Stan, West Point, VA

BUCKEYE TECHNOLOGIES

Streit, David, Perry, FL

BUCKMAN LABORATORIES

Borsje, Henk, Duxbury, MA Fannin, Tim, Lugoff, SC Graham, Jim, Memphis, TN Hoffman, Ron, Clintonville, WI Olavessen, Len, Memphis, TN

CNA RISK CONTROL

Walker, Billy, Apex, NC

CHARLES HIGGINBOTHAM, PE, LLC

Higginbotham, Charles, Saint Simons, Island, GA

CIANBRO CORPORATION

Birney, Bill, Pittsfield, ME Godin, Rick, Pittsfield, ME

CLEMENT CONSULTING Clement, Jack, Copley, OH

CMPC CELULOSA S.A. Garrido, Marcelo, Nacimiento, Chile

DIAMOND POWER

Adams, Jason, Lancaster, OH McAllister, Phil, Lancaster, OH Youssef, Simon, Lancaster, OH

DOMTAR PAPER COMPANY

Avery, David, Bennettsville, SC Bohn, Allan, Plymouth, NC Cahoon, Chris, Plymouth, NC Crouse, Ray, Bennettsville, SC Gore, Chris, Bennettsville, SC Worsham, Jesse, Bennettsville, SC

ENERFAB

Shull, Tom, Cartersville, GA

EXTRA HAND PLANT SUPPORT SERVICES

Phelps, Bob, Chester, VA

FLUOR CORPORATION

Lewis, John, Greenville, SC

FM GLOBAL

Beaulieu, Andre, Montreal, Que. Chuchro, Dan, Richmond, VA Coldwell, Sandy, Plano, TX Cooke, Craig, Oconomowoc, WI Cooper, Mark, Stockholm, Sweden Crysel, Scott, Plano, TX Farnbach, Cori, Plano, TX Farnbach, Cori, Plano, TX Hoffman, Daryl, Prosper, TX Judge, Chris, Manchester, UK Lang, Dave, Plano, TX Morgan, Rick, Plano, TX Onstead, Jimmy, Plano, TX Parrish, David, Norwood, MA Polagye, Mike, Norwood, MA

FOSSIL POWER SYSTEMS

Anderson, Paul, Dartmouth, NS Donahue, Mark, Dartmouth, NS

FPINNOVATIONS (d/b/a PAPRICAN)

Singbeil, Douglas, Vancouver, BC

GEORGE H. BODMAN, INC.

Bodman, George, Kingwood, TX Gaus, Jeff, Kingwood, TX

GEORGIA PACIFIC

Moyer, Scott, Palatka, FL DeCarrera, Robert, Atlanta, GA Morency, Karl, Atlanta, GA Smith, Roger, Snellville, GA Tavares, Alarick, Atlanta, GA Tenbrunsel, Robert, Atlanta, GA

GLATFELTER

Free, Roger, Chillicothe, OH Gentzler, William, Spring Grove, PA Young, Dan, Chillicothe, OH

GLOBAL RISK CONSULTANTS Jackson, Christopher, Beaverton, OR Smith, Andy, Atlanta, GA

GOMMITECH Gommi, Julius, Maple Valley, WA

GRAPHIC PACKAGING INTERNATIONAL Hutchison, Frank "Hutch", Macon, GA

HARBISON-WALKER REFRACTORIES Williams, Dennis, Birmingham, AL

HARRIS GROUP Worley, Matt, Atlanta, GA

HERCULES Johnston, Norris, Laceys Spring, AL

HSB GROUP Hess, Ron, Buckhead, GA Tessier, Henry, Hartford, CT

INTERNATIONAL PAPER

Barrineau, Hugh, Eastover, SC Clay, Dean, Loveland, OH Fredrickson, John, Loveland, OH Fuhrmann, Dave, Loveland, OH Kiper, Mike, Loveland, OH MacIntire, Wayne, Loveland, OH Sargent, Mark, Loveland, OH Weinberg, Marla, Loveland, OH

IRVING PULP & PAPER

Mott, Dan, Saint John, NB Jacobs Engineering Rickard, John, Greenville, SC

JANSEN COMBUSTION

Dye, Ned, Kirkland, WA Verloop, Arie, Kirkland, WA Page - 18 JOHN E. COVER ENGINEERING, INC. Cover, John, Birmingham, AL

K-PATENTS, INC. Gronowski, Eric, Naperville, IL Miller, Adam, Naperville, IL KPyorala, Keijo, Naperville, IL

LEWIS B. BRINGMAN Bringman, Lewis, Baltimore, MD

LINCOLN PAPER & TISSUE Davis, Tim, Lincoln, ME LaFlamme, Alan, Lincoln, ME

LIQUID SOLIDS CONTROL Sweeney, Michael, Upton, MA

LONGVIEW FIBRE Gregory, L. Jay, Longview, WA

LUMBERMEN'S UNDERWRITING ALLIANCE Correa, Antonio, Boca Raton, FL

MARATHON PULP Koevoet, Michael, Marathon, Ont.

MATRIX RISK CONSULTANT Garfield, Michael, Lowell, ME

MEADWESTVACO Andrews, John, Charleston, SC Jones, Jesse, Phenix City, AL Murch, Douglas, Glen Allen, VA

METSO POWER

Abrams, Larry, Charlotte, NC Blackard, Vernon, Charlotte, NC Borduas, Pierre, Charlotte, NC Brunetti, Louis, Charlotte, NC Gantt, Melissa, Charlotte, NC Geedey, Jim, Charlotte, NC Horcoff, Rod, Vancouver, BC Langstine, Bob, Charlotte, NC Nichols, Jody, Charlotte, NC Wasson, Eric, Charlotte, NC Weikmann, John, Charlotte, NC

NALCO

Morgan, Mitch, Naperville, IL Novak, Scott, Naperville, IL Totura, George, Naperville, IL

NATIONAL BOARD OF BPVI Bynog, George, Columbus, OH

NEWPAGE CORPORATION Bohman, Heath, Wisconsin Rapids, WI Pumper, Peter, Wisconsin Rapids, WI

NORAM ENGINEERING Bucher, Wayne, Birmingham, AL Lockhart, James, Birmingham. AL

PACKAGING CORP. OF AMERICA

Carter, Eric, Valdosta, GA Ghally, George, Valdosta, GA Lobermeier, Jake, Tomahawk, WI Stelling, John, Tomahawk, WI

POTLATCH

Bliss, Dave, McGehee, AR Randall, Tatiana, McGehee, AR

POWER SPECIALISTS ASSOC. INC.

Stempa, Jim, Sommers, CT Zawistowski, Bob, Somers, CT Page - 19 **PROCESS ENGINEERING, INC.** Almond, Charles, Birmingham, AL

PROCESS EQUIP/BARRON INDUSTRIES

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

PROTERRA-POWER Proterra, Joe, Gainesville, GA

RAYONIER Dean, Sam, Jessup, GA

RICK SPANGLER, INC. Spangler, Rick, St. Simons Island, GA

RINAN, INC. Pothier, Richard, Peabody, MA

RMR MECHANICAL Roy, Bob, Cumming, GA

SAPPI FINE PAPER Aderman, Craig, Westbrook, ME Boudreau, David, Skowhegan, ME

SIMPSON TACOMA KRAFT COMPANY Crawford, Steve, Tacoma, WA

Fay, Michael, Tacoma, WA

SMURFIT KAPPA CARTON DE COLOMBIA Cubillos, Jairo, Cali, Colombia Franco, Daniel, Cali, Colombia

SMURFIT KAPPA CARTON DE VENEZUELA

Costra, Jorge, San Felipe, Yaracuy, Venezuela

SMURFIT-STONE CONTAINER

Baker, Ken, Florence, SC Brown, Monty, Fernandina Beach, FL Buzzell, Maurice, La Tuque, Quebec, Canada Drose, Wes, Florence, SC English, Phil, Jacksonville, FL Johnson, James, Missoula, MT Lykins, Michael, Carol Stream, IL Mills, Drexel, Missoula, MT Smith, Dan, Hodge, LA Trampler, Fernandina Beach, FL Walker, Sy, Fernandina Beach, FL

SOUTHERN ENVIRONMENTAL

Shepherd, David, Pensacola, FL

SWISS RE GAPS

Goddard, Robert, Tupelo, MS

TEAM INDUSTRIAL SERVICES

Rackley, Jack, Charleston, SC Watkins, Tom, Daphne, AL

TEMPLE-INLAND

Ja'arah, Majed, Orange, TX

Page - 20

THILMANY LLC Glasheen, Mike, Kaukauna, WI Lamers, Randy, Kaukauna, WI

VERSO PAPER

Navojosky, Frank, Jay, ME

WEYERHAEUSER

Barreca, Cliff, New Bern, NC Beder, Hank, Federal Way, WA Bland, Ashley, PortWentworth, GA Burnette, Richard, Oglethorpe, GA Coyle, Wendy, Springfield, OR Hinman, James, Federal Way Knowlen, Bruce, Federal Way, WA Slagel, David, Savannah, GA Weum, Roger, PortWentworth, GA

XL GAPS (SWISS RE)

Franks, James, Somerville, TN Rawls, Lynn, Perkinston, MS Sides, Michael, Ocoee, FL

ZAMPELL REFRACTORIES

Barrett, Lynn, Tampa, FL

INTRODUCTION

BLRBAC's Chairman, Len Erickson, called the meeting to order at 8:00 a.m. on Wednesday, April 9, 2008.

CHAIRMAN: A couple points of order this morning. First there will be two votes today. They are on "Fire Protection in DCE's" and "Waste Streams Incineration." Those votes will be held at the end of the respective reports. For the votes, the attendees with red ribbons are the voting members. We request that they stand up for the vote and then raise their hands for either aye or nay.

This meeting, as well as all BLRBAC meetings, is being held in accordance with BLRBAC Anti-Trust Guidelines as stated in the By-laws.

OLD BUSINESS

ACCEPTANCE OF THE SPRING 2006 MEETING MINUTES – Len Erickson

The members were all e-mailed notification when the fall 2007 Meeting Minutes were posted on the BLRBAC website. I assume you have perused those and studied them in detail. Do I have a motion to accept the Minutes as posted? Second? The fall 2007 Meeting Minutes have been accepted as posted.

NEW BUSINESS

1. **NEW MEMBERS/REPRESENTTIVE CHANGES REPORT** – Mike Polagye

NEW REGULAR MEMBERSHIP – None Reported

NEW ASSOCIATE MEMBERSHIPS

Enerfab – boiler maintenance contractor Tom Shull designated as Associate Representative Andy Stetzler designated as Alternate Associate Representative

Extra Hand Plant Support Services – consultant for recovery boiler operation and maintenance

Robert Phelps designated as Associate Representative No one designated as Alternate Associate Representative at this time.

1. NEW MEMBERS/REPRESENTTIVE CHANGES REPORT – (Continued) NEW ASSOCIATE MEMBERSHIPS – (Continued)

BE&K Construction – Boiler Group

Bill Darnall designated as Associate Representative Jerry Dean designated as Alternate Associate Representative

Austin Fire Equipment – recovery boiler smelt bed cooling services Jack Tourres designated as Associate Representative Russell Ritchie designated as Alternate Associate Representative

NEW CORRESPONDING MEMBERSHIPS – None Reported

REGULAR REPRESENTATIVE CHANGES

Tembec

John Allen replaced Carl Terrell as designated Representative

Domtar

Chris Gore replaced William Adams as designated Representative David Avery replaced Tim Reid as designated Alternate Representative

ASSOCIATE REPRESENTATIVE CHANGES – None Reported

CORRESPONDING MEMBERSHIP CHANGES – None Reported

MEMBERSHIP COMPANY NAME CHANGES

Boise, Inc.

Previously d/b/a Boise Cascade

{Secretary's Note: The Company Membership List posted on the BLRBAC website is out of date, not reflecting all the mergers, acquisitions, and name changes that have occurred. Anyone who sees something that needs changing should bring it to the attention of the BLRBAC Secretary.}

2. **EXECUTIVE COMMITTEE REPORT** – Len Erickson

The Executive Committee met in closed session Tuesday afternoon. In attendance were Mike Polagye as Secretary; Ron Hess as Treasurer; Jimmy Onstead as the insurance company representative; Jim Dickinson as the boiler representative; Dave Fuhrmann as the operating company representative was absent; Scott Moyer as vice-chairman; and myself as chairman.

The committee covered a number of topics.

In response to an Executive Committee request for clarification made last year, Arun Bhandari of FM Global reported that at this time it does not appear that BLRBAC is actually codified in Western Canada. He is following up with government authorities to confirm. Over the years it has been reported that BLRBAC recommended practices were a statutory requirement in the western Canada Provinces. BLRBAC is following-up to let the members know if this is or is not the case.

The Executive Committee has been working on a Records Retention Policy. As the organization gets older, there is a need to sort out the records that are or are not required to be retained. The Records Retention Policy was presented to the Executive Committee. The Executive Committee modified it and voted to accept it. This policy will be included in the Operating Procedures.

A Conflict of Interest Statement it is still being worked on. The statement will be presented at the fall meeting. Standard Anti-Trust verbiage will be added to the Operating Procedures and will be available to the committee chairs to be used at the fall meeting.

An item discussed at the fall 2007 meeting was that a number of companies had approached the Executive Committee about the formation of a Water Treatment Subcommittee. A Task Force was assigned, met, and an outline prepared. Would Norris Johnson from Hercules please come up and present the findings?

NORRIS JOHNSTON: The Executive Committee has agreed to sponsor a subcommittee on water treatment. We haven't defined the scope of work or the work product that is expected, although clearly our charge will be to provide suggestions and recommendations that are designed to protect the safe operation of a recovery boiler and all the water systems that support it.

We will probably also include some operating practices, but again those kind of decisions have not yet been made since the committee is not fully formed.

A preliminary list for this committee's membership is being put together at this point from some people that I have spoken to and includes operating companies, insurance representatives, consultants, and water treatment suppliers. I will also be glad to add

2. **EXECUTIVE COMMITTEE REPORT** – (Continued)

names to the list of anyone who is interested. I will follow-up sometime between now and the fall regarding committee formation and discussions that need to take place.

My e-mail address is <u>njohnston@herc.com</u>.

(For background information, see *Appendix A* -- "**Water Treatment Committee Justification and Structure**")

CHAIRMAN: And as the final item for the Executive Committee report, the Executive Committee is reviewing the Operating Procedures that are an Appendix to the By-laws. We will be adding some of the procedures that have been voted on over the past five or six years by the Executive Committee into the Operating Procedures so that they are formalized and readily available to those that want to review them. The BLRBAC Operating Procedures and By-laws are posted on the BLRBAC website.

3. TREASURER'S REPORT – Ron Hess

For the spring 2008 meeting we had 170 Advance Registrations and 39 At-Door. That puts us around the 210-215 mark. We have been at this level of attendance for the past three or four meetings. Of the 209 attendees, we had 22 operating companies represented; four boiler companies; seven insurance companies; 29 Associate members and four guests of member companies. We always like to thank our foreign guests and visitors that travel to come to this meeting. We have representatives from Colombia; Venezuela; Chile; Great Britain and France. We appreciate their traveling and their participation.

On the financial side, as of this morning we have:

Checking Account	\$41,134.00
Certificate of Deposit	\$13.759.00

So, financially we are doing fine. Of course this is before all the bills that we have accumulated here have been paid. The 2007 income taxes and our Not-For-Profit status have been filed and renewed again for this year. I always ask, if somebody is interested in learning this job, I would be more than pleased to have a trainee or someone else to help out!

One other item, the Hotel Contract runs out next year. So if there is anybody interested in giving me feedback, discussing hotel issues or wants to help me look at different facilities, just let us know and we will consider it in the future contract negotiations. We are always open to the suggestions and recommendations from our members.

4. **SECRETARY'S REPORT** – Mike Polagye

Just a reminder that the BLRBAC Executive Committee and the staff that supports BLRBAC are all volunteers, with the exception of Barbara Holich who is paid for secretarial services. The only revenue that BLRBAC receives is from the meeting registrations and we carefully watch expenses to keep our revenue and cash flow in balance. So when we talk about finding a new hotel or we talk about looking for a volunteer for a different position, whether it is a subcommittee position, treasurer, secretary, etc., we are all volunteers and are not getting paid for this. This is in addition to our regular jobs and we very much appreciate people stepping forward and offering assistance.

That being said, I received an e-mail from Barbara a few weeks ago stating that "incomplete" registration forms were being submitted to her. There isn't a whole lot of information being requested on them; your name, company, address, phone, fax and e-mail address. Barbara uses that Registration Form to check the BLRBAC membership database, complete the Meeting Minutes' Attendee Lists and update the e-mail address book to make sure she has you associated with the correct company. (People change jobs, sometime a company changes their name, etc.) She needs this information, as it is the only way she can keep the records up-to-date and as accurate as possible. I don't know how all of you get the Meeting Registration Notice with the Registration Form, but it is posted on the BLRBAC website (www.blrbac.org) at about the same time the e-mail gets sent out notifying you that it is available and that it is time to register for the meeting. On the website the Meeting Registration Form is a separate MS Word document, which gives you the option of printing it and then filling it out by hand, or downloading it to your computer and typing in the information and then printing it out. Registrations aren't complete until the Registration Form and the check are in Barbara's hands. She sends an acknowledgement to each individual who sends in a registration form with a check, providing she has their proper e-mail address. If you don't get a response within a week of having sent in your registration and check, you might want to check with her to see if she has received it. Occasionally things do get lost in the mail or somehow get overlooked. We don't want that to happen!

SECRETARIAL SERVICES REPORT – Barbara Holich

It is required that each regular member company (boiler insurers, boiler operators and boiler manufacturers – voting members) keep me advised of names and e-mail addresses of their designated Representative and designated Alternate Representative. Preferably they will be someone who regularly attends BLRBAC. It is the member company's responsibility to keep me informed of any changes in representation by e-mailing me. A "Representative Change Form" is posted on the BLRBAC WEB to make it easier for management to submit the changes in responsibility and/or any e-mail address changes.

4. SECRETARIAL SERVICES REPORT - (Continued)

Anyone who wishes to be added or deleted from the BLRBAC e-mail list, please e-mail me (<u>fhholich@aol.com</u>) your intentions. Include your name, company and your e-mail address.

Someone is needed to take the initiative (in best case scenario, this should be the designated Representative) to keep me advised 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 notification (letter, fax, or e-mail are acceptable) 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 notice of meetings and meeting minutes will only be sent via e-mail. If an e-mailed notice is returned to me as "undeliverable," that e-mail address will be deleted from the BLRBAC database after a second attempt has been made. This second attempt is made in case someone's mailbox is full or there was a system problem at the time of the first mailing.

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 (<u>fhholich@aol.com</u>) and supply me with the name and e-mail address of whomever will fill your vacated position within BLRBAC.

Per BLRBAC's policy, BLRBAC's Secretarial Services will verify receipt of meeting registrations and checks via e-mail when appropriate e-mail addresses are given on the registration form. Despite the comment on the Registration Form not to fax me registration forms, before every meeting I receive five or more faxed documents. Be advised that these faxed registration forms are of no use to me until the appropriate fees are paid. Therefore, please **DO NOT FAX REGISTRATION FORMS**!! – unless it's accompanied by a note explaining why your check will be arriving separately.

5. SUBCOMMITTEE REPORTS

5.1 AUXILIARY FUEL REPORT – Dave Streit

The Auxiliary Fuel Subcommittee met in open session on Monday afternoon in the Fitzgerald Room. There were 3 members/alternates and 10 guests present at the meeting.

5. SUBCOMMITTEE REPORTS – (Continued) 5.1 AUXILIARY FUEL REPORT – (Continued)

No subcommittee meeting was held during the fall 2008 meeting and there was no hold over business/"old business" from the meeting last spring. Therefore our agenda was based on "new business", primarily issues received by e-mail during the last week and issues from the floor.

The question was asked via e-mail if the Auxiliary Fuel Subcommittee document should include language similar to language included in the Safe Firing of Black Liquor document ("New recovery boilers should be equipped, and existing units should be retrofitted with the black liquor safe firing system described....") that makes it clear that existing units should not be "grand fathered in" with older designs, but should be retrofitted to include the latest recommendations.

After significant discussion, it was the opinion of the subcommittee members that BLRBAC is not a regulatory agent. We can't dictate what designs must be included on new equipment or what design changes must be made to existing equipment or when changes must be made. Our document presents our best recommendations based on the collective knowledge and experience of the membership. Each company should evaluate what designs are included for their equipment. Generally, decisions should include input from their insurance carrier and any jurisdiction requirements. It is believed that final resolution of this question should be an Executive Committee decision. It was agreed the question would be passed on at the "Executive Committee meeting with Subcommittee Chairman" meeting.

Another question asked via e-mail was related to the logic regarding furnace pressure (high and low) trip logic. The concern was that recommendations from manufacturers and NFPA 85 were in conflict with the Auxiliary Fuel document. Included in the e-mail was a detailed write-up from Babcock & Wilcox on furnace pressure tripping philosophy. The write-up included pressure set points for alarms and trips for both high and low furnace pressure and when master fuel trips should occur and any time delays recommended for shutting down I.D. and/or F.D fans. A pdf file of the Babcock & Wilcox write-up is included in the minutes. (See *Appendix B* -- **B&W's Furnace Pressure Tripping Philosophy**)

The subcommittee members and guests reviewed the write-up. It was explained that the logics in the Auxiliary Fuel document are only block logics based on design principles, and they are not intended to be for detailed design. The block logics do not define set points, the requirement to use or not use time delays, or time delay restrictions.

5. SUBCOMMITTEE REPORTS – (Continued) 5.1 AUXILIARY FUEL REPORT – (Continued)

Each boiler design is unique, and the detailed design must de developed by the designers and manufacturers based on the specific design needs of the equipment. In addition to the equipment needs, the detailed designs must consider operability, testing, and how to insure failsafe conditions. It would be impossible for a BLRBAC document to include this level of detail.

It was the opinion of the subcommittee membership that our block logics are adequate as written, and are not in conflict with the B&W write-up.

There was discussion on potential future topics, including scanner failure/ false flame and dissolving tank level/smelt spout cooling water flow requirements prior to purging the boiler. These topics will be worked on in detail at the appropriate time.

One guest discussed a new system design on his boiler where the fuel supply and recirculation valves would trip when the last auxiliary burner is removed from service, even though purge credit is maintained by burning black liquor. It was explained that the burner management system supplier to be compatible with NFPA 85 requirements included this design. The supply and recirculation valves can immediately be reopened, but this requires operator action.

It was explained that the Auxiliary Fuel document does not require the supply and recirculation valves to close unless there is complete loss of flame, and the design may be changed, if desired, to eliminate additional operator task.

A question was asked if the Auxiliary Fuel Subcommittee should be involved in details on how furnace pressure should be measured, i.e. number of taps, transmitters, etc. It was the opinion of the subcommittee membership that the Auxiliary fuel Subcommittee should determine if a measurement, such as furnace pressure, is needed, but the Instrumentation Subcommittee has the expertise and experience in their membership to better determine the best method to accurately and reliably make the measurement.

The meeting was adjourned, as there were no more issues or concerns to be discussed. There will be no Auxiliary Fuel Subcommittee meeting next fall. The next meeting of the Auxiliary Fuel Subcommittee will be held in one year, during the spring 2009 BLRBAC meeting.

5. **SUBCOMMITTEE REPORTS** – (Continued)

5.2 BLACK LIQUOR REPORT – Mark Sargent

Nine members and approximately 40 guests attended the morning session. Eight members and approximately 25 guests attended the afternoon session.

The fall 2007 meeting minutes were reviewed and approved.

The subcommittee is continuing to investigate and explore recommendations for operator green liquor density testing frequency and methods, i.e.; baume vs. T.A. There are some thoughts that when sulfidity levels are high there is a separation of T.A. vs. baume. The SFBL Subcommittee will be actively pursuing and collecting more information from the industry at large. Nikolai DeMartini, IPST has done some preliminary research along with AF&PA to determine if a research project is justified. We will continue to watch developments.

IPST performed a review of the history of dissolving tank incidents on record from the BLRBAC case histories. We received the report from IPST and have found areas of our document that need clarification or improvement and we will be working on several items between this meeting and the Fall 2008 meeting.

The SFBL Subcommittee will review new wording for guidelines for non-water cooled spouts in our document for Executive review for the Fall 2008 meeting.

Another item we will discuss as a group is the black liquor permissive starting logic. We have had discussions since the Fall 2007 meeting as to whether or not the document needs improvement for the black liquor starting logic. We will draft language for Executive Committee review regarding black liquor permissive purge logic. Presently our document requires "sufficient hearth burners in service as a black liquor header purge permissive. Our intention is to further define the purge permissives to include recovery boiler steam being admitted to the outlet steam header, stable firing established, and SH platens cleared of condensate.

Improvements to the document logic drawing changes were discussed. These are listed below:

<u>Figure 1 – Common Permissive Starting Logic – Shared w/ SF Aux</u> <u>Fuel</u>

5. SUBCOMMITTEE REPORTS – (Continued) 5.2 BLACK LIQUOR REPORT – (Continued)

"Prove fuel header supply safety shutoff valves closed" is currently shown as a permissive to start the first ID fan. This should also be specifically noted as a boiler purge permissive.

"No flame proven" should be added as a required boiler purge permissive.

Some discussion from our subcommittee if proof of smelt spout cooling water flow and dissolving tank level should be permissives to establish purge credit. We will submit to SF Aux. Fuel for their input.

Figure 2 – Permissive Starting Logic for Black Liquor Firing

"Prove all black liquor guns out of furnace" is currently shown as a permissive to start the black liquor pump. This should also be specifically noted as a permissive to open/close the header/divert valves as well as a BL header purge permissive.

"Sufficient aux fuel hearth burners in service" is a permissive to open the black liquor header and close the divert valve; it should also be added as a BL header purge permissive.

Figure 4 – Common Protective Tripping Logic

A question has arisen as to whether or not operating class 1 igniters is sufficient to maintain boiler firing in the event of loss of stable liquor firing. Wording in "No auxiliary burners in service" block may need to be modified.

Figure 5 – Protective Tripping Logic for Black Liquor Firing

Similar question as for Figure 4: are class 1 igniters sufficient to maintain liquor firing below 30% MCR?

"BL header valve or divert valve failure" should be added as a mandatory black liquor trip.

New Business:

We review questions and/or clarifications received from member companies since the Fall 2007 meeting or assignments to Subcommittee members:

5. SUBCOMMITTEE REPORTS – (Continued) 5.2 BLACK LIQUOR REPORT – (Continued)

- We fielded a question regarding the NFPA and OEM requirements for fan tripping. We have decided not to be specific and prescriptive of code requirements in our document; rather we have general guidelines. More specific guidelines should be between the owner/operator, the OEM, and insurance carrier.
- We fielded a question regarding guidelines for dissolving tank explosion relief. We feel that we should provide some guidelines regarding the good working condition of this equipment. However, specific guidelines for how much explosion relief should be provided is a design specific issue best addressed by the owner/operator and the OEM.

We have had one member resign from the Subcommittee and therefore, we are seeking to add one operating company representative. Please contact Mark Sargent or any member of the Subcommittee or the Executive Committee if you are interested.

KARL MORENCY: Mark, was there any discussion about adding the changes to the Safe Firing of Black Liquor where the incidents we were talking about yesterday where you get a high furnace pressure trip in combination with a low drum level trip and closing off the feed water valve? I think your committee is probably the appropriate place to address that and I think it is something we should seriously look at.

MARK SARGENT: We did not discuss that. However, we will add it added to our action list for work between now and the Fall 2008 meeting.

CHAIRMAN: That did come up in the Executive Committee yesterday, Karl, and followup was to direct the Safe Firing Committee to follow-up on that.

5. **SUBCOMMITTEE REPORTS** – (Continued)

5.3 ESP SUBCOMMITTEE REPORT – John Andrews (Also see *Appendix C* – Incident List and *Appendix D* - Slide Presentation)

The ESP Subcommittee met in closed session on Monday April 7th with 12 members present. Greg Manzulenko who represents Western Canada BLRBAC resigned from the committee due to a change in employment. We are waiting to find out who will be the new representative from Western Canada. The Subcommittee met in open session on Tuesday morning April 8th with 12 members present and about 180 guests. During the open session, the Subcommittee reviewed 25 incident reports from North America and one international incident. Of the 25 incidents, there were no boiler explosions or dissolving tank explosion reported. Thirteen (13) of the leaks were classified as critical incidents and 11 were non-critical incidents. One incident was an ESP with no leak. An ESP was performed in 9 of the incidents including 6 of the critical incidents representing 46% of the critical incidents reported but represents 50% of the critical incidents that should have been ESP'd. Generally, the classification of Critical Incident implies that the boiler should have been ESP'd because water could have entered the furnace cavity. In one case, the leak was discovered at a time when molten smelt would not have been present in the furnace. This percentage is below the recent history of 60 - 67%.

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).

<u>**Critical Incidents:**</u> 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.

5. SUBCOMMITTEE REPORTS – (Continued) 5.3 ESP SUBCOMMITTEE REPORT – (Continued)

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

Some explosions reported before 1999 occurred with no discernable damage or injury, but were reported to be an explosion. Before 1999, the term Critical Exposure was used rather than Critical Incident. A Critical Exposure required the presence of smelt that could be contacted by the water. If there was a leak found and there was a clean furnace, it was considered a Non-critical Exposure. The 1999 change had the effect of increasing the cases classified as Critical Incidents from this standpoint.

It should be noted that there were five smelt water reactions reported but no discernable damage was reported. One was from a lower furnace leak, two from floor tube leaks and one during a boiler waterwash. We are continuing to have some very close calls.

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, the red were listed as critical incidents and the blue mark indicates an ESP with no leak. The leaks locations are summarized as follows:

- 9 Economizer
- 2 Superheater
- 7 Boiler Bank
- 0 Furnace Screen
- 3 Wall Tubes
- 2 Floor Tubes
- 1 Smelt water reaction during a waterwash
- 1 ESP w/ no leak

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:

5. SUBCOMMITTEE REPORTS – (Continued) 5.3 ESP SUBCOMMITTEE REPORT – (Continued)

- 3 Fatigue
- 2 Thermal Fatigue
- 4 Thinning
- 4 Weld Failure
- 5 Stress Assisted Corrosion or Corrosion Fatigue
- 4 Overheat
- 1 Mechanical Damage
- 1 Operation

There were four incidents that were due to overheat that highlights the importance of proper tube clearing procedures on start-up and particularly after trips.

How Discovered

Operator observations during boiler walkdowns continue to be the prevalent method of detecting leaks and accounted for identification of 20 of the leaks (67%). Four (4) of the leaks were identified by the control room and one of the leaks was discovered by a hydrostatic test during an outage.

Leak detection systems were installed on units in 14 of the incidents (58%), which is on par from past meetings; but none of those systems first detected the leaks. Seven of the economizer leaks were on boilers that had leak detection systems installed. The effectiveness of lead detection systems is dependent on them being in proper working order and mills should consider dedicating maintenance personnel to the calibration and repair of those systems.

The Subcommittee has been looking at the time between the initial indication of the leak and the initiation of the ESP. The incidents reviewed showed that for those incidents that an ESP was performed, the time between initial indication of the leak and the initiation of the ESP ranged from about one minute to more than 24 hours. The median time between the first indication of a leak and the initiation of the ESP for the 8 incidents that provided a time line was 32 minutes which indicates there still is room for improvement in making the decision to ESP. The hazard of looking for leaks after low drum level trips with high furnace pressure should continue to be emphasized in training.

Incident Review

Appendix D contains a summary of the incidents reviewed during the meeting.

5. SUBCOMMITTEE REPORTS – (Continued) 5.3 ESP SUBCOMMITTEE REPORT – (Continued)

We are receiving most of the reports electronically and the Subcommittee has initiated a procedure to acknowledge the receipt of all Incident Reports that are received in order to make sure no reports are lost in "cyberspace". Often the reports become large files when pictures and diagrams are attached so there have been some issues with getting through the e-mail system. Whenever you submit an Incident Report, you should receive a confirmation within a week. If not, please contact the Secretary, Jules Gommi, to see what happened to the report.

Figure 2 shows the critical incidents reported each year. The 13 Critical Incidents represents only half the year so if it is annualized, it appears to be about where we have been running in the recent past. The increasing trend may be a result of changes in the definition of Critical or could result from better reporting by the mills. A third possibility may be indicative or the increasing average age of the recovery units in North America.

Figure 3 shows that there has been a significant reduction in the reported boiler explosions with no reported explosions since 2002 and only four boiler explosions in the last 10 years. The five-year rolling average is now down to zero. Even with several close calls of late, this trend is encouraging. The absence of Auxiliary Fuel and Black Liquor Pyrolysis Gas explosions since 1992 indicates the positive impacts made through the implementation of the BLRBAC Safe Firing Guidelines.

The Durango incident in 2002 is listed as "Unknown" under the explosion type. The Subcommittee has determined that without a formal report being submitted, there is insufficient information available to the subcommittee to definitively identify the cause.

Figure 4 shows the history of dissolving tank explosions and none have been reported so far this year. There were no incident reports for dissolving tank explosions submitted prior to 1973 and the incident rate appears to be increasing since that time although it may be that more dissolving tank incident reports are being submitted now where they may not have been reported previously. AF&PA has released their report of Dissolving Tank Explosions and several recommendations from that report are being considered by the Safe Firing of Black Liquor Subcommittee to be added into their document.

5. SUBCOMMITTEE REPORTS – (Continued) 5.3 ESP SUBCOMMITTEE REPORT – (Continued)

Figure 5 is a plot of explosion history per 100-boiler operating years. This is a statistical summary of the experience across the industry. The smelt water explosion experience is continuing to trend down over time and is just above 0.5 explosions per 100 boiler operating years. The total explosions, which includes dissolving tank explosions, is also starting to drop slightly at just under 0.9 explosions per 100 boiler years. The Total Explosions includes all causes combined, and is being driven by the recent dissolving tank explosions. The factor is calculated by a summation of all reported explosions since 1948 divided by a summation of the number of boilers reported in service each year during the same period. We all need to continue making the effort to keep these graphs trending down. Effort should be focused in developing better procedures to handle heavy smelt runs and plugged spouts.

Learnings

There were several incidents reported that were very close calls and five reports indicated that a smelt water reaction occurred but there was no damage reported. The reports of the two floor tube leaks and the one leak in the lower furnace wall all mentioned a smelt water reaction had occurred. There were two reports that mentioned a smelt water reaction during the waterwash. Two incidents had large generating bank leaks that put a large amount of water into the furnace but fortunately, no smelt water reaction occurred.

We still see problems identifying a leak from a large failure that causes a low drum level and high furnace pressure. Mills may want to consider an interlock that will close the feedwater control valve if there had been a low drum level trip along with high furnace pressure. The operator would have to go to the controller and open the valve. This may prevent the automatic controller going wide open and putting lots of water into the boiler in the time that the operator is evaluating the situation.

We are continuing to see problems with localized heavy internal tube deposits, especially at the air port openings. Localized corrosion or discoloration of the composite surface may indicate that internal deposits are present. Dents, depressions and weld push through on floor tubes are a concern because of the potential for steam blanketing downstream of that area.
5. SUBCOMMITTEE REPORTS – (Continued) 5.3 ESP SUBCOMMITTEE REPORT – (Continued)

The report of the superheater leak at Thilmany (Incident 12) provided excellent information on issues with clearing superheater tubes and the importance of using graphs of the individual superheater tube outlet temperatures. Even though the mill had a temperature limit of several degrees above saturation to show the tubes were clear, reviewing graphs of those temperatures showed that several tubes were above the minimum limit but they did not show the characteristic spike in temperature that occurs when the tube actually clears. The mill has since implemented standard graphs to review all temperatures before putting the unit back on liquor.

The smelt water reaction during a waterwash at Evadale (Incident 25) provided several learnings. The mill discovered that the insulation for the thermocouples was not rated for the high temperatures that are present in the furnace during cooldown and were giving false indications. It was clear that the mill should not rely on the assessment of a bed cooling contractor to determine when the bed is sufficiently cooled to begin the waterwash. All areas of the bed should be probed with thermocouples and not just those areas that are more easily accessible. The use of a thermal imaging camera can be helpful to locate hot areas of the bed but the temperature readings from the camera should not be used in place of actual thermocouple readings. Additional information on cooling the bed for waterwash can be found in Chapter 8 of the Post ESP Procedure document and Section 2.7 of the Recommended Guidelines for Personnel Safety. The Subcommittee will be reviewing the Post ESP Procedure to see if there needs to be any revisions based on these learnings.

It is human nature to try to find other explanations for problems such as leaks so it is important to emphasize leak detection and leak identification in operator training. Training should also emphasize that the appropriate operators have the authority to initiate the ESP without having to get approval from department supervision.

Clarification of "Dedicated Stand – Alone"

The Subcommittee continued to work on the appropriate language for a clarification of "Dedicated, Stand-Alone" as it refers to the ESP system architecture. Draft language has been submitted to the Executive Committee to forward to the Task Group that has been assigned to the process.

5. SUBCOMMITTEE REPORTS – (Continued) 5.3 ESP SUBCOMMITTEE REPORT – (Continued)

List of Operating Boilers

The lists of Operating Boilers in the USA and Operating Boilers in Canada is posted on the BLRBAC Website and will continue to be updated by Jack Clement. Please submit any updated information to him.

Incident Questionnaires

The Subcommittee appreciates the effort that is required to prepare the incident questionnaires since it is important to receive that information in order to help BLRBAC continue to provide guidelines for the industry.

The ESP Questionnaire continues to be updated and mills are requested to obtain the current version from the BLRBAC website if an incident needs to be reported. The completed form should be submitted to Jules Gommi at the e-mail address listed on the form. Please note that Jules' mail box is limited to a file size of 10 megabytes so please consider this limit when submitting the report. Jules will send out an e-mail confirmation to the mill any time he receives a questionnaire. If the mill does not receive that confirmation within a couple of weeks of submitting the form, please contact Jules to see if there is a problem.

Are there any questions?

DEAN CLAY: I guess I have a comment or a request, on your root cause pie chart, I would suggest for the Rayonier leak perhaps something like "false indication" instead of "operator error" be used. I believe they evaluated as best they could and made a good decision to ESP and I wouldn't want to imply by the chart that it was an error.

JOHN ANDREWS: That incident was not included in the root cause numbers. The operator error was the water wash incident saying that the operators made an error on starting to water wash before the bed was cool. There were only 24 incidents listed in the root causes and I did not address the Rayonier incident. That would not have been an easy one to pick up I guess. As we stated earlier, the Rayonier operators certainly did the right thing based on the information that they had at the time.

5. SUBCOMMITTEE REPORTS – (Continued) 5.3 ESP SUBCOMMITTEE REPORT – (Continued)

CRAIG ADERMAN: Personally I would like to thank you. It was a very informative report and nice summary. Also, it was very educational in what you portray. To kind of go along with what is expected in life, the better you do the more that is expected. We track critical incidents as a precursor to the probability that explosions are eminent. My request is, especially after attending this meeting and seeing how "lucky" we are some times, that you would you consider tracking smelt water reactions that are not classified as an explosion as part of the record?

JOHN ANDREWS: I think that from what we have seen the last two or three meetings, it is probably a good one to add in. We will take a look at that and probably will add that in the future. Thank you.

CHAIRMAN: I have one editorial following your report. It is kind of disturbing when you look at the bar chart that shows the critical incidents with ESP's verses critical incidents with no ESP's are just about equal. I think that is a challenge to us engineers, designers, operators and trainers to get out there. I don't know about your organizations, but in our organization we have some pretty significant turn over of the older guys that were there when the boiler started up and are now gone. There now are young guys out there who don't have the experience and don't get out of the control room and walk the boiler down, etc. I think we need to challenge the industry and ourselves otherwise we are going to face a serious problem.



Figure 1





KRAFT RECOVERY BOILER CRITICAL INCIDENTS

Figure 2

(Critical Exposure Classification Began in 1965, Changed to Critical Incident in 1999)

Minutes of Meeting

BLRBAC

April 7, 8 & 9, 2008

Page - 42



Figure 3

KRAFT RECOVERY DISSOLVING TANK EXPLOSIONS North America Pulp and Paper Industry 4.5 3.5 Total # 2.5 1.5 0.5 0 -YEAR

Figure 4



Figure 5

5. **SUBCOMMITTEE REPORTS** – (Continued)

5.4 **FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS REPORT** – Chris Jackson

The Fire Protection in Direct Contact Evaporators Subcommittee did not hold a meeting this time. We did have a meeting in October and one of the things we addressed was a question that had come to us last summer. It was an issue of clarification. We decided in October to make some changes to the document. They have been posted on the WEB site for your consideration and we are going to be holding a vote at the end of my report.

Apparently we have a very good document. We had very few questions about it and there have been people who have modified their fire suppression detection systems in their cascades and cyclones based on it. But we received very few questions. We also get very few incident reports. I would love to believe that there are no more incidents then have been reported, which is zero. But the cynical part of me suggests that there are incidents out there that are not being reported. There could be findings there that could bring value to the whole organization and I would encourage you, please if you have a near miss, if your fire suppression system trips for some reason, even if you don't have a fire, or if you do have a fire, please go to the WEB site. There is an easy Incident Report to fill out. My e-mail address is posted there. Please let us know so that the committee can discuss it.

In an effort to bring some more value to the group aside from incident evaluations, my committee would like to present some educational opportunities and some opportunities for discussion for the membership. In that spirit it is our plan that in October we will hold a meeting and have some presentations. I have asked some people whose business it is to inspect boilers and DCE's to consider making a presentation on the substance of their inspections and their findings. We have expertise within the subcommittee. I'm going to be asking the members to consider making presentations. We may have a panel discussion. However it turns out, I hope that the October meeting will be a valuable one for everyone who comes to visit. If I do e-mail you, please strongly consider coming and making some kind of offering to the membership. If you have a DCE, cyclone or cascade, please consider coming to the meeting and participating. We very much hope you will find value in it.

As always we look for new member. Are there any questions or comments?

At this time I will read the changes that we have proposed and that have been posted. The issue that came to the committee followed an internal audit by a company and the question of resetting the fire suppression system that had tripped was brought to the committee. The question was: "At what point should the system automatically reset itself?" Well, at that point we called a timeout because it is implicit in fire suppression systems that they not automatically reset, but that they be manually reset.

Page - 46

5. SUBCOMMITTEE REPORTS – (Continued) 5.4 FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS REPORT – (Continued)

So we looked at the document and our implicit assumption was not clearly spelled out. Two issues: (1) should it be manually reset and (2) when should it be manually reset. The first one we dealt with clearly; on the second one we used weasel words.

The changes are as follows:

Chapter 4 – Fire Suppression/Detection

- 4.1 The general section, we have added a single sentence paragraph that says: "Regardless of the means of activation, a manual reset should be required of the fire suppression system."
- 4.2.4 Additional Considerations
 - The second bullet was modified to add the sentence: "Manual reset should be based on a mill's procedure defining the reset criteria." Yes, that is weasel words! But the sentence prior to it says: "The system should not reset until it has been confirmed that the fire is out." We are not in the business of designing fire suppression systems. However, we are trying to put a performance document out there. Our document is intended to help you understand what needs to be accomplished. How you choose to accomplish that is up to the designer in conjunction with the owner/operator.

At this point I would like to call for a vote.

CHAIRMAN: Would the voting membership's representatives please stand. Are there any questions of the proposed changes? All in favor raise your hand. Opposed? The vote to approve changes to the document is unanimous.

5.5 **INSTRUMENTATION REPORT** – Dave Avery

The instrumentation subcommittee met in open session on Monday morning with 14 out of 15 members and 3 guests. Our session began with introductions of members and guests. This was followed by a review of March's minutes, which were accepted as written.

Our business session began with a dialog on the development of wording to address programmable devices and how they are installed, maintained and tested. This led too looking at our proposal to create a new insert 3.13.5 into the "EMERGENCY SHUTDOWN PROCEDURE (ESP) AND PROCEDURE FOR TESTING ESP SYSTEM FOR BLACK LIQUOR RECOVERY BOILERS" Recommended Good Practice section 3.13 Valves: Our submitted wording was:

5. SUBCOMMITTEE REPORTS – (Continued) 5.5 INSTRUMENTATION REPORT – (Continued)

"3.13.5 Valve Programming and Wiring

The actuators on rapid drain valves, and all other valves that operate during an ESP, should be arranged to move to their appointed ESP position regardless of any external interlocks, internal wiring and/or logic. Additionally, detailed attention is needed in the initial set up, programming, functional testing and maintenance of programmable actuated valves."

Concerns were presented that this encompasses more than just Rapid Drain Valves. It is felt that we should propose a modification to the existing section 3.13.4 Torque limits for Rapid Drain valves specifically and address all other valves in the Instrumentation document. We are scheduling time with the ESP sub committee to have Roger Smith meet with them in the fall and present our proposal for resolution.

We concluded the morning session by assigning Recommended Good Practices to teams for review. The review is a necessary to update the checklist.

The afternoon session had 14 members with 4 quests present.

Work focused on a common approach for the checklist update, adding "reference" and "working notes" columns to the checklist spreadsheet. This is to accommodate the development of a cross reference between the checklist and the related 'Recommended Good Practice". This is all part of our task to review Recommended Good Practices for updating the checklist. The review also includes the front-end of our document to keep it current with technology. As a footnote, the front-end of our document was developed when cassette tapes and bag cell phones were still popular. It needs some updating.

In our general review session, a healthy discussion developed on our document frontend usage of "Safety Instrument Systems" (SIS) terminology. When our document was re-written in the early 90's we attempted to standardize our language to fit the industry at that time. As time has gone by "Safety Instrument Systems" as defined by ISA SP84 far exceeds our intent and no longer fits our definitions for Recovery Boiler controls. Existing recovery boiler case history does not support the need for the extreme requirements of SP84 with multiple SIL levels. Based on this information, we will readdress our designation for "Safety Instrumented System" definition and all references in the Instrument Checklist with a term that better conveys our intent. We will remove the existing SIS terms within our document as part of our document review process.

The subcommittee has agreed to meet on Sunday afternoon before the fall meeting as a working session to expedite this process.

5. **SUBCOMMITTEE REPORTS** – (Continued)

5.5 **INSTRUMENTATION REPORT** – (Continued)

Finally, the instrumentation sub-committee would like for you to stop in and visit, we offer mind stimulating, robust conversation about essential industrial papermaking process application control integration as well as having fun with generic wordsmithing. We'll see you soon!

5.6 MATERIALS & WELDING REPORT – Jesse Worsham (Co-chair)

The Materials and Welding Subcommittee met in morning session on April 7, 2008 with 11 of 18 members represented and one guest.

Membership attendance was reviewed. One member was removed from the membership list at the request of the represented company.

Old Business

The chairman advised the group of the Executive Committee's comments after review of the document submitted to them for review. The Executive Committee advised that focus should be placed on completing references for material. Assignments were made to provide listings from various reference documents:

ASME – Dave Lang NACE – Billy Walker / Michael Lykins NBIC – George Bynog B&W Plant Services Bulletins – Steve Osborne TAPPI TIPs – Michael Lykins AF&PA – Dave Fuhrmann Alstom Power Bulletins – Dennis Hollenbach Welding Manual – Jesse Worsham Copper contamination of welds – Henry Tessier

New Business:

A conflict with sections 3.2.2 and 3.2.4 of the Recommended Good Practice for Personnel Safety was identified. These sections address weld inspection and the use of RT and UT for final inspection of all welds. At the Executive Committee meeting on Monday evening, Personal Safety clarified that no conflict was intended and the sections will be removed when M&W finalizes their language.

The subcommittee reviewed a draft document of an additional procedure, which was completed during the open meeting: Weld overlay repair of Pressure Boundary Tubes

The afternoon session met in an open meeting with 11 members present and 16 guests.

5. SUBCOMMITTEE REPORTS – (Continued) 5.6 MATERIALS & WELDING REPORT – (Continued)

The chairman presented a review of the closed meeting proceedings. Guest registration was completed with a solicitation for new members. A presentation was given on floor tube failure due to weld push through.

Document review continued through section 2.3 and is ready for subcommittee general review in preparation for submitting to the Executive Committee for review and approval.

The meeting adjourned at 3:45 pm.

Plans for the next meeting include:

Review welding and material references.

Update status on Individual and Task Team assignments.

Continue draft reviews and get subcommittee approval.

Consideration was given to development of a glossary to better define specific terms.

Jesse Worsham will develop a draft to present to the group next session.

- a. Develop Technical Bulletins for Materials -
- b. Chemical Cleaning George Bodman, Mike Garfield, Max Moskal
- c. Refractory Installation (sloped floor) Lynn Barrett, Steve Osborn
- d. Refractory Installation (decanting Hearth) John Heffernan, Dennis Hollenbach
- e. Tube coatings (fireside) -
- f. Tube coatings (cold side) Ron McCarty, Dan Phillips

Additional Technical Bulletins and Procedures will be developed, approved and inserted into the document as completed. Consideration will also be given to conducting another survey for other materials issues. Presentations of experiences to be discussed may be of interest to this group.

5.7 **PERSONNEL SAFETY REPORT** – Robert Zawistowski

The Personnel Safety Sub-committee met in an "open" session on Monday, April 7, 2008. There were 11 members (out of 19) and 19 guests in attendance during the meeting.

Representation at our meeting by regular members and guests included original equipment manufacturers Babcock & Wilcox, Enerfab, and Diamond Power. Representation from insurance and insurance service companies included FM-Global, Hartford Steam Boiler, and XL Gaps.

Operating company representatives were from Boise, Inc., Domtar, Georgia Pacific, International Paper, Marathon Pulp, Inc. Packaging Corporation of America, Smurfit-Stone, Thilmany LLC., Verso, and Weyerhaeuser. Water treatment representation included Buckman Labs. Consultant representation included Power Specialists Associates, Inc.

There have been three changes in membership since the last meeting. We welcomed Wayne MacIntire replacing Dave Fuhrman from International Paper and Jim Hinman from Weyerhaeuser to our sub-committee. Following the meeting a third person joined the Subcommittee, Frank Navojosky of Verso Paper.

Over the course of the winter Bob Zawistowski was in contact with Outi Pisto. She supplied the following supplier information for the materials used in the prototype protective clothing that she reported on during our last meeting:

The Finnish study indicated the best protection was obtained by a three-layer combination of underwear, protective clothing, and special protective gear. The materials used in the garment design were:

- underwear	55% modacryclic, 45% cotton
- middle layer	50% viscose, 30% wool, 17% polyester, 3% R-Stat
- protective gear	30% Kevlar, 70% polyacrylonitrile (Panox) with silicon coating

The protective gear manufacturer in Finland is Filtercon. Their contact information is listed below and is only in Finnish.

Filtercon Oy Kairakatu 8 26100 RAUMA Tel. +358 2 83879900 Fax. +358 2 8389907

The Finnish company Lindström fabricates workwear (middle layer, outer jacket and pants, she was not sure if they also fabricate the underwear). They operate in Europe in addition to Finland so they also have a website in English. However, she had not been in contact with this company herself. Mills ordering new working clothes have directly contacted the company. Their contact information and website is listed below:

Lindstrom Group POB 29 FIN-00581 Helsinki Finland Tel. +358 20 111 600 Fax +358 20 111 601

email: <u>lindstrom@lindstrom.fi</u> www.lindstromgroup.com (in English)

Phil McAllister of Diamond Power made a technical presentation on their new automatic smelt rodding system. Following the presentation there was a Q&A session. This technology is new with one installation in Sweden that has been in operation for approximately three months. A second installation in the states is underway and the product is still being refined as information is gathered. As we continue to discuss operator safety around smelt spouts we are always interested in hearing what mills are implementing and what vendors are developing.

The Personnel Safety document indicates that smelt tanks should have adequate relief capacity in the event of an explosion. One user asked the question, "How do you know you have adequate relieving capacity?" After a period of discussion it was pretty much agreed the relieving capacity provided by the OEM's is generally satisfactory. The "weighted dampers" that may be in the dissolving tank vent stack along with explosion doors on top of the tanks (if so equipped) should be sufficient. It is important to keep weighted dampers and explosion doors operating freely. There was some discussion about mills that have added additional relieving capacity by venting to the floor beside the dissolving tank or outside of the building.

BLRBAC has long recommended the doors leading to emergency stair wells open into the boiler building and not into the stairwell. One user drafted a letter and submitted it to the local jurisdictions referencing the BLRBAC position and reasoning. This resulted in the Fire Marshalls granting a written variance for three different mill locations. A copy of this generic letter used by the company is included below for those companies that wish to pursue a similar course of action. We will also find a location within the Personnel Safety document to include a copy as well.

To:

The purpose of this letter is to request a variance regarding the direction of the door openings into the enclosed stairwell in the ______ Mill's __ & __ Recovery Boilers. Please note that this request is for the Recovery Boiler enclosed stairwell doors only.

NFPA Life and Safety Code 101 currently require that the doors open into the stairwell. This is to prevent a group of people pushing at once against an emergency exit door in an attempt to escape a dangerous situation. In a Paper Mill Recovery Boiler, however, the situation is likely to be very different. In the most probable scenario - a boiler explosion - the viability of the enclosed stairwell as an emergency egress route is more likely if the doorframes prevent the doors from opening into the stairwell. Additionally the Recovery Boiler building is usually occupied by a small group of trained individuals who are regularly trained in the operation and evacuation of the Recovery Boiler. Visitors to the Recovery Boiler area are also trained in the proper emergency responses before being allowed in the Recovery Boiler building.

In the event of a Recovery Boiler explosion, the enclosed stairwell is the primary egress route. The smelt/water interaction can cause the release of high pressure steam and high temperature water in the building due to the failure of tubes and/or piping.

For these reasons, the Black Liquor Boiler Advisory Committee (BLRBAC) (Sections 1.1.6 and 1.3.2) recommends that the doors to the enclosed stairwell in a Recovery Boiler building open into the boiler area. It further requires these doors to be pressure resistant and self closing – but not lockable.

Based on this information, we are requesting a variance from the NFPA Life and Safety Code 101 for the enclosed stairwells in the #___ and #___ Recovery Boilers at the _____ Mill. This variance will apply only to those specific stairwells.

Your consideration of this request is appreciated.

Thank you,

One user indicated he was aware some mills have been jumpering an in service refractometer if the second was off line and being repaired. He noted this was in direct conflict with BLRBAC recommendations and should not be done. He said he was also aware some mills were taking their boilers off liquor while servicing one of the refractometers.

The reason for jumping one of the refractometers was because of the wash cycle. On this particular model refractometer the solids level would drop when the unit was being washed causing liquor to divert if the second unit was out of service. In discussions in the Executive Committee it was stated that some older units had this problem, but newer units have logic to hold the last value just before entering the wash cycle. This allows the refractometer to be washed and come back on line without diverting liquor. The only problem that could occur was if the "in service" refractometer went into "fault mode" while the other was out of service. If this were to happen liquor would then divert. It was stated that there are conversion kits available from the manufacturer to correct the logic problem in older units.

Discussion was held about a steam line failure in the proximity of an amine chemical feed point. I had an opportunity to speak with a person from that mill following our subcommittee meeting and obtained additional information. During the meeting I made the statement the line "ruptured." Apparently this was not accurate. I was informed the line cracked and sprayed steam. Based on my original information I was told the location used to inject amine into the steam line had no quill. This was not quite accurate either. It appears there originally was a quill in this line, but it failed close to the inside of the steam pipe. This allowed amine to come in contact with the line eventually resulting in the corrosion and subsequent failure. The mill has instituted a program to regularly check all quills at chemical feed points.

Discussion was held about auxiliary fuel start up guidelines. After I had several "false starts" this past winter the draft was started. Rather than develop a complete draft only a short section was developed for discussion with the subcommittee. Drafting of this new material will continue between now and the October 2008 meeting. There will be information in this section explaining the hazards commonly associated with auxiliary fuel firing.

As it is nearly impossible to include every possible scenario in the guidelines, a disclaimer will be written and added to the Personnel Safety document.

Personal protective equipment (PPE) was discussed this meeting. Again, like the auxiliary fuel section, we will work to develop material that explains the hazards so mills can choose and evaluate PPE for their situations.

"Near misses" were discussed. One user reported that observation ports that were not securely closed and latched on start up burners resulted in some burns to operator. One door popped open and blew hot air and char at an operator. In another situation an operator not wearing gloves suffered some burns when a burner observation port door opened.

Another user reported that a blowdown pipe had corroded and had holes in its side. When one operator opened up the blowdown another operator happened to be in the vicinity of the blowdown pipe where the holes were located. This resulted in burns from hot water and steam.

One user reported that a drain line was accidentally left open on the suction side of a black liquor pump. The drain line extended straight downward into a trench. When the pump was started black liquor shot straight down into the trench and sprayed back up at an operator. This was corrected by adding to the drain line an elbow and another piece of pipe parallel to the trench to the drain line away from the pump. If the drain were to be left open now, liquor would flow through the drain and into the trench and not spray back up at an operator.

In the Executive Committee meeting it was brought to our attention that new "Materials and Welding" draft has a conflict with information currently in the Personnel Safety document that pertains to "Materials and Welding." This information will be removed from our document around the same time the Materials and Welding is ready for publication.

MIKE POLAGYE: I have one comment on some of the information that you presented last fall about face masks, etc. There have been some people who have gone back to their mills and have tested their facemasks. Some of them were quite surprised at how the masks would not offer the protection that they thought they should. I think the work you are doing has been very good for the Personnel Safety Subcommittee and for the operators.

5. SUBCOMMITTEE REPORTS – (Continued)

BOB ZAWISTOWSKI: In answer to this comment, what came about was an operating group had an incident and went on to investigate the causes and perform tests on their equipment. They brought that information forward and shared their experience with us so we were able to present it to you. I was merely the conduit.

User groups having experiences such as these need to bring them forth so we can share the information with others. We talk about "near misses" and we learn from them.

We have a lot more work that we are planning on doing in trying to get more educational information into our document to make operations safer to help you folks as you go about your business. We want to encourage you to use our document as a resource. We want our document to be a useful resource

One closing note, I have had people tell me they have been unable to contact me by the e-mail "link" on the website. I spoke with Mike a while back about it and he checked the link in the WEB site. In addition I went to the WEB site and was able to e-mail myself. As a reminder my e-mail address is <u>bob.zawistowski@psaengineering.com</u>. My office phone number as listed on the website is accurate as well, but e-mail tends to be best.

In closing, we are always welcome to new committee members who can participate in any capacity.

5.8 **PUBLICITY & NEWS REPORT** – Craig Cooke

No report submitted at this meeting.

5.9 WASTE STREAMS REPORT – John Rickard

On April 7, 2008 the Waste Streams Subcommittee met in closed session at 8:00 AM with 11 members and 1 visitor present and in open session at 1 PM with 10 members and 7 visitors present.

Marla Weinberg joined the subcommittee. Paul Seefeld and Wayne MacIntire resigned as members.

Since our last meeting, the subcommittee received four questions. Two questions concerned burning liquid waste streams in dedicated burners, which is covered in Chapter 7 (to be voted on today). Both times the proposed guidelines on the BLRBAC website were referenced as an answer. There was a question concerning the suitability of water ring blowers for CNCG transport and subcommittee members provided useful experience and advice on the subject. A final question concerned suitability of firing a purchased waste stream in a recovery boiler. The particular liquid first needed to be analyzed before any comments could be made concerning suitability.

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

The question about a purchased waste streams stirred discussion that ended with a definition of the waste streams for which this subcommittee is responsible. The Waste Streams Subcommittee creates guidelines for waste streams that are the product of the pulping process. The subcommittee agreed waste streams created by other industries (i.e. pet coke or glycerol) and fired in a recovery boiler to increase steam generation are more correctly auxiliary fuels and beyond the scope of the waste streams recommended practice.

There were questions about some of the wording in the chapter 4 revisions for adding the dissolving tank vent to the guidelines so the subcommittee improved the previously-sparse wording. (There was no change of intent.) The most important rewording resulted in this revised paragraph:

"Gas piping should be designed to prevent accumulation of condensates and flammable deposits. Generally, piping should be sloped in the direction of gas flow to minimize deposits. A low point with a liquid seal drain should be provided in the gas line prior to injection into the recovery boiler system. From the last drain to the recovery boiler, the piping should be designed to prevent condensate from entering the recovery boiler. Sealed liquid drains should have a method of verifying that the seal is in place. Since fiber and organic deposits can be expected, provisions should be made for inspection and cleaning on a periodic preventative maintenance schedule."

The subcommittee had proposed a revision to Chapter 5, CNCG, allowing steam purging of the CNCG line from the double block and bleed valves to the furnace and the Executive Committee furnished feedback on the proposal. The subcommittee added explanation and detail to the proposed revision and will resubmit the revision to the executive committee.

Soon there will be a waste streams incident report available on the BLRBAC website. The form will be Excel-based for ease of use and we will be encouraging all members to use the form to inform the subcommittee of problems with their waste stream incineration systems.

Also in the works is a questionnaire for those who are firing waste streams. Questionnaire submittal will be anonymous. It will request real-life experience with waste stream incineration, in both recovery and power boilers, and it will investigate process implications of waste stream incineration.

The subcommittee began work on revising the first part of the guidelines, the forward and chapters 1, 2 and 3. These parts are original to the guidelines and need to be updated to align with liquid waste streams, chip bin NCG and other guideline

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

improvements. During the meeting the subcommittee completed revisions to all but chapter 3. Mark Cooper and Wendy Coyle have agreed to provide a draft revision for chapter 3 for the subcommittee to review during the fall meeting.

The subcommittee meeting was adjourned after a good day's work.

Summary of new guidelines and revisions to existing guidelines:

- Chapter 7, Waste Streams in Dedicated Burners vote on this meeting
- Revisions to Chapter 4, Dissolving Tank Vent Incineration (excluding CBNCG) some "wordsmith" revisions to the posted document and vote on this meeting
- Chapter 8, Chip Bin NCG and Appendix B posted for review and voting in October. After the dissolving tank revisions are approved, Chip Bin NCG revisions will be made to Chapter 4 and it will be included in the October vote.
- Revisions to Chapter 5 for steam purge will be reviewed by the Executive Committee.
- Forward and Chapters 1, 2 and 3 are being revised to include liquid waste streams

Today you will vote on Chapter 7, Guidelines for Thermal Oxidation of Liquid Waste Streams in Dedicated Burners and revisions to Chapter 4 to include incineration of the dissolving tank vent. These changes are posted on the BLRBAC website as a complete guideline with revisions. Chapter 7 provides a method to fire liquid waste streams using a dedicated burner, which will allow a waste stream such as methanol to be used as a continuous igniter fuel on a CNCG burner and will allow a method for disposing of turpentine. Including the dissolving tank vent as a DNCG waste stream aligns the guidelines with the design used for new installations.

CHAIRMAN: Would the voting membership's representatives please stand. Are there any questions of the proposed changes? Those in favor of the proposed changes to Recommended Good Practice of Thermal Oxidation of Waste Streams in Recovery Boilers please raise your hand. Opposed? The vote to approve changes to the document was unanimous.

6. AMERICAN FOREST & PAPER ASOCIATION RECOVERY BOILER 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.

6. AMERICAN FOREST & PAPER ASOCIATION RECOVERY BOILER REPORT – (Continued)

<u>Membership</u>

Currently, 32 companies participate in the Program including 7 non-AF&PA member companies The Program members represent nearly 96% of the total production of sulphate pulp in the U. S. There are three other companies operating recovery boilers that are not in the Program. We will continue to encourage them to join with the current members in the cooperative efforts for the safe operation and research to improve the reliability of the recovery boilers. All companies operating recovery boilers benefit directly from the Program's activities, including the research.

Currently, there are 119 mills operating 173 recovery boilers in the U. S. They produce about 40% of the total energy used in the U. S. pulp and paper industry. The average age of the boilers is about 29 year. Over 67% of the boilers were installed prior to 1979.

Operational Safety Seminars

AF&PA is continuing to sponsor three Operational Safety Seminars each year as it has done since 1985. Nearly 2,700 superintendents, supervisors, operators and maintenance personnel have attended these seminars. We held our first seminar for this year in Portland, Oregon in March and had the largest attendance (50) for the West Coast since we started the seminars. Our next seminar will be held in Atlanta on April 22 and 23rd. At present, we have nearly 70 people registered. We try to limit the sessions to 64 but had to accommodate a few people who can not make the last seminar of the year. That one will be held in Atlanta on May 13 and 14th, and at present we have 57 registered and expect a few more to reach our 64 limit. This is the third year that we have had the new format of one and one-half day sessions, which includes a review, and discussion of the AF&PA training material and BLRBAC guidelines, in addition to the usual discussion of explosions. The responses we have received from attendees indicate that it is well received and very informative. Dr. Tom Grace and Ron McCarty monitor the discussions with the attendees for actual reported explosions and critical incidents, and the review of the AF&PA and BLRBAC guidelines. Attendees continue to feel that the dialogue among the attendees and monitors is outstanding and most beneficial to all.

Recovery Boiler Reference Manuals

The Operation and Maintenance Subcommittee is reviewing the AF&PA Recovery Boiler Reference Manuals to include any possible new information. They are also attempting to put the manuals onto CDs to make them more available at the mills.

Non-Destructive Technologies for Detecting Water-Side Deposits

The final report for this study was presented at the Annual Conference in February and copies were distributed to representatives of the AF&PA Program member companies. It was sponsored by the R & D Subcommittee under the direction of the Advisory Group headed by Mr. Fred Evans of International Paper. The study was conducted by B & W Technical Services Group. AF&PA would like to publicly thank the Advisory Group members and especially Fred for their outstanding efforts and long hours in completing this study.

6. AMERICAN FOREST & PAPER ASOCIATION RECOVERY BOILER REPORT – (Continued)

This report describes a feasibility survey that tested non-destructive evaluation (NDE) techniques

on in-service samples. The project is a step toward the ultimate research goal of developing NDE methods for identifying waterside deposits with a least 90 percent accuracy in finding deposits with deposit weight densities (DWD) greater than 20 g/ft2. The feasibility testing on the samples in this report used pulsed thermography, heat flux measurement, radiography and ultrasonics. The methods, as tested in this project, did not detect DWD at the threshold level desired but did detect higher levels.

Pulsed thermography offers the most effective thermal method and direct path to commercialization for measuring DWD. Ultrasonics may be effective in cases where the deposits are tightly adhered and non-porous (or nearly so). Radiography, unless it can be applied as a computed topography type scan, appears to be ineffective or impractical for the thin deposits of interest.

The Advisory Group has been in contact with another vendor (Aptech) to determine the prospect of their instrument for future study in the area of pulsed thermography.

Study of Dissolving Tank Explosions

The R & D Subcommittee sponsored a study of the Dissolving Tank Explosions that were reported to BLRBAC and AF&PA from 1973 thru 2008. It was conducted by Dr. De Martini at IPST/Georgia Tech. The Final report was recently completed and distributed to the AF&PA Recovery Program member company's representatives. It was also sent to Mr. Mark Sargent, chairman of the BLRBAC Safe Firing Subcommittee, for discussion at the meeting Monday. We look for that subcommittee to recommend a future study of these incidents.

The study involved a review of the incidents reported to BLRBAC relating to smelt dissolving tank explosions. It is believed that the industry experienced additional incidents related to dissolving tank explosions but they were not reported. The analysis of the data reported indicated several aspects as causes of these explosions. This analysis suggests that reducing smelt run-offs, particularly during a chill and blow, or after a boiler trip, is where the most effort is needed to avoid dissolving tank explosions. A number of recommendations and future research needs are included in the report.

Including Economizer Leak Study Recommendations and Guidelines into AF&PA Guidelines and Checklist Document

The Operations and Maintenance Subcommittee reviewed the recommendations and guidelines developed in the Economizer Leak Study. These are being processed so that the AF&PA Guidelines and Checklist document maybe updated to include these recommendations. A draft of the TAPPI TIP sheet on economizers is being reviewed so that it may be added to the Guidelines.

6. AMERICAN FOREST & PAPER ASOCIATION RECOVERY BOILER REPORT – (Continued)

Updating Kraft Recovery Boilers - Blue Book

The R & D Subcommittee is planning to review and update the Kraft Recovery Boilers: - Blue Book that was published in 1997. The subcommittee feels that enough commercial advances and research activities have been documented to warrant a new edition. Dr. Tran will spearhead this effort with the authors with a target date for completion at the end of 2010. Copies of the current edition are available for purchase from TAPPI.

Possible TAPPI TIP Sheets

In addition to the AF&PA sponsored study on Economizer Leaks used to develop a TIP sheet, the TAPPI Subcommittee is reviewing the possibility of TIP sheets for industry use from the other AF&PA sponsored studies on: Floor Tubes; Behavior of Furnace Corners in Explosions; and Superheater Leaks.

Other Possible Projects Related to Recovery Boiler Safety

The R & S Subcommittee recently discussed several potential research projects related to recovery boiler safety. A proposal for bids is being drafted for a study regarding feedwater research. The Operations and Maintenance Subcommittee is planning to meet with BLRBAC to determine the possibility of a joint seminar following a BLRBAC meeting.

Annual Meetings and Conference

AF&PA's annual meetings and Conference were held in Atlanta February 12 and 13th. Attendance and participation was very good. The Conference is open to all operating companies, insurers, vendors and manufacturers. The presentations included reports on the projects currently sponsored by AF&PA and subcommittee reports on their accomplishments, as well as other research being done related to recovery boilers. 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 hope that many of you will plan to attend next year's Conference that will be held in Atlanta in early February.

7. NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS REPORT – George Bynog

I have two items to report on for this meeting:

- a) The first is the National Board Inspection Code (NBIC). The 2007 edition was published December 31, 2007, in the restructured format consisting of three parts:
 - Part 1 Installation
 - Part 2 Inspection
 - Part 3 Repairs and Alterations

Page - 60

7. NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS REPORT – (Continued)

You will also find a completely different numbering system. You won't find, for example, RB-2030. Instead, the sequence will start with the book part number further subdivided by numbers and letters to indicate sections and paragraphs.

Also, the mandatory and non-mandatory appendices have been replaced with supplements. It will be up to each jurisdiction as to which supplements will be mandatory.

The NBIC is available in three formats: Hard Copy, CD-ROM and, new this year, a Flash Drive. All formats include addenda. The CD-ROM and Flash Drive come with a license for five users. The Hard Copy is priced at \$150.00 for all three parts. The CD-ROM and Flash Drive will cost \$395.00 comes with a license that is good for five years. Complete ordering information is available on our Web site www.nationalboard.org.

Mr. Terry Parks was appointed Chairman of the NBIC Committee in July 2007. Terry is the Manager of Field Services with the National Board staff in Columbus, Ohio.

The 2008 Addendum Cycle B is available on our Web site for public review and comment.

The next meeting of the NBIC Committees will be July 21-24, 2008 in Seattle, Washington. We encourage participation by anyone able to attend the meetings.

b) The second part of the report has to do with our new training facility. At this meeting, I've heard the same thing as I hear at other meetings, most recently the ABMA (American Boiler Manufacturers Association) meeting, which is the shrinking talent pool for skilled labor and, in our case, prospective pressure equipment inspectors. The traditional sources of inspectors from military and maritime communities are drying up. We have been studying this for a number of years. One of the things we found is that we must rethink the minimum qualifications criteria for entry-level inspectors and provide more entry-level hands-on practical training. The results will not be performance based or prescriptive requirements, but a combination or hybrid approach. This type of approach is similar to the proposed federal apprenticeship program.

To address the practical training applications we started construction last fall on a new training facility in Columbus, Ohio. The facility will be devoted to practical, hands-on training. Training in in-service inspection activities, repairs and alterations inspection and acceptance, and with modification to existing courses, new construction activities. We anticipate completion of the facility in August 2008 with the first classes in January or February of 2009.

7. NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS REPORT – (Continued)

QUESTIONS:

Karl Morency: One of the things that we run into as we are checking wall thickness for on our operating units regards applying the higher allowable stresses for a lot of the materials we use. I believe you can only use the new values for anything that was installed after 1999. Do you know why that restriction exists for limiting the higher stress values to materials that were put into service after 1999?

George Bynog: I would rather not comment on the logic behind a change to ASME's requirements. What I would advise you to do is to address an inquiry to the appropriate subcommittee with ASME asking this question. In turn, the subcommittee will answer that question and provide you with much better logic and guidance than I can. I could offer you many things, but I would rather not do that.

Karl Morency: Since ASME is for new construction and the NBIC tells us what we can do with stuff that is in service, I didn't know if you had that question addressed in the NBIC because it seems like it falls in that code's realm of responsibility.

George Bynog: To answer that part of it, yes. We are looking at that within the NBIC. In my opinion, what you are going to find is that in ASME's effort to go international, they are trying to make their standards more palatable to the world. They are trying to get more inline with the European codes. You are seeing design margins go down. You are seeing a different set of requirements and a number of different materials that you can use in new construction, different stress values, etc., for a number of different reasons. Once this is all sorted out in the new construction arena, yes, the NBIC will have to look at that and will have to address it and, of course, make recommendations in our document as to what we think is good for industry in our jurisdictions who hopefully will make it the "law of the land". Again, I'm not trying to avoid your question. You are just addressing it to the wrong organization. Once we do the work in the NBIC, I will be happy to report on it, but I would rather not speak for the ASME.

8. **TAPPI RECOVERY BOILER SUBCOMMITTEE OF STEAM & POWER REPORT** – Jim Dickinson (See Slide Presentation – Appendix E)

MICHAEL LYKINS: I'm assisting on the TAPPI TIP that addresses the inspection of recovery boilers. Sandy Sharp is leading that effort. One of the things we need is a general layout of a decanting boiler. There is a general layout of a sloping bottom boiler in the TIP, but there is no decanting boiler. So one of the OEM's can either get with me or forward something to me, we would like to include it in the TAPPI TIP.

Another TIP is on generating bank tubes. I saw that it is up for its revision and focuses on tube rolling. Another issue that I think needs to be addressed is making sure the tubes are not too short or not too long. I recommend that a verification of tube length be included in that TAPPI TIP.

JIM DICKINSON: Fred Marsnik is the one who is revising the generating bank tube rolling TIP. I don't think he is here, but we will be going over that this afternoon as part of the status review and I will make sure that this is included in there.

9. WESTERN CANADA BLRBAC REPORT

No report submitted at this meeting.

10. ACTIVITIES OUTSIDE NORTH AMERICA REPORTS -

No reports submitted at this meeting.

11. **OPERATING PROBLEMS SESSION REPORT** – Scott Moyer

We had a good session. We started off with a quiz after the ESP and I am happy to report that most people improved their scores. After lunch we had an Operation Problems Session with about 150 people present. I think it was very successful.

Various topics were discussed. There were a lot of questions and discussions on dissolving tank density, agitators, shatter jets, smelt spouts, etc. We talked about start-up procedures, including cleaning the superheater. There was also a discussion on post-ESP procedures. If there is any feedback on any of the sessions, other than complaints on the test questions, or any suggestions for improvement, my e-mail is on the WEB site.

12. TECHNICAL PRESENTATIONS

Immediately after this we will take a quick break and we will have the Technical Presentations. I encourage you to attend. The presenters have spent quite a bit of time preparing these. The subject is on "Chloride Removal Systems." We have three OEM's presenting their technology. We have Eric Wasson with Metso; Jarmo Kaila with Andritz and Wayne Bucherwith NORAM Engineering. I'll even give you ten bonus points on your quiz if you stick around!

In the future if anybody has technical material they would like to present, just corner me afterwards or send me an e-mail.

CHAIRMAN: I just have a couple comments. As you are aware our fall meeting is our annual meeting and on a bi-annual basis we elect new officers. That will be occurring at the October meeting. The By-laws provide for a Nominating Committee that will be appointed and they work between 30 to 60 days before the meeting. If there are people interested in serving on the Executive Committee, feel free to throw your name in the hat by either contacting Scott Moyer or myself. We will forward the information on to the Nominating Committee.

NEXT MEETING: October 6, 7 & 8, 2008, at the Crowne Plaza Hotel, Atlanta GA.

ADJOURNMENT: Are there any other comments or new issues from the membership? If not, can I have a motion to adjourn the meeting? Second? All in favor? The spring meeting of the 2008 BLRBAC is now closed. Everyone have a safe trip home!

Page - 64

BLRBAC Water Treatment Committee Justification and Structure

- Industry Consolidation and economic pressures
 - Reduction in mill support staff
 - Less experience at mill management level in utilities
 - Reduction in knowledge transfer activities (BLRBAC, TAPPI, PIMA)
 - Cost cutting directives
 - o Cost versus Risk
- Supplier Consolidation
 - Reduction in technical support staff
 - Reduction in water treatment professionals per boiler
 - o Cost competitive directives
 - Profit versus Risk
- Equipment Assessment
 - Equipment suppliers
 - Reduction in technical support staff
 - Reduction in experienced personnel 'on-the-ground'
 - Equipment TLC
 - Extended periods between outages
 - Extended solids processing
- Proposed Committee Structure
 - o Chair/Secretary/Membership
 - o Guidelines Production
 - Makeup Water systems
 - Feedwater Supply systems
 - Recovery Boiler systems
 - Steam & Condensate systems
 - Product is a practical document with guidelines or suggestions
- Summary of Justification
 - Support reduced
 - Equipment aging
 - The water treatment committee in BLRBAC
 - Practical guidelines without bias
 - SME membership
 - BLRBAC oversight

Attached document authored by Tom Madersky:

"Reasons to consider a water treatment subcommittee with BLRBAC"

Page - 65

Reasons to consider a water treatment subcommittee with BLRBAC

Authored by Tom Madersky, PSA, Inc.

Chemical supplier and mill downsizing initiatives, mergers and acquisitions have changed the water systems management landscape within the water treatment sector of the pulp and paper marketplace; both the supplier of and recipient of services have, over the past ten years, undergone major staff reductions in an effort to contain costs and remain competitive.

Utility department budgets for boiler water chemical treatment have been reduced by an estimated 30% when compared to costs for similar services in the late 1990's (in dollars per million lbs of steam) while utility department operational and maintenance staffing has undergone significant reductions deleteriously impacting how department personnel could support the management/surveillance effort on the boiler water side.

The net result: the mill utility departments are demanding more supplier site time to off- set reductions in operational and maintenance personnel and the supplier is trying to find a comfortable balance between chemical cost management and site time management.

On the supplier side, where once there were seven or eight experienced personnel representing small technically driven water treatment districts you now have, at best, three or four field service engineers being stretched thin with larger territorial responsibilities trying to provide a respectable level of boiler water treatment support services at a given site.

To compound the representation concern, the boiler and ancillary boiler support systems OEM's (SME's regarding boilers, deaerators, demineralizers etc.) have also undergone a similar reduction in staffing and as a result, the P&P industry has lost the check and balance of multifaceted perspectives that once was so vital to the reliable and safe operation of recovery boiler.

To further compound the concern, the boiler demographic (an aging asset) and the recover boiler operating demographic (youth and inexperience) are on two completely different time lines.

When you take all of the aforementioned factors into consideration, the potential for the recovery boiler to be at risk from a water treatment perspective, particularly when the boiler is being pushed to maximum solids loading, increases each year in a non linear fashion.

To minimize the risk to the recovery boiler will require practical guidelines and practices to be applied to all of the boiler feedwater support systems and the recovery boiler proper. The relevance and significance of deviating from or adhering to the practice guidelines would be defined by a BLRBAC sub-committee of SME's whose shared experiences can serve to qualify and quantify in writing the differences between acceptable, good, better and best practices.

B&W's Furnace Pressure Tripping Philosophy

Furnace Pressure Tripping Philosophy

Babcock & Wilcox's recommendations for tripping on high or low furnace pressure excursions is based on the NFPA furnace implosion prevention recommendations first published in NFPA 85G, Standard for the Prevention of Furnace Implosions in Multiple Burner Boilers, in 1978. The current requirements are from section 3.5 of NFPA 85, Boiler and Combustion System Hazards Code, 2001 Edition.

High Furnace Pressure

Babcock & Wilcox's recommendations for high furnace pressure are to:

- Alarm if furnace pressure exceeds the normal operating pressure (typically -0.5 in. H20) by more than 2.5 in. H20.
- Automatically initiate a Master Fuel Trip if furnace pressure exceeds for two seconds the lower of
 - the normal operating pressure plus 5.0 in. H20
 - o or the continuous design pressure

Tripping the fuel should immediately result in a rapid decrease in furnace pressure. Fans . should remain in service to provide a post-trip unit purge whenever possible.

- Prior to main fuel firing and after main fuel firing has been stopped for at least five minutes, automatically trip all FD fans if furnace pressure exceeds for two seconds the lower of
 - o the normal operating pressure plus 5.0 in, H20
 - or the continuous design pressure. Loss of all FD fans will initiate a Master Fuel Trip if it has not already occurred. This trip is intended to address loss of control or damper misoperation during the start-up or shut-down of the unit.
- Automatically trip all FD fans if the furnace pressure exceeds the continuous design pressure by more than 3.0 in. H20 for five seconds. Although tripping of all FD fans should initiate a Master Fuel Trip if it had not already been initiated, this signal may also be used to directly initiate a Master Fuel Trip. The primary purpose of this trip is to react to furnace overpressure resulting from massive furnace tube ruptures.

High Windbox Pressure (High Secondary Air Duct Pressure on Compartmented Windbox Systems)

Babcock & Wilcox's recommendation high windbox (or duct) pressure trips only if the maximum FD fan head capability exceeds the windbox (or duct) continuous design pressure by more than 20 percent or it exceeds the transient design pressure. These recommendations include the following:

- Alarm if the pressure exceeds a value midway between the maximum operating pressure and the continuous design pressure.
- Automatically initiate a Master Fuel Trip if pressure exceeds the continuous design pressure for two seconds. Tripping the fuel should immediately result in a rapid decrease in pressure. Fans should remain in service to provide a post-trip unit purge whenever possible.
- Prior to main fuel firing and after main fuel firing has been stopped for at least five minutes, automatically trip all FD fans if pressure exceeds continuous design pressure for two seconds. Loss of all FD fans will initiate a Master Fuel Trip if it has not already occurred. This trip is

B&W's Furnace Pressure Tripping Philosophy (Cont'd.)

intended to address air register or damper misoperation during the start-up or shut-down of the unit.

- Automatically trip all FD fans if the pressure exceeds for five seconds the highest of
 - the continuous design pressure by more than 3.0 in. H20 or 10%
 - or the transient design pressure.

Although tripping of all FD fans should initiate a Master Fuel Trip if it had not already been initiated, this signal may also be used to directly initiate a Master Fuel Trip.

Low Furnace Pressure

Babcock & Wilcox's recommendations for low furnace pressure are:

- Alarm if furnace pressure exceeds the normal operating pressure (typically -0.5 in. H20) by more than -2.5 in. H20.
- Initiate a Master Fuel Trip if furnace pressure exceeds the continuous negative design pressure for two seconds. Since tripping the fuel will immediately result in a rapid further decrease in furnace pressure, this trip may be an operating procedure rather than an automatic trip. Fans should
 remain in service to provide a post-trip unit purge whenever possible.
- Prior to main fuel firing and after main fuel firing has been stopped for at least five minutes, automatically trip all ID fans if furnace pressure exceeds the continuous negative design pressure for two seconds. Loss of all ID fans will initiate a Master Fuel Trip if it has not already occurred. This trip is intended to address loss of control or damper misoperation during the start-up or shutdown of the unit.

Babcock & Wilcox's recommendation is that any low furnace pressure trip of ID fans be delayed for fiveminutes after a master fuel trip to allow for a furnace post-purge and to allow the negative furnace pressure transient to be eliminated. Having a low furnace pressure trip of ID fans active within 30-60 seconds of a master fuel trip results in the automatic tripping of ID fans on the majority of master fuel trips. Tripping of ID fans on a master fuel trip has almost no effect on reducing the magnitude of the negative furnace pressure transient or risk of furnace implosion damage while greatly increasing the risk of furnace explosion damage.

The operator should not be prevented from manually tripping ID or FD fans at any time should a control failure occur which results in gross damper misoperation which could subject the unit to extreme continuous furnace pressures.

These recommendations assume a furnace implosion protection furnace pressure control system meeting the requirements of NFPA 85 has been implemented on the unit, including the control system having the ability to act even if any of the fans are on manual.

B&W's Furnace Pressure Tripping Philosophy (Cont'd.)



AJ Zadiraka 19 September 2001

ESP ONLY - NO LEAK

SPRING 2008 - 1	
Classification:	ESP – No Leak
Location:	Rayonier Performance Fibers, Jesup GA
Unit:	#6 CE Contract 24579 2-drum, Start-up 1981;
Unit Size:	4.9 MM lb ds/day; 900,000 lb/hr steam at 1325 psig, 900°F, 1500 psig design
Incident Date:	November 8, 2007
Downtime hrs, leak/total:	47 hrs
ESP?	Yes
Leak/Incident Loc:	none
How discovered:	Steam-Water diff; Positive furnace pressure; Walk down water seen at nose arch lagging
Wash adjacent tube:	n/a
Root cause:	n/a
Leak detection:	
Bed cooling enhanc	
Last full inspection:	
Sequence of events:	Steam/water differential rising; That day ID fan negative but boiler draft positive. During walk
	down, water seen from behind some lagging at the nose arch. ESP's the unit.
	12-hr evacuation. No leaks at hydro. Lagging water from a hole in a soot blower seal box
	and leaking poppet valve. Draft came from two rows of plugged boiler bank
Repair procedure:	Waterwashed unit and returned to service.
Future prevention:	na

SPRING 2008 - 2	
Classification:	Non-Critical
Location:	International Paper, Franklin VA
Unit:	#5 RB, CE Contract 12868, 2-Drum DCE, Startup 1970, New Econ: CE 1993
Unit Size:	1.75 MM lb ds/day; 274000 lb/hr steam at 600 psig, 750 F, 700 psig design
Incident Date:	May 21, 2007
Downtime hrs, leak/total:	42.25; 42.25
ESP?	No
Leak/Incident Loc:	Pin Hole in tube 8" above lower header
How discovered:	Walk down: Boiler was off liquor, on oil, to repair spout water line leak; operator saw water running
	out of economizer lagging on 5th floor.
Wash adjacent tube:	No
Root cause:	Tube corrosion and thinning at lower economizer header; casing forms pocket for ash & water
Leak detection:	Yes
Bed cooling enhanc	No
Last full inspection:	Apr 2007
Sequence of events:	Walk down: Boiler was off liquor, on oil, to repair spout water line leak; operator saw water running
-	out of economizer lagging on 5th floor.
Repair procedure:	Plugged leaking tube and weld overlay build up on a 5" X 5" area of thinning header
Future prevention:	Economizer design holds salt cake around Lower header, makes cleaning during outages very
•	difficult. South end of lower header has severe thinning due to corrosion. Plan 2008 outage to
	reconfigure lower header casing design to allow for cleaning and prevent trapping salt cake
	around lower header

ECONOMIZER

SPRING 2008 - 3	
Classification:	Non-Critical
Location:	International Paper, Franklin VA
Unit:	#5 RB, CE Contract 12868, 2-Drum DCE, Startup 1970, New Econ: CE 1993
Unit Size:	1.75 MM lb ds/day; 274000 lb/hr steam at 600 psig, 750 F, 700 psig design
Incident Date:	Jan 30, 2008
Downtime hrs, leak/total:	38 hr 23 min /38 hr 23 min
ESP?	No
Leak/Incident Loc:	Pin hole in economizer tube #7 Row 3, 2" above lower economizer header, 5 th floor
How discovered:	Walk down. Operator saw small amount of water running out of economizer casing on 5 th floor
Wash adjacent tube:	No
Root cause:	Corrosion of Economizer tubes at south end of Lower Economizer header causing thinning
Leak detection:	Yes
Bed cooling enhanc	No
Last full inspection:	Apr 07
Sequence of events:	9:30 am Operator saw small drip of water running out of economizer casing on 5th floor. Isolated
	soot blowers. Inspection confirmed small economizer leak near the lower header. Pulled liquor,
	switch to oil. 10:00 Liquor out, econ doors opened, small leak spray visible. 11:30 Bed burned out,
	boiler cooled; Later: washed part of econ for repair
Repair procedure:	Installed 24" Dutchman to header
Future prevention:	Economizer design holds salt cake around Lower header, makes cleaning during outages very
	difficult. South end of lower header has severe thinning due to corrosion. Plan 2009 outage to
	reconfigure lower header casing design to allow for cleaning and prevent trapping salt cake
	around lower header

SPRING 2008 - 4	
Classification:	Non-Critical
Location:	International Paper, Texarkana TX
Unit:	B&W, Contract PR-144, 1972 Startup, 2-drum large econ; New econ B&W 1985
Unit Size:	2.6 MM lb ds/day, 408000 lb/hr steam at 650 psig, 750 F, 775 psig design
Incident Date:	May 24, 2007
Downtime hrs, leak/total:	17.25
ESP?	No
Leak/Incident Loc:	Leaking hand hole cap, center header, front set Primary outlet Econ header
How discovered:	Walk down: Maintenance foreman saw steam emitting from insulation on top of primary econ
Wash adjacent tube:	No
Root cause:	Weld failure. Appeared to be porosity when cap was cut out
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	April 2007
Sequence of events:	Maintenance foreman saw steam coming out from under the insulation on the top of the primary
	economizer. Insulation was removed and found the outlet header hand hole cap leaking. The
	boiler was running steady at 45 t/hr, no auxiliary fuel, producing 370,000 #/hr steam.
Repair procedure:	Gouge old, repair seat, weld new cap.
Future prevention:	na

ECONOMIZER

SPRING 2008 - 5	
Classification:	Non-Critical
Location:	Catalyst Paper, Crofton BC
Unit:	#4 RB, CE Can, Contract CA 88105, Startup 1991
Unit Size:	4.0 MM lb ds/day, 587000 lb/hr steam at 600 psig, 750 F, 800 psig design
Incident Date:	Jun 25, 2007
Downtime hrs, leak/total:	60
ESP?	Νο
Leak/Incident Loc:	Pinhole leak in primary economizer Header #3 Row #16 tube #2 the leak was 12" from the lower
	header
How discovered:	Walk down of boiler revealed moisture in rotary valve below economizer conveyor
Wash adjacent tube:	No
Root cause:	Stress assisted corrosion initiated by O2 pitting
Leak detection:	Yes RBLI
Bed cooling enhanc	No
Last full inspection:	Jun 2005
Sequence of events:	Moisture was noticed by the Recovery Field assistant in the primary economizer rotary valve. The unit was taken off liquor to investigate further and a tube leak in the economizer was confirmed. The boiler was taken down in a controlled manner (no ESP). The leak was in the primary economizer Header #3 Row #16 tube #2 the leak was 12" from the lower header. The leaking tube section was replaced. The hydro inspection performed and the boiler was tight.
Repair procedure: Future prevention:	The leaking tube section was replaced.

SPRING 2008 - 6	
Classification:	Non-Critical
Location:	Catalyst Paper, Crofton BC
Unit:	#4 RB, CE Can, Contract CA 88105, Startup 1991
Unit Size:	4.0 MM lb ds/day, 587000 lb/hr steam at 600 psig, 750 F, 800 psig design
Incident Date:	July 25, 2007
Downtime hrs, leak/total:	63
ESP?	Νο
Leak/Incident Loc:	the primary economizer Header #3 Row #17 tube #2 the leak was 12" from the lower header
How discovered:	Walk down of boiler revealed moisture in rotary valve below economizer conveyor
Wash adjacent tube:	No
Root cause:	Stress assisted corrosion initiated by O2 pitting
Leak detection:	Yes RBLI
Bed cooling enhanc	No
Last full inspection:	Jun 2005
Sequence of events:	Moisture was noticed by the Recovery Field assistant in the primary economizer rotary valve. The unit was taken off liquor to investigate further and a tube leak in the economizer was confirmed. The boiler was taken down in a controlled manner (no ESP). The leak was in the primary economizer Header #3 Row #17 tube #2 the leak was 12" from the lower header. The leaking tube was plugged. The hydro inspection performed and the boiler was tight.
Repair procedure: Future prevention:	Tube was plugged at the lower and upper economizer header

ECONOMIZER

SPRING 2008 - 7	
Classification:	Non-Critical
Location:	Domtar Johnsonburg PA
Unit:	Tampella Contract 90132 Startup 1993
Unit Size:	2.8 MM lb ds/day, 400000 lb/hr steam at 1250 psig, 900 F, 1600 psig design
Incident Date:	Dec 21, 2007
Downtime hrs, leak/total:	30.75/30.75
ESP?	No
Leak/Incident Loc:	Crack in weld 1" above weld between tube and extruded econ header, Platen 69, tube 4
How discovered:	Walk down – Operator found wet ash
Wash adjacent tube:	No
Root cause:	Poor shop welds are root cause of failure. Stress assisted corrosion; stress corrosion fatigue
	cracking; both thermal expansion of the tube length, and cantilever effect of sloped portion of tube
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	May 2007
Sequence of events:	During walk down, operator saw water in #1 econ ash hopper. Normal shutdown. Bed burned out
	Water wash. Tube repair. Hydro. Startup.
Repair procedure:	Defect was ground out, and weld repaired
Future prevention:	During past 7 years, many similar leaks from this design/poor shop welds

SPRING 2008 - 8	
Classification:	Non-Critical
Location:	International Paper, Ticonderoga, NY
Unit:	#1 RB, B&W Contract PR-131 (523-0131), Startup 1969, 2-drum Large Econ; New B&W Econ 1981
Unit Size:	2.01 MM lb ds/day, 300000 lb/hr steam @ 875 psig 825 F, 975 psig design
Incident Date:	December 29, 2007
Downtime hrs, leak/total:	0/-
ESP?	No - boiler was already offline
Leak/Incident Loc:	#1 crack in tube 1" from top econ header; #2 due to 1 st leak washing 2 nd tube thin
How discovered:	During hydro test
Wash adjacent tube:	Yes
Root cause:	stress assisted corrosion and thermal cycling
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	2007, 2006
Sequence of events:	Boiler taken off line due to a smelt leak between the north wall and the floor. Two leaks found in
•	economizer during hydrostatic test
Repair procedure:	Both leaks repaired by removing the tubes and plugging them at the header using ER70-S2 tig
Future prevention:	
ECONOMIZER

SPRING 2008 - 9	
Classification:	Critical Incident # 693 (due to upper leak)
Location:	Weyerhaeuser Flint River, Oglethorpe GA
Unit:	#1 RB, B&W Contract PR 198, Startup 1980, 2-drum 5-pass Econ
Unit Size:	5.2 MM lb ds/day, 667000 lb/hr steam @ 900 psig 825 F, 1175 psig design
Incident Date:	January 2, 2008
Downtime hrs, leak/total:	-/36.9
ESP?	Νο
Leak/Incident Loc:	Leak #1: 3/16" diameter hole in tube at top inlet pass of economizer 12th floor, un-confirmed tube defect or pit. Leak #2: ³ / ₄ " long fatique crack located at toe of tube to header weld (lower economizer header module (7th floor)
How discovered:	Tracking steam-water differential, listening during quiet time, walk downs looking for water. Took off line due to steam-water differential. Found leaks during inspection walk down
Wash adjacent tube:	No
Root cause:	Leak #1 - Unconfirmed defect internal to tube; Leak #2 – Fatique crack at toe of tube to header
	weld
Leak detection:	Yes
Bed cooling enhanc	No
Last full inspection:	Sept 2007
Sequence of events:	Dec 31 saw steam-water differential 12000 lb/hr, listening during quiet time, walk downs looking for water Jan 1 differential increased to 15,000#/hr. Jan 2 up to 18000 #/hr. Took unit off liquor. During inspection walk down 1st leak found at the tube to lower economizer area. No bed in furnace. 2nd leak found near the top of the economizer (first pass) near a vibration restraint bar. Boiler was scaffolded to access both leaks. Both leaks were weld repaired. Boiler hydrostatically tested and turned over to process.
Repair procedure:	Top leak hole repaired by grinding a notch, beveling and welding using the TIG process Bottom leak - ground the crack out and repaired using the TIG process.
Future prevention:	Internal tube analysis and look for potential sources of the fatigue failure

ECONOMIZER

SPRING 2008 - 10	
Classification:	Non-Critical
Location:	Weyerhaeuser Flint River, Oglethorpe GA
Unit:	#1 RB, B&W Contract PR 198, Startup 1980, 2-drum 5-pass Econ
Unit Size:	5.2 MM lb ds/day, 667000 lb/hr steam @ 900 psig 825 F, 1175 psig design
Incident Date:	February 5, 2008
Downtime hrs, leak/total:	29 hr 36 min
ESP?	No
Leak/Incident Loc:	1/8" diameter hole in tube, just above the lower economizer tube to header weld, 7th floor.
How discovered:	Walk down. Wet ash in econ hopper and increasing water/steam diffeential
Wash adjacent tube:	No
Root cause:	Soft rust deposits inside indicate internal pitting
Leak detection:	Yes
Bed cooling enhanc	No
Last full inspection:	Sept 2007
Sequence of events:	After 4 days of cleaning hard salt cake at econ hopper discharge, found wet salt cake there, and
-	then water running down rear hopper wall. Confirmed increasing feed water/steam differential,
	grew to 15000. Took off liquor and saw spraying from either a tube or the lower economizer
	header. Burned out bed, fire out, unit cooled, scaffolded. Tube repaired. Hydro OK.
Repair procedure:	Ground out hole, weld repair had porosity, reground weld, TIG repair weld good
Future prevention:	Do Digital Radiography during 2008 shut down, looking for pitting.

SUPERHEATER

SPRING 2008 - 11	
Classification:	Non-Critical
Location:	Boise Cascade, Wallula WA
Unit:	#3 RB, CE Contract 23772 Start up 1973, 2-Drum Large Econ, New SH by Andritz 2003
Unit Size:	3.15 MM lb ds/day, 550,000 lb/hr steam @ 600 psig, 700 f, 710 psig design
Incident Date:	Oct 19, 2007
Downtime hrs, leak/total:	46 hr / 49 hr
ESP?	Yes
Leak/Incident Loc:	3/8 inch transverse through-wall crack in primary SH attemperator feedwater nozzle coupling weld, in penthouse, propogated from weld porosity. Additional crack indications around pipe and weld.
How discovered:	Walk down. Operator saw small wisp of steam from penthouse wall casing with some discoloration
Wash adjacent tube:	No
Root cause:	Wrong size coupling for feed pipe along with weld porosity defects; Loose hanger.
Leak detection:	Yes Triple-5
Bed cooling enhanc	No
Last full inspection:	May 2007
Sequence of events:	19Oct 10:30 Operator saw small wisp of steam from penthouse wall casing with some discoloration. No sign in water/steam differential, feed water chemistry or Triple-5. 10:52 ESP'd unit. 4-hr evacuation. Had to refill to find leak, above roof. No sign of water entering furnace. 20Oct 11:00 pm Start repair. 21Oct 11:00 am complete repair for hydro. 22 Oct just after midnight Liquor back in
Repair procedure: Future prevention:	Extensive grinding, re-build feed pipe, recentered, and welded. MT and visual tests. 2 nd nozzle in similar arrgt. Repair and replace both nozzles June 2008

SUPERHEATER

SPRING 2008 - 12	
Classification:	Non-Critical
Location:	Thilmany LLC, Packaging Dynamics, KaukaunaWI
Unit:	#10 RB, B&W Contract PR-63 Start-up 1991, 2-Drum Low Odor Air heater
Unit Size:	.390 MM lb ds/day, 187000 lb/hr steam @ 600 psig, 830 F, 700 psig design
Incident Date:	Oct 6, 2007
Downtime hrs, leak/total:	4 hr/96 hr
ESP?	Yes
Leak/Incident Loc:	Rupture with complete severing of #2 primary SH tube on hot side leading edge of hairpin bend.
How discovered:	Operators heard a loud roaring sound at 8:59pm from the control room with and immediate sharp
	increase in steam drum level accompanied by a rapid decline in feedwater flow. The boiler
	pressure start to decline with drum level and feed water flow rapidly increasing
Wash adjacent tube:	No
Root cause:	Short term overheat, from uncleared SH tube
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	April 2007
Sequence of events:	Operators heard a loud roaring sound at 8:59pm from the control room with and immediate sharp
	increase in steam drum level accompanied by a rapid decline in feedwater flow. The boiler
	pressure start to decline with drum level and feedwater flow rapidly increasing, at this point
	9:02pm (approx.) 3 minutes later the ESP system was activated. All personnel safely evacuated
	the control room with continued monitoring of the ESP from a remote safe area. 4-hr evacuation.
Repair procedure:	Removed damaged tube and replaced with new element. Root pass TIG w/ E7018 cap; RT
Future prevention:	Better individual tube temp charting and attention to info. See rogue tube on temp chart.

SPRING 2008 - 13	
Classification:	Critical Incident # 694
Location:	International Paper Vicksburg MS
Unit:	B&W Contract PR-105, Start up 1967, New B&W Boiler 1991, 2-drum Direct Cyclone Evaps
Unit Size:	3.0 MM lb ds/day, 509000 lb/hr steam @ 1020 psig, 825 F. 1200 psig design
Incident Date:	December 18, 2007
Downtime hrs, leak/total:	48
ESP?	No
Leak/Incident Loc:	Leak #1 = 1" high x 1" wide Verticle split 1/8" above mud drum. (2 nd leak at hydro at OD of mud
	drum rear)
How discovered:	Unit tripped off line from hi furnace P & corresponding low drum level
Wash adjacent tube:	Yes
Root cause:	Likely one tube leak washed other. Possible vibration fatigue, possible faulty installation
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	February 2007
Sequence of events:	18Dec 2:35 am During normal operation, unit tripped on hi furnace pressure. Operator thought was liquor divert, but feed water increased 50%, steam decreased to ¼, Total mill blackout. 5 am power back up. Walk down revealed water in hopper and econ entry. No potential into furnace. No boiler water pressure. Did cool down. Found thin wall tube rupture 2" above back side of mud drum. 9 pm Repaired. Hydro revealed 2 nd leak, same area. 19 Dec 5:40 am Redrained for repair. 4:10 pm PT test good. 20 Dec 1:25 am first fire. 9:00 am On line.
Repair procedure:	Plugged both tube holes at both drums.
Future prevention:	Reviewed critical id of recovery unit trips and potential for disaster.

SPRING 2008 - 14	
Classification:	Critical Incident # 695
Location:	International Paper Vicksburg MS
Unit:	B&W Contract PR-105, Start up 1967, New B&W Boiler 1991, 2-drum Direct Cyclone Evaps
Unit Size:	3.0 MM lb ds/day, 509000 lb/hr steam @ 1020 psig, 825 F. 1200 psig design
Incident Date:	January 3, 2008
Downtime hrs, leak/total:	52
ESP?	Yes
Leak/Incident Loc:	Vertical split leak in rear boiler tube 1" above mud drum, in a thinned, bulged area
How discovered:	Walk down Water discovered in boiler ash hopper
Wash adjacent tube:	Yes. This IS the adjacent tube.
Root cause:	This failure likely from being washed and thinned by December 18 tube leak
Leak detection:	No
Bed cooling enhanc	Yes Southland NaBiCarb & N2
Last full inspection:	February 2007
Sequence of events:	Jan 3 noon. On load on liquor, drum level maintained by feed water regulator. Water seen in ash
-	hopper; 12:35 ESP. 5 pm Cleared for reentry. 9:50 pm Southland start bed cooling NaBiCarb &
	N2. Jan 4 12:30 am stop bed cooling.
Repair procedure:	This tube and 5 other thinned tubes all plugged at both drums
Future prevention:	Further review of cause in April 08. Orig leak Possible vibration fatigue, possible faulty installation

SPRING 2008 - 15	
Classification:	Critical Incident # 696
Location:	Boise Cascade, DeRidder, LA
Unit:	Unit # 069212 LA, B&W Contract PR-130, 2-Drum Large Econ Start up 1969, New boiler B&W
	1907 A 2 MM lh da/day, CO4000lh/hr ataam @ 850 pair, 825 5, 4000 pair daaim
Unit Size:	4.2 Mini ib ds/day, 604000ib/nr steam @ 850 psig, 825 F, 1000 psig design
Incident Date:	November 6, 2007
Downtime nrs, leak/total:	
ESP?	Yes, after 41 minutes
Leak/Incident Loc:	Generating Bank Riser Tube Rupture. Tube failed catastrophically and separated completely at 3d
	row, about 24° below upper bend
How discovered:	Boller tripped on high turnace pressure. Operators went to relight a second auxiliary fuel burner,
Wash adjacent tube:	No
	INU
Root cause:	long term overheat with a rapid catastrophic failure of the tube, insufficient circulation due to gas-
	side pluggage pattern; may have been aggravated by localized high DWD's.
Leak detection:	No
Bed cooling enhanc	Yes
Last full inspection:	August 2007
Sequence of events:	Boiler tripped on high furnace pressure. Drum level swinging, thought was heat/shrink activity and
·	soot blower activity, so adjusted when operators went to relight additional auxiliary fuel burner,
	water was noticed entering in the lower furnace at the liquor gun elevation. ESP was immediately
	initiated
Repair procedure:	Ruptured tube was cut out for failure analysis and then plugged at both the mud drum and steam
	drum. Three Adjacent tubes were also sampled for DWD and metallurgical Analyses
Future prevention:	Held critique with operators and supervision present to determine timeline and inadequacies in
-	procedure. In process of developing/updating procedures for determining conditions that
	represent the boiler suffering a tube rupture and other variables to determine pluggage versus
	water intrusion. Pursuing considerations for leak detection software and simulation/training
	equipment

SPRING 2008 - 16	
Classification:	Critical Incident # 697
Location:	Cariboo Pulp & Paper, Quesnel, BC
Unit:	Unit # 461-503 B&W Contract 6860, Start up 1972, 2-Drum Large Econ, New Econr B&W 1989
Unit Size:	4.3 MM lb ds/day, 700000 lb/hr steam @ 650 psig, 750 F, 800 psig design
Incident Date:	January 23, 2008
Downtime hrs, leak/total:	60.5/77.5
ESP?	Yes
Leak/Incident Loc:	Pinhole leak below an anti-vibration bar in boiler bank front tube row, half-way between drums.
	Fretting cut like a saw into the tube.
How discovered:	Walk down. Boiler was on low load aux fuel being inspected for buildup during a mill maintenance
	outage. Water was observed dripping during inspection. Sootblowers were shut off, and dripping
	followed up until leak found.
Wash adjacent tube:	Yes. Two adjacent tubes were thinned
Root cause:	Fretting of tube from antivibration bar. Bar was attached to a rear wall tube on the upstream side,
	not a generating bank tube.
Leak detection:	Yes Acoustic, Triple-5
Bed cooling enhanc	No
Last full inspection:	April 2007
Sequence of events:	Boiler was on low load aux fuel being inspected for buildup during a mill maintenance outage. 7:36
	am Tracks noticed in saltcake on superheater tubes above bullnose. 07:40 Shutdown
	sootblowers and inspect the generating bank. Found leak in leading edge of gen bank 11th floor.
	Spraying towards furnace. 07:54 ESP initiated.
Repair procedure:	Failed tube plugged in both drums. One added tube plugged. Ten tubes overlaid
Future prevention:	Previous inspection showed no fretting. Checking sootblower pressures, wear bar design, and
	alternate anti-vibration systems.

SPRING 2008 – 17	
Classification:	Critical Incident # 698
Location:	International Paper, Pensacola FL
Unit:	RB 2 B&W Contract PR-171b, Start up 1975, 2-Drun large Econ
Unit Size:	2.89 MM lb ds/day, 430000 lb/hr steam @ 850 psig, 850 F, 1000 psig design
Incident Date:	January 29, 2008
Downtime hrs, leak/total:	44/44
ESP?	No
Leak/Incident Loc:	1/8" pinhole, 8 th row of boiler, next to soot blower lane, 1/3 of way down from upper drum. Washed 2 nd leak circumferential ½" long x 1/8" hole.
How discovered:	Walk down. Discovered water in dry hopper and leaking from IK port and noise from leakage heard
Wash adjacent tube:	Yes
Root cause:	Size, geometry and surrounding wall thickness all point to possible arc strike from welding rod.
Leak detection:	Yes Mass balance, Foxboro
Bed cooling enhanc	No
Last full inspection:	Jun 2007
Sequence of events:	Operator and senior operator observed water in dry hopper and #20 IK. Control room operator
	and management decided to pull liquor, burn out bed, do controlled shut down. Leaking tubes
	identified and repaired. Hydro test OK Followed start up curve, put on line, added liquor.
Repair procedure:	Plugged tubes of both tube leaks
Future prevention:	Documented event, initiated root cause failure analysis procedure, shared with mill operating crews. Reviewed procedures how to evaluate recovery boiler leaks, decision making information, and that the operating crews have the authority to act as they determine based on the situation, up to and including immediate ESP shutdown.

SPRING 2008 - 18	
Classification:	Critical Incident # 699
Location:	International Paper, Courtland AL
Unit:	#3 RB B&W Contract PR-213, Start up 1991, 1-Drum Large Econ
Unit Size:	4.84 MM lb ds/day, 672000 lb/hr steam @ 1250 psig, 900 F
Incident Date:	Oct 26, 2007
Downtime hrs, leak/total:	0 – unit was down
ESP?	No
Leak/Incident Loc:	Gen bank tubes, 10th floor, left side. Two holes in tube 2, platen 21, 4' from top header by
	previous vibration bar; One weld crack in tube 3, platen 25, at upper header weld
How discovered:	Walk down. Unit was down. Leak found in the generating bank.
Wash adjacent tube:	No
Root cause:	Two holes: Thermal Fatigue. Some scale on ID. Weld crack: Thermal stress.
Leak detection:	Yes mass balance
Bed cooling enhanc	No
Last full inspection:	April 2007
Sequence of events:	Unit down to repair smelt burn-out in primary wind box About noon, during cool down, water was
	seen running down nose arch. Leaks were found in generating bank just below the generating
	bank top header. Lowered water level. Repaired leaks. Oct28 7:30 am Boiler fired
Repair procedure:	Two-hole tube: removed section and welded in dutchman. Weld crack: removed a section and
	welded in a dutchman with an S bend. GTAW for both. Ultrasonic shearwave NDT. Hydro OK.
Future prevention:	S-bend used to relieve stress

SPRING 2008 - 19	
Classification:	Critical Incident # 700
Location:	International Paper, Courtland AL
Unit:	#2 RB B&W Contract 524-0180, Start up 1979, 2-Drum DCE Cyclone Evaps
Unit Size:	4.15 MM lb ds/day, 500000 lb/hr steam@450 psig, 550 F
Incident Date:	January 23, 2008
Downtime hrs, leak/total:	0
ESP?	No. Unit off line on gas
Leak/Incident Loc:	Crack in boiler wall tube 7' above mud drum, 8th floor, left side, where vibration bar pulled away
How discovered:	Walk down. Operator discovered water running in the boiler bank hopper
Wash adjacent tube:	No
Root cause:	Vibration bar welded to the tube pulled away causing the crack
Leak detection:	Yes Mass balance
Bed cooling enhanc	No
Last full inspection:	Sept 2007
Sequence of events:	Unit on scheduled outage. Jan 23 7:15 am, walk down operator saw water in boiler hopper. Leak
	location found. 7:00 pm repairs made, NDT done, hydro OK. 1:30 pm Fire in
Repair procedure:	The support was extended and attached to the membrane instead of the tube surface. GTAW pad
	weld.
Future prevention:	-

UPPER FURNACE

SPRING 2008 - 20	
Classification:	Non-Critical
Location:	International Paper, Courtland AL
Unit:	#2 RB B&W Contract 524-0180, Start up 1979, 2-Drum DCE Cyclone Evaps
Unit Size:	4.15 MM lb ds/day, 500000 lb/hr steam@450 psig, 550 F
Incident Date:	May 16, 2007
Downtime hrs, leak/total:	0
ESP?	No. Unit off line on gas
Leak/Incident Loc:	Crack in tube at a buck stay attachment weld external to the boiler furnace, 7th floor, left side wall,
	near mud drum
How discovered:	Walk down
Wash adjacent tube:	No
Root cause:	Crack pulled by buckstay clip attachment weld (Weld failure)
Leak detection:	Yes Mass balance
Bed cooling enhanc	No
Last full inspection:	Sept 2006
Sequence of events:	5/16/07 10:45 am field operator noticed water running down the outside of the boiler at the
	generating bank ash hopper level. Tube leak found exterior at buckstay. Boiler shut down, leak
	repaired, dye pen'd and hydro OK. 10:50 pm Fire lit
Repair procedure:	Ground out crack and welded a full penetration weld. (GTAW) The support attachment was
	moved to the membrane
Future prevention:	Weld attachment to membrane

UPPER FURNACE

SPRING 2008 - 21			
Classification:	Critical Incident # 701		
Location:	Temple Inland, Orange TX		
Unit:	#1 RB, B&W Contract PR-108, Start up 1967, 2-Drum DCE cyclone evap		
Unit Size:	1.65 MM lb ds/day, 256000 lb/hr steam @ 850 psig, 825 F, 975 psig design		
Incident Date:	April 4, 2007		
Downtime hrs, leak/total:	128/128		
ESP?	Yes		
Leak/Incident Loc:	1 ½" X 2" Fishmouth rupture in roof tube at steam drum; Added tubes washed. Drum surface		
	washed		
How discovered:	High furnace pressure, boiler tripped, and walk down operator saw stream coming out of		
	penthouse.		
Wash adjacent tube:	Yes		
Root cause:	Although the detailed tube analysis revealed the presence of grooves in the entire swaged section		
	of the failure, the unit has a history of frequent cycling for water washing during it's +40 year life		
	and the fact that "multiple cracks were found on the ID of the tube, the mechanism of the cracking		
	is essentially SACC		
Leak detection:	Yes Trasar		
Bed cooling enhanc	enhanc Yes Southland		
Last full inspection:	May 2006		
Sequence of events:	April 4, 2007, 6:45 PM, No. 1 RB furnace pressure went high and tripped the F.D Fan. Operators		
Repair procedure:	walked down, saw, steam coming from penthouse. Operators looked inside the furnace at the liquor ports for signs of water and none was noted. The furnace side ports were opened and water was observed running down the furnace side of the mud drum; an ESP was initiated. The ESP sequence verified no issues. Personnel restricted 4 hrs. April 5 3:00AM Southland arrived to cool the bed. 8:00PM Started pulling drum internals and inspecting failure area. Found fishmouth rupture in one roof tube at the steam drum. 4 added tubes and an area on the steam drum approximately 1/2" X 2" X 7/8"D were undercut by washing from the tube failure. Repairs and overlay made. Boiler hydro OK. The drum is fabricated from SA516-70 material, 3 1/8" thick in the tube sheet area. The tubes surrounding the repair area were removed and the base metal was ground clean to 2 inches outside the repair area. Dye Penetrant was applied to identify possible cracking issue, none noted. The base metal was preheated to 300F for welding overlay. Stringer bead technique was used with E6010/E7018 electrodes with each weld deposit cleaned of slag before the next layer was laid down; the finished weld was Dye Penetrant tested.		
Future prevention:	The 5 tube stubs were welded to the existing tube segments, installed into the steam drum and lightly rolled to hold into place. The tube sheet was preheated to 300F and the tubes were seal welded to the tube sheet using 7018 electrodes. The 5 tube welds outside the drum were X-rayed and the welds inside the drum on the rolls were tested using Dye Penetrant. All roof tubes were replaced in May 2007, including those repaired in this report		

SWR LOWER FURNACE

SPRING 2008 - 22			
Classification:	Critical Incident # 702		
Location:	Delta Natural Kraft, Pine Bluff AR (was Mid-America Packaging, Gaylord; Weyerhaeuser (1981		
	Expl & rebuild), Dierks)		
Unit:	#1 RB CE Contract 6256 Start up 1957, 3-Drum DCE Cascade Evap; 1986 B&W Lower furnace		
Unit Size:	.750 MM lb ds/day, 100000 lb/hr steam @ 450 psig, 750 F, 675 psig design		
Incident Date:	February 4, 2008		
Downtime hrs, leak/total:	102/102		
ESP?	Yes		
Leak/Incident Loc:	Small (1/8") hole/crack in an undercut area where a pin stud was welded to RHSW Tube # 18 at		
	the primary air elevation. (3' 6" above the floor).		
How discovered:	Smelt-water reaction. Operator 1st heard pop or band when inserted punch rod into plugged port.		
A few seconds later small water reaction blew debris out of air and dup ports			
Wash adjacent tube:	No		
Root cause:	Poor nin stud attachment and excessive deposit build-up resulting in loss of wall thickness		
Noor buuse.	overheating and corrosion fatigue cracking		
Leak detection:	No		
Bed cooling enhanc	Yes Hand lances through the primary air ports using low pressure dry steam		
Last full inspection:	. July 2007		
Sequence of events:	From approximately 11 AM to 2:15 PM 2-4-08 several primary air ports were staving blacked out		
Sequence of events.	on the RHSW near the back, right corner. The liquor around the ports was dry and not sticky		
	Punch rode came out clean and dry. The Recovery Operator thought a ledge of dried liquor had		
	slid down the wall and just peeded to burn out. A new Receivery Operator came on shift at 2:15		
	Silu down the wall and just needed to built out. A new Recovery Operator came on shift at 2.15		
	Pivi, was briefed on the studiion, checked control room instruments which du not indicate		
	anything unusual, and then went to investigate the black out. When he inserted a punch rod into		
	one of the blacked out ports, he heard a pop of bang.		
	He pulled the rod out and began walking away from the boller towards the 2nd floor exit. After		
	walking a few feet, a smelt/water reaction occurred in the boller, blowing debris out through the		
	primary and secondary air ports and gun ports. The boiler tripped on high furnace pressure. The		
	operator ran to the building exit on the 2nd floor and called the control room to initiate an ESP.		
	The fireman immediately initiated the ESP at 2:28 PM. At 6:30 AM the next morning, the		
	Superintendent and Asst. Supt. went out around the boiler verifying that the ESP functions worked		
	correctly. They did. An inspection revealed no apparent physical damage to the boiler. After the		
	inspection, personnel were allowed around the boiler beginning at 7:00 AM. Bed temperature		
	readings taken at 11:00 AM, 2-5-08, ran from 1300 – 14000F. At 1:30 PM, mill personnel began		
	cooling the bed using a low pressure, dry steam lance. At 7:00 AM, 2-6-08, bed temperature		
	readings had dropped to 400 - 7500F. At 7:30 AM the boiler water wash began. At 9:00 PM, as		
	the boiler was filling with water for a hydro, the leak was identified. The boiler was drained and		
	repairs begun. Three additional tubes along the RHSW were visually identified as needing		
	replacement Repairs were completed and the boiler had a good hydro at 6:45 AM, 2-8-08.		
Repair procedure:	A section of the tube, 92" long, containing the area of the leak, was cut out and a dutchman was		
	installed. Three additional tubes along the RHSW were visually identified as needing replacement.		
	These three and the one leaking tube were sectioned out and dutchmen were installed		
Future prevention:	One previous undercut leak in 2007. Monitor pin studs for undercut. Use 1/2" studs: holding up		
	better than 3/8". Perhaps boroscope for internal deposits.		

Т

SWR FLOOR SPRING 2008 - 23

SPRING 2000 - 23			
Classification:	Critical Incident # 703		
Location:	Marathon Pulp, Marathon, ON		
Unit:	#4 RB JRMaR3 B&W Contract 7386 Start up 1978, 2-Drum LAH; ABB 1992 decanting bottom		
Unit Size:	2.2 MM lb ds/day, 330000 lb/hr steam @ 680 psig, 750 F, 750 psig design		
Incident Date:	Sept 28, 2007		
Downtime hrs, leak/total:	117/		
ESP?	Yes		
Leak/Incident Loc:	blister and a crack about 1/2 to 3/4 of an inch long on 2nd floor tube from left sidewall, ~ 3' from rear		
	wall.		
How discovered:	Walk down operators were preparing to change oil gun when they noticed a "percolating" effect in		
	the bed.		
Wash adjacent tube:	No		
Root cause:	Evidence points to Long term overheat, by spout that plugs often callig for use of starting burner		
Leak detection:	No		
Bed cooling enhanc	No		
Last full inspection:	April/May 2007 included floor inspection		
Sequence of events:	Sep 27 Unit tripped on hi pressure, with unusual noise, attributed to large buildup falling on bed		
Sequence of events.	Sep 28 3:20 am Unit tripped on hi pressure. Restart on oil Operators cleaning air ports and		
	be 20 5.20 and only upped on his pressure. Restart on oil. Operators cleaning all ports and		
	amolt had 7:40 am ESD'd on likely tube look 9:10 Three miner explosions hook to have Son 20		
	Silleli beu. 7.40 am ESP u on likely lube leak. 0.10 Three million explosions back to back. Sep 29		
	5,45 pm Started waterwash. Minor reactions on bed, so stopped wash. Used steam lances to cool		
	Two not spots. 7.05 pm began water wash again. Sep 50 6.55 am entered furnace, located leak.		
Demoin marchedume.	Removed 3 wide strip of bed to repair and inspect. Tube repaired		
Repair procedure:			
Future prevention:	Oil gun flows are now monitored and recorded during weekly tests to ensure no worn tips are in		
	service allowing higher then normal flows. New oil gun tips and pressures/flows will be instituted.		
	Reviewed air/liquor flows and distribution. Secondary air damper settings modified to eliminate		
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SWR FLOOR	Reviewed air/liquor flows and distribution. Secondary air damper settings modified to eliminate swirling action in that corner of the furnace.		
SWR FLOOR SPRING 2008 - 24	Reviewed air/liquor flows and distribution. Secondary air damper settings modified to eliminate swirling action in that corner of the furnace.		
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SPRING 2008 - 25			
Classification:	Critical Incident # 705		
Location:	MeadWestvaco, Evadale, TX		
Unit:	#3 RB, Ahlstrom Contract 6135, 1-Drum Large Econ, Start up 1995, Decanting Hearth		
Unit Size:	2.85 MM lb ds/day, 410000 lb/hr steam @ 624 psig, 760 F, 800 psig design		
Incident Date:	Sep 18, 2007		
Downtime hrs, leak/total:	90.75		
ESP?	Νο		
Leak/Incident Loc:	Depression in smelt bed (NOT FLOOR) in dead center of decanting hearth		
How discovered:	Smelt water reaction		
Wash adiacent tube:	No		
Root cause:	There was an unknown hidden amount of molten smelt present in the bed after water wash		
	began. Bed lance thermocouples not properly insulated. Likely giving surface temps since		
	insulation burned back.		
Leak detection:	n/a		
Bed cooling enhanc	Yes Southland NaBicarb & N2		
Last full inspection:	March 2007		
Sequence of events:	Sep 17 Liquor diverted when smelt found leaking from spout onto dissolver, and down to floor		
Sequence of events:	Sep 17 Liquor diverted when smell found leaking from spout onto dissolver, and down to floor. Bed 2-3'above primary air. All spouts plugged. Contacted Southland. Inserted bed temp probes. Sep 18 10:00 am Southland started cooling NaBiCarb & N2. 8750 lb injected. 3:30 pm 3500 more lbs added. Appeared to be cooled. Probe temps still varying, 480 – 930 F. 7:15 pm Begin water wash, Floor tube TC's at 150F. 9:45 pm Smelt Water Reaction . Set up 8-hour non-entry. Sep 19 6:00 am unit inspected. No damage found. Small area of depression in the smelt bed char noted in middle exact center area of bed where reaction occurred. Spent most of day checking bed. There was no floor beam deflection or deflection of the floor tubes in the "small area of depression". This area of depression was in the smelt bed itself. Probe wire found to be inadequate and also in error when compared to properly jacketed wire. 6:00 pm resume water wash Sep 20 6:00 am Water wash complete. Sep 21 4:15 am Hydro OK. No Leaks. 7:30 am start up with gas		
Repair procedure:	n/a		
Future prevention:	Will have bed probes built out of properly jacketed type K wire and available at boiler prior to any future waterwash. Will have steam lances also available along with hoses and a manifold station for steam lancing at multiple points. Will modify char bed cooldown procedure to indicate 800 degrees or less as targeted final temperature. Will also edit procedure to provide step to ensure proper probes have been inserted in bed. Initial set of temperatures to be recorded on a separate form when cooldown begins as well as final set of temperatures prior to introduction of water. Will use surface thermometer and/or thermal imaging camera to indicate bed temperatures at beginning of cooldown as well as final bed surface temperatures. Floor tube thermocouples that are not reading will be repaired at next shutdown. Will barricade bottom of boiler when beginning wash and restrict access to boiler for first 2.5 hours of wash. Will also restrict traffic in front of boiler for first 2.5 hours of wash as well. Will also restrict traffic in front of boiler for first 2.5 hours of wash. All duct washing will be postponed until first 2.5 hours of wash are completed. Step will be added to open all doors on boiler prior to waterwashing.		
	THE FAILED THERMOCOUPLE WAS A COMMON TYPE PLTC EXTENSION WIRE WITH TYPE KX WIRES, OUTER INSULATION: Flame-retardant Okoseal® (PVC) per UL Standard 13 and 2250, 15 mils nominal thickness, 105°C temperature rating. TEMPERATURE RATING OF 221 F ON THE OUTER JACKET AND 392 F ON THE WIRES THEMSELVES		
	WE ARE NOW USING SS-K-14-IV, WHICH IS ACTUALLY AN XS-K-14 WITH INCONEL 600 OVERBRAID. HAS A TEMPERATURE RATING OF 2000 F AND AN BRAIDED INCONEL OUTER COVERING TO PROTECT AGAINST ABRASION.		

SMELT-WATER REACTION (SWR) WATER WASH

	DUD	
UPPER	FUK	NACE

SPRING 2008	INTL 1102
Classification:	(Int'l units not classified)
Location:	Australian Paper, Maryvale Australia (Paper Links)
Unit:	#6 RB B&W Contract 7761, Start up 1983, 2-Drum Large Econ
Unit Size:	2.4 MM lb ds/day, 352000 lb/hr steam@ 915 psig, 840 F, 1050 psig design
Incident Date:	January 25, 2008
Downtime hrs, leak/total:	95
ESP?	Yes
Leak/Incident Loc:	3 mm x 20 mm rupture at IK #4 soot blower opening, 6th floor, 22.5 m above hearth
How discovered:	Walk down. Operator heard noise
Wash adjacent tube:	No
Root cause:	Condensate leaking from sootblower lance onto wall tube causing corrosion thinning until
	tube ruptured
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	November 2007
Sequence of events:	Jan 25, 19:00. Operator on walk down heard unusual noise by IK#4. Poppet valve looked OK, so
	thought it was purge steam. Next operator rechecked with depressurized soot blower system.
	Noise still there. Pulled back cladding. Found water leaking. Thought was outside furnace, so
	pulled liquor to burn down bed. 20:30 unit tripped from gas burner upset. Looked in unit and saw
	water spraying into furnace. 20:45 Did ESP. After 12 hours evacuation, hearth still had hot spots.
	Pressure gauge in lower header drain line used to measure residual water level: indicated water
	was below floor tubes, calling for full floor tube inspection. Cooled 24 hours more. Did water wash.
	Jan 27 13:00 water wash complete. Repairs made. Jan 28 23:00 hydro OK. 19:20 Liquor.
Repair procedure:	I hinning evident in 40 mm x 70 mm area. Membrane cut away to gain access. I hinned area
	removed and prep'd for window insert. Window prep'd and welded in to NS-043. Ndt – 100%
E. (Visual, radiography, Mag Particle. Hydro OK.
Future prevention:	Survey all soot blower openings tube thickness on ongoing basis. Check all soot blower lance limit
	settings to insure complete withdrawal. Inspect integrity of all poppet valves.

Appendix D ESP Report – Slide Presentation











Page - 85

Appendix D ESP Report – Slide Presentation





Initiation of ESP

Four incidents with smelt water reaction

Ranged from 1 minute to days

Median was 32 minutes



Leak Detection Systems installed – 14







Appendix D ESP Report – Slide Presentation



Explosion History per 100 Oper Yr









Subcommittee Activities

- Draft language for "Dedicated Stand Alone" submitted to task group.
- Working on expansion of Char Bed Cooldown section of Recommended Post ESP Procedure

BLRBAC

Operating Boiler Lists

Page - 88

List of Operating Boilers in US and Canada posted on BLRBAC website.

- Jack Clement will continue to maintain

- Contact Jack with any corrections or updates

BLRBAC

TAPPI Steam & Power/Energy **Management Committee**

Officers:

- · Chairman Paul Conner Southern Co.
- Secretary John Andrews Mead-Westvaco
- Membership Chair Jim Dickinson B&W

Subcommittees:

- Recovery & Power Boilers Andy Jones IP
- Water Treatment– Mark Sargent IP
- Energy– Tom Harriz Jacobs
- Gasification Jay Gregory Longview Fibre

87 members

	■ 21 Mill
	20 Suppliers
	20 Consultants
	• 11 AE Firms
	15 Other (University, Retired, Labs, etc.)
Subc	<u>committee Breakdown:</u>
Re	covery & Power Boilers 46

Recovery & Power Boilers	46	
Water Treatment	11	
Energy	21	
Gasification	9	

- To develop & disseminate information, and provide best practice guidelines related to:
- Design & operation of recovery bollers, evaporators, NCG systems & related equipment
- Steam generation from solid fuels, such as coal, bark, wood refuse and MSW
- Thermal and electric power cycle design, operating performance and <u>onergy</u> policy considerations Design requirements for boiler feedwater systems,
- moniforing requirements for boller feedwater ar condensate systems and response to feedwater
- contamination. Design, application and operation of gasification technologies for biomass and black liquor.

Develop TIP's (Tech. Info. Papers/Proc.) Support TAPPI Conferences with technical program items, coordination

- Recovery Boiler Sootblowers The Basics
 New TIP (Sootblowers 101) Alarick Tavares/Danny Tandra, in initial draft stages

- Guidelines for Operating and Maintenance Impacting Recovery Boiler Economizers
 New TIP from recent AF&PA economizer study Jack Clement, just beginning
- Ultrasonic Testing for Tube Thickness in Black. Liquor Recovery Boilers
 Guidelines for accurate thickness testing, layouts for tube thickness surveys beginning a major updating

- Stripping of Kraft Pulping Process
- Collection and Burning of Concentrated NCG's
 Regulations, Design, Operation
 Being updated, 5-year mandatory review, nearly complete
- Liquor Evaporators
- - · New TIP, based on Andy Jones presentation

Recovery Boiler – Past/Recently Released TIP's

- Tube Rolling Procedures and Quality Guidelines

Page - 89

Appendix E Page - 90 TAPPI Report - Slide Presentation (Cont'd)

Power Boiler - Current Activities:

- "Sampling Procedures for Biomass Fuel for
 - Original TAPPI Technical paper, making into
 - Drafts completed, under initial reviews

Water Treatment Activities

<u>8 TAPPI Engi</u> onference ineering. Pulping & Environmental

- Portland, OR
 Reyhaneh Shenassa, Metso Steam & Power Program Chair

Requirements to Join?