BLACK LIQUOR RECOVERY BOILER
ADVISORY COMMITTEE

MINUTES OF MEETING
Crowne Plaza Hotel/Atlanta Airport
April 4, 5 & 6, 2016

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. ***Bylaws - 2.1***

OFFICERS

Chairman:	**John Gray** Rayonier Advanced Materials 10 Gum Street Fernandina Beach, FL 32034	Tel: 912-277-1388 Cell: 912-321-7582 john.p.gray@rayonieram.com
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Treasurer:	**Len Olavessen** LENRO, Inc. 5303 Atascocita Road, #117 Humble, TX 77346	Cell: 901 573 8343 olavessen@aol.com

REGULAR MEMBERSHIP

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

ASSOCIATE MEMBERSHIP

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

CORRESPONDING MEMBERSHIP

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

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BLRBAC MEETING SCHEDULE

Fall	**October**	***24, 25 & 26**	**--**	**2016**
Spring	**April**	**3, 4 & 5**	**--**	**2017**
Fall	**October**	**2, 3 & 4**	**--**	**2017**
Spring	**April**	**9, 10 & 11**	**--**	**2018**
Fall	**October**	**8, 9 & 10**	**--**	**2018**
Fall	**October**	**8, 9 & 10**	**--**	**2018**

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

■ Past Chairman Lon Schroeder

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* **NOTE:** For varying reasons, the previously published meeting dates have been changed at the discretion of the Executive Committee.

BLRBAC has established its own WEB Site which is: www.blrbac.org

At this WEB site 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 WEB site. 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.

CROWNE PLAZA HOTEL — Blocked room dates, pricing, address, hotel phone numbers

SCHEDULE — List of subcommittee activities on Monday and Tuesday

AGENDA — Reports given to Joint BLRBAC Meeting on Wednesday

OPERATING PROBLEMS QUESTIONNAIRE — 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
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Frank's Cell Phone: 630-269-1005
Barbara's Cell Phone: 630-640-1805
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These are available at the **BLRBAC INTERNET ADDRESS**: **www.blrbac.org**

BLRBAC Guidelines & Recommended Practices

LEGAL NOTICE

Waste Stream Incineration
(Dated: April 2013

Emergency Shutdown Procedure
(Dated: October 2012)

Safe Firing of Black Liquor in Black Liquor Recovery Boilers
(Dated: April 2015)

Materials & Welding Guidelines
(Dated: April 2013)

Safe Firing of Auxiliary Fuel in Black Liquor Recovery Boilers
(Dated: February 2012)

Fire Protection in Direct Contact Evaporators and Associated Equipment
(Dated: February 2012)

Personnel Safety & Training
(Dated: February 2012)

Application of Rotork Actuators on Black Liquor Recovery Boilers
(Dated: October 2005)

Post ESP Water Level
(Dated: January 2005)

Post ESP Guidelines
(Dated: October 2002)

Boiler Water Management Guidelines for Black Liquor Recovery Boilers
(Dated: October 2014)

Instrumentation Checklist and Classification Guide for Instruments and Control Systems Used in the Operation of Black Liquor Recovery Boilers
(Dated: April 2014)

If you have any questions, contact:

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‡Guy Labonte FM Global 600 de la Gauchetiere Ouest, 14th Floor Montreal, Que H3B 4L8 Canada Tel: 514-876-7412 Cell: 514-942-3651 guy.labonte@fmglobal.com	**‡Doug Murch** WestRock 501 South 5th Street Richmond VA 23219 Tel: 804-444-5245 Cell: 804-787-0781 douglas.murch@westrock.com	**‡Bob Phelps** Extra Hand, Plant Support Services 5440 Karma Road Chester, VA 23831 Ph. (804) 921-7374 Cell: 804-748-4391 robert.phelps1@verison.net
‡Mark Sargent George H. Bodman, Inc. 857 Tall Trees Drive Cincinnati, OH 45245 Tel: 514-543-0480 msarge1031@yahoo.com	**‡Alvaro Timotheo** Andritz Pulp & Paper 5405 Windward Parkway, Ste.100W Alpharetta, GA 30004 Tel: 770-640-2642 Cell: 770-630-4577 alvaro.timotheo@andritz.com	**‡Thomas Wranosky - Co-chair** International Paper 568 Shore Airport Road Ticonderoga, NY 12883-9699 Tel: 518-585-5305 tom.wranosky@ipaper.com

‡ Denotes attendance at the April 2016 meeting.

WASTE STREAMS SUBCOMMITTEE

‡**Paul Seefeld**
A.H. Lundberg Associates Inc.
6174 Kissengen Springs Ct.
Jacksonville, FL 32258
Tel: 904-614-6492
paul.seefeld@lundberg-us.com

‡**Mark E. Cooper** FM Global 550Birmard St., Ste. 1788 Bentall 5 Vancouver, BC V6C2B5 Tel: 604-694-8262 Cell: 425-877-9735 **mark.cooper@fmglobal.com**	**Wendy Coyle** International Paper 7600 Highway 10 West Pine Hill, AL 36769 Office: 334-963-2362 Cell: 541-285-1867 **wendy.coyle@ipaper.com** **Substitute: Richard Waters**	**David Frazier** International Paper 3819 Blue Springs Trace Evans, GA 30809 Tel: 706-210-3470 Cell: 706-305-5321 david.frazier@ipaper.com
Michael Glasheen Expera Specialty Solutions prev. d/b/a Thilmany Kaukauna, WI **michael.glasheen @experaspecialty.com**	Gary Thomas Weyerhaeuser Address: City/State Zip Tel: **thomas.gary@weyerhaeuser.com**	**Meville Hedges** Babcock & Wilcox 2302 Parklake Drive, NE, Suite 300 Atlanta, GA 30345 Tel: 770-621-3907 **mhedges@babcock.com**
‡**John Lewis** Fluor Daniel Forest Products 100 Fluor Daniel Drive Greenville, SC 29607-2762 Tel: 864-517-1683 **john.lewis@fluor.com**	‡**Steven L. Osborne** Babcock & Wilcox 20 S. Van Buren Avenue Barberton, OH 44203 Tel: 330-860-1686 slosborne@babcock.com	**John Rickard** Jacobs Engineering P. O. Box 5456 Greenville, SC 29606 Tel: 864 676-6393 **john.richard@jacobs.com**
‡**Michael D. Sides** XL GAPS 1360 Olympia Park Circle Ocoee, FL 34761 Tel: 407-656-4275 Mobile: 407-462-4622 **michael.sides@xlgroup.com**	**John Veltre** Chartis Insurance 2565 Mohawk Trail Acworth, GA 30102 Tel: 678-347-5406 **john.veltre@chartis.com**	‡**Arie Verloop** Jansen Combustion and Boiler Technologies 12025 115th Avenue N.E., Ste 250 Kirkland, WA 98034-6935 Tel: 425-952-2825 **arie.verloop@jansenboiler.com**
‡**Greg Wass** A. H. Lundberg P.O. Box 597 Bellevue, WA 98009 Tel: 425-283-5070 Cell: 425-503-2744 greg.wass@lundberg-us.com	‡**Marla Weinberg** International Paper 6283 Tri-Ridge Blvd. Loveland, OH 45244 Cell: 706-339-1631 **marla.weinberg@ipaper.com**	

‡ Denotes attendance at the April 2016 meeting.

WATER TREATMENT SUBCOMMITTEE

‡**Tom Przybylski**
Power Specialists Assoc., Inc.
531 Main Street, Somers, CT 06071
Tel: 860.763.3241
tom.przybylski@psaengineering.com

Craig Aderman Sappi Fine Paper NA 89 Cumberland Street P.O. Box 5000 Westbrook, ME 04098-1597 Tel: 207-856-3517 Cell: 207-831-2472 **craig.aderman@sappi.com**	**Robert Bartholomew, P.E.** Sheppard T. Powell Associates, LLC 1915 Aliceanna Street Baltimore, MD 21231 Voice: 410-327-3500 **rdb@stpa.com**	**Kelli Bastarache** Power Specialists Assoc., Inc. 531 Main Street Somers, CT 06071 Tel: 860-763-3241 **kelli.bastarache@psaengineering.com**
‡**Wayne Bucher** NORAM Engineering Birmingham, AL Tel: 205-408-1874 Cell: 205-368-9396 **wayne.bucher@gmail.com**	‡**Fred Call** Buckman North America 1256 North McLean Blvd. Memphis, TN 38108-1241 Tel: 207-214-8357 **fccall@buckman.com**	‡**Susan Childress** IP Technology Power Mfg. Solutions 5870 Anderson Road Grovetown, GA 30813 Tel: 706-339-1631 **susan.childress@ipaper.com**
‡**Frank DeStefano** The Purolite Company 500 Locust Grove Spartanburg, SC 29303 Cell: 864-617-0881 **fdestefano@puroliteusa.com**	‡**Buck Dunton** ChemTreat, Inc. 4301 Dominion Blvd. Glen Allen, VA 23060 Tel: 804-935-2000 **buckd@chemtreat.com**	**Don Flach** Georgia-Pacific Corporation 133 Peachtree Street Atlanta, GA 30303 Tel: 386-336-5584 **don.flach@gapac.com**
John Gray Rayonier Advanced Materials 10 Gum Street Fernandina Beach, FL 32034 Tel: 912-277-1388 Cell: 912-321-7582 **john.p.gray@rayonieram.com**	‡**Ken Hansen** Babcock & Wilcox Company 20 South Van Buren Avenue Barberton, OH 44203 Tel: 330-860-6443 **kehansen@babcock.com**	‡Jeff Fox Nalco Company 1601 W. Diehl Road Naperville, IL 60563-1198 **jfox@nalco.com**
‡**Virginia Durham** Solenis Wilmington, DE Cell: 215-882-0735 **vedurham@solenis.com**	**Dave Kittel** Valmet, Inc. 3430 Toringdon Way, Ste. 201 Charlotte, NC 28277 Tel: 704-414-3434 Cell: 704-614-0492 **dave.kittel@valmet.com**	‡**Sam Lewis** Delta Training Partners, Inc. 4020 Oleander Drive Wilmington, NC 28403 Tel: 910-790-1988 **slewis@deltatraining.com**

‡ Denotes attendance at the April 2016 meeting.

WATER TREATMENT SUBCOMMITTEE - (Cont.)

Michael Lykins Packaging Corporation of America 1061 Woodcliff Drive South Elgin, IL 60177 Cell: 630-659-7115 **mlykins@packagingcorp.com**	**Tom Madersky** Power Specialists Assoc., Inc. 531 Main Street Somers, CT 06071 Tel: 860-763-3241 **tom.madersky@psaengineering.com**	‡**Jason Miller** Andritz Inc. 1115 Northmeadow Parkway Roswell, GA 30076-3857 Tel: 770-640-2528 Cell: 770-335-8529 **jason.miller@andritz.com**
Mitch Morgan Nalco Company 1601 W. Diehl Road Naperville, IL 60563-1198 Tel: 630-305-1000 **jmorgan@nalco.com**	‡**Rick Morgan** FM Global 5700 Granite Pkwy. Plano, TX 75024 Tel: 972-731-1869 **rick.morgan@fmglobal.com**	‡**Kurt Parks** Packaging Corporation of America 5495 Lake Park-Clyattville Road Valdosta, GA 31601 Tel: 229-559-2257 Cell: 229-415-8557 **kparks@packagingcorp.com**
Jim Robinson GE (Infra, Water) 4636 Somerton Rd. Trevose, PA 19053 Tel: 215-942-3381 **james.robinson@ge.com**	**Alarick Tavares** Georgia-Pacific Corporation 133 Peachtree Street Atlanta, GA 30303 Tel: 404-652-4000 **ajtavare@gapac.com**	

‡ Denotes attendance at the April 2016 meeting.

Registered for the meeting were:

3S Team
Fudge, Joey, Skiatook, OK
Pyszynski, George, Skiatook, OK

A.H. Lundberg
Seefeld, Paul, Jacksonville, FL
Wass, Greg, Bellevue, WA

Acuren
Spires, Lawrence, Augusta, GA
Strand, Jeff, Bolivar, OH

AIG
Doidge, Greg, New York, NY

AirTek Construction
Baines, Troy, Troy, AL

American Forest & Paper Assn. (AF&PA)
Grant, Thomas, Yonkers, NY

American International Group (AIG)
DeBeer, Thomas, Woodstock, GA
Laulumaa, Kimmo, Stockholm Sweden
Smith, Andy, Woodstock, GA

Andritz
Airola, Marko, Varkaus, Finland
Arja, Kolari, Varkaus, Finland
Burn, Deirdre, Alpharetta, GA
Gazsi, Andrew, Alpharetta, GA
Hakkarainen, Aimo, Varkaus, Finland
Imig, Greg, Alpharetta, GA
Johnson, David, Alpharetta, GA
LeBel, Mark, Alpharetta, GA
Miller, Jason, Alpharetta, GA
Phillips, John, Alpharetta, GA
Pulkka, Antti, Varkaus, Finland
Soderlund, Harri, Alpharetta, GA
Timotheo, Alvaro, Alpharetta, GA

Atlantic Firebrick Supply
Goddard, Doug, Jacksonville, FL
Spring, Paul, Jacksonville, FL

AXA Matrix Risk
Hayes, Michael, Miamisburg, OH

AZZ (SMS)
Power, Stacy, St. Petersburg, FL

Babcock & Wilcox
Blazer, Phil, Charlette, NC
Coley, Lance, Atlanta, GA
Hansen, Kenneth, Barberton, OH

Babcock & Wilcox (Cont.)
Hovinga, Mark, Barberton, OH
Kornaker, Greg, Barberton, OH
Kulig, John, Barberton, OH
Kumar, Sam, Houston, TX
LeClair, Amber, Barberton, OH
Leibel, Greg, Charlette, NC
Osborne, Steve, Barberton, OH
Phinney, Michael, Fordland, MO
Sallee, Greg, Atlanta, GA
Schwartz, Eric, Barberton, OH

Beecher Carlson
Mirek, Mark, Dallas, TX

Boiler Services and Inspection (BSI)
Andrews, John, Charleston, SC
Clay, Dean, Simsboro, LA

Buckman Laboratories
Call, Fred, Newry, ME

Chalmers & Kubeck
Richardson, Curt, Watkinsville, GA

ChemTreat
Gillian, Marty, Roanoke, VA
Graham, Jim, Collierville, TN

Chicago Tube and Iron (CTI Power)
Morgan, Preston, Locust, NC

Clearwater Paper Corporation
Babino, Brian, Lewiston, ID
Bass, Mike, McGehee, AR
Beck, Justin, Lewiston, ID
Bliss, Dave, McGehee, AR

Clyde Bergemann
Miller, Mark, Atlanta, GA

CORR Systems
Ruiz de Molina, Eliadio, Birmingham, AL

Delta Training Partners
Lewis, Sam, Wilmington, NC

Diamond Power Specialty
Youssef, Simon, Lancaster, OH

Domtar
Avery, David, Bennettsville, SC
Worsham, Jesse, Bennettsville, SC

Registered for the meeting were:

Ecolab/Nalco Water
Olavessen, Len, Saraland, AL

Electron Machine
Hall, Joseph, Umatilla, FL
Osborne, Brad, Umatilla, FL
Vossberg, C. A., Umatilla, FL

Energy & Environmental Tech
Brown, Michael, Jacksonville, AL

Envirovac
Baxter, Rick, Fruitdale, AL
Owens, Ed, Fruitdale, AL

Expera Specialty Solutions
Basler, Dan, Kaukauna, WI
Krupp, Brandon, Kaukauna, WI
McCarty, Matt, Kaukauna, WI

Extra Hand Plant Support Services
Phelps, Robert, Chester, VA

FITNIR Analyzers
Trung, Thanh, Vancouver, BC

Fluor Daniel Forest Products
Lewis, John, Greenville, SC

FM Global
Beaulieu, Andre, Montreal, Que
Britt, Francisco, Mckinney, TX
Cooke, Craig, Oconomowoc, WI
Cooper, Mark, Woodinville, WA
Crysel, Scott, Plano, TX
Dondona, Jasbir, Vancouver, BC
Hoffman, Daryl, Plano, TX
Huelsbeck, Kevin, Sherwood, WI
Hume, Everett, Norwood, MA
Labonté, Guy, Montreal, Que.
Moberg, Eric, Plano, TX
Morgan, Rick, Plano, TX
Onstead, Jimmy, Plano, TX

Fossil Power Systems (FPS)
Donahue, Mark, Dartmouth, NS

FPInnovations Paprican
Rezaei, Hooman, Vancouver, BC

Fuel Tech
Benisvy, Howard, Warrenville, IL
Bohlen, Scott, Warrenville, IL

General Electric (GE)
Harmon, John, Windsor, CT
Hollenbach, Denis, Windsor, CT
Whelahan, Shawn, Knoeville, TN

George H. Bodman, Inc.
Bayse, Michael, Kingwood, TX
Bodman, George, Kingwood, TX
Holland, Brook, Kingwood, TX
Sargent, Mark, Kingwood, TX

Georgia-Pacific
Browning, John, Atlanta, GA
Daily, Chris, Atlanta, GA
Hill, Wes, Atlanta, GA
King, Robert, Atlanta, GA
Kujanpaa, Olli, Atlanta, GA
Lane, Terry, Brunswick, GA
Miller, William, Brunswick, GA
Morency, Karl, Atlanta, GA

Glatfelter, P.H.
Davis, Charles, Chillicothe, OH
Free, Roger, Chillicothe, OH
Gentzler, William, Spring Grove, PA
Plappert, William, Spring Grove, PA
Smith, Mark, Chillicothe, OH

Global Risk Consultants
Garfield, Michael, Lowell, ME

Greif
Johnson, Benjie, Amherst, VA
Schrock, Eric, Amherst, VA
Stratton, Tom, Amherst, VA

Houghton Cascade
Leary, William, Auburn, WA

International Paper
Bedgood, Sam, Campti, LA
Blackard, Vernon, Loveland, OH
Blair, Michael, Loveland, OH
Byrd, Joel, Loveland, OH
Childress, Susan, Loveland, OH
Cousins, Bob, Rome, GA
Hendrix, Sam, Loveland, OH
Krekeler, Daniel, Loveland, OH
Loomans, William, Campti, LA
MacIntire, Wayne, Loveland, OH
Navojosky, Frank, Loveland, OH
Stevens, Jeff, Memphis, TN
Weinberg, Marla, Loveland, OH
Wranosky, Tom, Ticonderoga, NY
Young, Roderick, Rome, GA

Registered for the meeting were:

Interstate Paper
Long, Clay, Riceboro, GA
Stapleton, David, Riceboro, GA

Jansen Combustion
Henderson, Matt, Kirkland, WA
La Fond, John, Kirkland, WA
Verloop, Arie, Kirkland, WA

Kadant Black Clawson
Patel, Jean-Claude, Mason, OH
Smith, Jason, Mason, OH

Kapstone Paper
Burns, Gregory, Charleston, SC
Hansford, Monte, N. Charleston, SC
Jones, William, Charleston, SC

K-Patents
Gronowski, Eric, Naperville, IL
Hamalainen, Arto, Naperville, IL
Pyörälä, Keijo, Naperville, IL
Wagner, Phil, Naperville, IL

Liquid Solids Control
Sweeney, Michael, Upton, MA
Vandenburg, Gordon, Upton, MA

Marsh & McLennan
Weisenberg, Dale, Calgary, Alberta

Mondi Pine Bluff
Taylor, Jim, Pine Bluff, AL

MPW Industrial Services
Elam, Monty, Hebron, OH
Houseal, Bradford, Richmond Hill, GA
Marchant, William, Hebron, OH
Thomas, Ron, Hebron, OH
Tjader, Joel, Hebron, OH

Nalco
Fox, Jeff, Springboro, OH

National Boiler Service
Harville, Steve, Trenton, GA
Mesamore, Mike, Trenton, GA

Nautilus Loss Control
Jackson, Christopher, Fox Island, WA

NORAM Engineering and Constructors
Bucher, Wayne, Birmingham, AL

Northern Pulp Nova Scotia
MacLeod, Kevin, New Glasgow, NS

Packaging Corp. of America
Parks, Kurt, Valdosta, GA
Petroff, Greg, Valdosta, GA
Stelling, John, Tomahawk, WI

Peerless
Schindler, Nathan, Monroe, CT

Power Specialists Associates
Erickson, Leonard, Somers, CT
Przybylski, Tom, Somers, CT
Zawistowski, Bob, Somers, CT

Process Engineering
Doyal, Ashley, Pelham, AL
Ray, Allen, Birmingham, AL

Purolite
DeStefano, Frank, Bala Cynwyd, PA
Frain, Jeffrey, Bala Cynwyd, PA
Graham, Chris, Bala Cynwyd, PA

RAE Engineering & Inspection
Santo, Shawn, Edmonton, Alberta

Rayonier
Gray, John, Fernandina Beach, FL

Remco Industrial
Emmertson, Robert, Saraland, AL

Rick Spangler, Inc.
Spangler, Rick, St. Simons Island, GA

RIMS (Rocky Mt Ind Services)
Cassel, Raymond , Denver, CO

RMR Mechanical,
Roy, Bob, Cumming, GA
Williams, Dick, Cumming, GA

Sappi Fine Paper
Aderman, Craig, Westbrook, ME
Bolduc, Lance, Skowhegan, ME
Boudreau, David, Skowhegan, ME

Sharp Consultant
Sharp, Sandy, Columbia, MD

Registered for the meeting were:

Smurfit Kappa
Bito, Rudolf, Haud bei Ansfelden, Austria
Franco, Daniel,, Cali, Columbia
Marchgraber, Walter, Haud bei Ansfelden, Austria

Solenis
Durham, Virginia, Wilmington, DE
Meredeth, Jim, Gulf Breeze, FL

Southern Environmental
Harris, Don, Pensacola, FL

Swiss Re
Moran, Jose, Vancouver, BC

Thompson Construction Group
Halbig, John, Sumter, SC

Thompson Industrial Services
Hope, Monty, Sumter, SC
Jackson, Dwayne, Sumter, SC
Wise, Carl, Sumter, SC

Tolko Manitoba
Rydberg, Blair, Manitoba, SK

Valmet Automation
Borduas, Pierre, Charlotte, NC
Burelle, Raymond, Charlotte, NC
Conley, Clark, Charlotte, NC
Daigle, Chad, Charlotte, NC
Farmer, Robert, Charlotte, NC
Hughes, Riley, Charlotte, NC

Valmet Automation
Martin, James, Charlotte, NC
Morrison, Dan, Charlotte, NC
Nichols, Jody, Charlotte, NC
Reed, Ron, Charlotte, NC
Relangi, Ramana, Charlotte, NC

Valmet Automation (Cont.)
Swayne, Greg, Charlotte, NC
Trivett, Michael, Charlotte, NC
Ulrich, Jim, Charlotte, NC

Verso Paper
Helmick, Kurt, Luke, MD

WestRock
Byrd, Jeremy, Cottonton, AL
Collins, Mark, Fernandina Beach, FL
Lee, Tyson, Fernandina Beach, FL
Lindsay, Kyle, Fernandina Beach, FL
Moyer, Scott, Jacksonville, FL
Murch, Douglas, Richmond, VA
Shirley, Wade, Phenix City, AL
von Oepen, David, Demopolis, AL
Walker, Sayed, Fernandina Beach, FL

Weyerhaeuser
Alderson, Jason, Port Wentworth, GA
Barreca, Clif, New Bern, NC
Craft, Matthew, Columbus, MS
Hill, Greg, Columbus, MS
Knowlen, Bruce, Federal Way, WA
Slagel, David, Port Wentworth, GA
Wilson, Ken, Columbus, MS
Wright, Chris, Port Wentworth, GA

XL Catlin (prev. XL GAPS)
Franks, James, Somerville, TN
Goddard, Robert, Tupelo, MA
Sides, Michael, Ocoee, FL

Zeeco
Langstine, Bob, Broken Arrow, OK

****

MAIN COMMITTEE MEETING

INTRODUCTION – John Gray - Chairman: Good morning! Welcome to the Spring 2016 BLRBAC Main Committee Meeting!. Thank you all for being here this week. The Main Committee Meeting is now open. This meeting, as are all of our BLRBAC meetings, is being held in strict compliance with BLRBAC's Anti-Trust Policy which states that any discussions involving pricing, pricing policy or any restraints on competition are not allowed.

We will begin with some introductions of your Executive Committee: (Each Executive Officer introduced himself and his title)

John Gray, Chairman;
Len Olavessen, Treasurer;
Everett Hume, Secretary;
David Slagel, Vice Chairman;
John Phillips, Manufacturing Representative;
David von Oepen, Operating Representative;
Jimmy Onstead, Insurance Representative.

OLD BUSINESS

1. **ACCEPTANCE OF THE FALL 2015 MEETING MINUTES** – John Gray

   Acceptance of Minutes from the Fall 2015 Session. Those Meeting Minutes were posted on the BLRBAC web site for several months prior to this meeting. Does anyone have any corrections to those minutes as they have been posted? Can I get a motion to accept those Minutes? (Accepted!) Can I get a second? (Seconded!) All in favor? All opposed? Thank you – The Fall 2015 Meeting Minutes have been unanimously approved.

   Is there any other old business that we need to discuss? Moving on……

NEW BUSINESS

1. **NEW MEMBERS/REPRESENTTIVE CHANGES REPORT** – Everett Hume

NEW REGULAR MEMBERSHIP - None Reported

NEW ASSOCIATE MEMBERSHIPS

REMCO Industrial Piping Materials, Inc -Saraland, AL
Robert Emmertson has been designated as the Associate Representative
Bryan Emmertson has been designated as the Alternate Representative

Field Services, LLC -Stevenson, AL
Fred Little has been designated as the Associate Representative
Neil Houser has been designated as the Alternate Representative

1. **NEW MEMBERS/REPRESENTTIVE CHANGES REPORT -** (Cont.)

NEW CORRESPONDING MEMBERSHIPS – None Reported

REGULAR REPRESENTATIVE CHANGES

Domtar

David Avery is the designated Representative
Jonathan Dunn replaced Al Gore as the designated Alternate Representative

General Electric

John Harmon is the designated Representative
Lee Dupree is the designated Alternate Representative

Global Risk Consultants

Michael Garfield replaced Andy Smith as the Representative
Charlie Macaulay remains as the Alternate Representative

ASSOCIATE REPRESENTATIVE CHANGES

AF&PA

Wayne J. Grilliot replaces Tom Grant as Associate Representative

Zellstof Pols is changed from Corresponding Associate member to Corresponding Regular member.

CORRESPONDING MEMBERSHIP CHANGES - None Reported

MEMBERSHIP COMPANY NAME CHANGES

General Electric

Previously known as Alstom Power
Previously known as GE Water & Process Technology
Previously known as GE GAP Services

Oji Fibre Solutions

Previously known as Carter Holt Harvey

XL Catlin

Previously known as XL GAPS

MEMBERSHIP COMPANY STATUS CHANGES - None Reported

*{**Secretary's Note**: The Company Membership List posted on the BLRBAC website may be out of date and 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 via fhholich@aol.com}*

2. **EXECUTIVE COMMITTEE REPORT –** John Gray

The Executive Committee met Tuesday afternoon in closed session with all seven members present. We discussed a host of administrative items. I will discuss a few of the highlights here this morning:

First of all we did confirm the October 2016 dates as October 24-26. That does represent a three week shift. Our aim there is to get away from the "outage season" and to facilitate more attendance, specifically from operators. We do recognize that operators and their input is really the life blood of this organization. So we are going to see if we can get more operators here by shifting to later in the month of October. We can always revert back to early October in future meetings if that does not seem to facilitate more attendance. Likewise we are also exploring a possible shift to the April 2017 dates. Again a small shift further into the month of April may help facilitate better operator attendance.

The Executive Committee did confirm several Subcommittee changes. Tom Wranosky has been confirmed as the Safe Firing Co-chair; Tom DeBeer was confirmed as the Auxiliary Fuel Co-chair; and Mike Blair was voted on and confirmed as Materials & Welding Chair. He will officially replace Dave Fuhrmann in October of 2016. We greatly appreciate Dave's service on that Subcommittee. He was unable to join us for this meeting.

We also had a good bit of discussion around a cloud sharing or drop box approach for Subcommittee use to facilitate working on documents and sharing information in between meetings. We have had a substantial amount of interest in this as a way to both work on documents and store progress and historical items at the Subcommittee level. We believe that drop box may be a viable and straight forward approach. We will be working with chairmen in the future on setting up some trials for that.

We also discussed the details of moving forward with Advance Registration via credit cards. As most of you know at the last two meetings we have been able to register At Door with a credit card. We have not yet rolled that out to allow Advance Registrations. We are going to pursue that and hope to have it operational within a year. It may not be by October, but it may be by next April. We are headed in that direction and into the 21st Century where you can actually register on-line. This concludes the Executive Committee Report!

3. **TREASURER'S REPORT** – Len Olavessen

- As of close of business 4/5/2016, checking account had $88,949.30
- We are on budget for routine expenses; and expect approximately $25,000 in costs associated with this current meeting. Leaving us a balance moving forward to the Fall 2016 meeting of approximately $64,000 to cover anticipated routine expenses of approximately $12,000 coming into the Fall Meeting

3. **TREASURER'S REPORT** – (Cont.)

- Attendees included:
  - 21 Paper Companies
  - 4 Boiler Manufacturers
  - 6 Insurance Companies
  - 27 Associate Members
  - 5 Guest Companies
- Offshore Attendees Included:
  - 3 From Columbia
  - 4 From Finland
- Advanced Registrations: 190
- At Door Registrations: 52
- Total Revenue for this meeting $34,150

4. **SECRETARY'S REPORT** – Everett Hume

We have two companies submit applications for Associate memberships and have been approved by the Executive Committee:

- REMCO Industrial Piping Materials, Inc
  Saraland, Al
  Primary Representative: Robert Emmertson
  Alternate Representative: Bryan Emmertson

- Field Services, LLC
  Stevenson, AL
  Primary Representative: Fred Little
  Alternate Representative: Neil Houser

Changes in Member Names:

GE now the new name for all companies under the GE Associate Business Divisions, this includes Alstom.

XLGAPS now XL Catlin

Zellstof Pols is changed from corresponding associate member to corresponding regular member.

4. **SECRETARY'S REPORT** – (Cont.)

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 website to make it easier for management to submit the changes in responsibility and/or any e-mail address changes.**

Anyone who wishes to be added or deleted from the BLRBAC e-mail list, please e-mail me (fhholich@aol.com) your intentions. Include your name, company and your e-mail address. Someone is needed to take the initiative (in the best case scenario, this should be the designated Representative or Associate Representative) to keep me advised of any member company name changes, mergers, etc. so that the BLRBAC database can be properly maintained.

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.

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 (fhholich@aol.com) 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. Sometimes e-mails pop back as "undeliverable." This may be due to the fact that the e-mail box is full, incorrectly typed due to not being able to decipher attendee handwriting, etc. I will do my best to see that all e-mails are properly received at the posted e-mail address. The BLRBAC database is corrected according to what is posted on the most recent Registration Form.

All Advance Registration attendees are recorded, given a registration number and sent a confirmation e-mail usually on the same day checks are received. This notification is sent to the e-mail address listed on the Registration Form. If you have not received a confirmation notification from me, you are not registered for BLRBAC! I am again requesting that all Meeting Registration Forms be completed in their entirety. This form is the only way I can confirm the accuracy of the BLRBAC database and e-mail address book.

4. **SECRETARY'S REPORT** – (Cont.)

Finally, if you know from past experience that your Accounting Department takes weeks to issue a requested check for registration purposes, just send me your completed Registration Form and a personal check before the posted cut-off date. Then you can get reimbursed from your company at a later date. This will guarantee you are registered at the Advance registration fee. Per BLRBAC policy, there are no exceptions when paying after the cut-off date given on the Registration Form. Your organization will be required to pay the higher At Door fee for all registrations posted after the cut-off date..

5. **SUBCOMMITTEE REPORTS**

5.1 **AUXILIARY FUEL REPORT –** Bruce Knowlen

The SFAF meeting was called to order with a reminder of the BLRBAC Anti-Trust Statement. Introductions were made of all attending. There were 8 of 11 members and 22 guests present. We welcomed two new members - Dan Krekeler of International Paper and Bentley Sherlock of Georgia Pacific.

The minutes of the last meeting were read and passed. A call was made for any new business. None was brought forward.

After presenting the agenda, a brief summary was made on the recent work on revisions and updates of the SFAF document. This included: Major Maintenance Outage, Managed System, new text on furnace purge including when calling for de-energizing the electrostatic precipitator, adding a definition of the Precipitator, and Superheater Clearing at start up. All but the Superheater Clearing text will be forwarded to gain approval, posted for general review, and have these published in an updated SFAF document.

Work then continued on the topic of boiler startup and the placement of Clearing of Superheaters into the logic Figures 4, 10, 17 and 21 of SFAF. Several good suggestions were made on how to approach start-up using thermoprobes (temperature indications) to monitor the fume temperature to maintain safe limits. Additional associated considerations were raised related to load burners. A task group was formed and assigned work to draft additional text before the next meeting.

The topic of "drum level" was introduced … measurement, control and trips. Question: Should we include more on drum level by multiple means and methods? Should the subject be expanded in the SFAF document? A suggested was made that we consider ASME standards. From discussion, the SFAF committee seemed to be in agreement that more is needed on this subject and we should ask the Instrumentation Subcommittee to support this by providing greater definition. This should be available before we add any additional text or diagrams to the current SFAF document.

5. **SUBCOMMITTEE REPORTS**

5.1 **AUXILIARY FUEL REPORT-** (Cont.)

Next, discussion on "Chapter 5 – Audible Alarms and Visual Indications" was resumed. Chapter 5 of our SFAF document was reviewed. The work was described as an effort to clear inappropriate topics from SFAF and redirect these to other subcommittees operating in those topic areas. Work that had begun by one subcommittee member was recognized. This will be presented in the Fall2016 meeting for discussion and revision of our document

A series of questions, sent earlier by email to the chairman, were then presented to the group by a guest. The guest was seeking clarification on wording in the SFAF document on: power to the BMS, resetting of SSVs, high precipitator outlet temp, furnace purge, and others. Efforts were made to provide responses by the members.

And finally, the group was asked on a show of support for a meeting in the Fall Session 2016. The consensus is to have a standard afternoon meeting at that time and carry on with planned work.

5.2 **SAFE FIRING OF BLACK LIQUOR REPORT** – Vernon Blackard

SFBL Subcommittee Meetings – Monday 8:30 AM (CLOSED) and 1:00 PM (OPEN). Sub-Chair meeting on Monday 4:00 PM. Main meeting report out Wednesday 8 am.

Agenda:

- Open the meetings. Closed and Open.
- Reviewed BLRBAC Anti Trust statement. Both closed and open meeting.
- Introduced members and guests. 11 of 18 members present and 51 guests in open meeting.
- Reviewed and approved the Fall 2015 meeting minutes.
- Three items submitted, approved by vote by the main meeting membership this meeting.
    - April 2016 – Summary of Changes Proposed to Executive Committee for vote April 2016 meeting.
    - Chapter 2 Definitions:
    - Revised definition of "Managed System"

5. **SUBCOMMITTEE REPORTS** - (Cont.)

5.2 **SAFE FIRING OF BLACK LIQUOR REPORT** - (Cont.)

- A documented procedure which includes a checklist of critical manual valves or devices that is completed by the operator prior to start-up and as needed throughout the operation. The checklist shall identify each valve or device and the proper position, condition or state. Any deviation from the checklist shall be controlled and documented through a jumper policy.

- Chapter 4.10 Refractometer Calibration

- Revised wording of refractometer calibration and refractometer standardization as presented from the Instrumentation Subcommittee on 10/6/2014. More details were provided on standardization procedure.

- Chapter 13 Item 9. Steam/water mixture for cooling liquor guns.

- Revised wording to allow steam/water mixture to cool liquor guns as long as proper use of alarms and interlocks are in place to prevent excessive use of water that could enter the furnace.

➢ Open item discussion from members and guests.

❖ Sect. 3.1.1 & 4.4.6--Poor wording of rec. for low BL % solids, i.e. "alarm at 70% if firing >70%." Problem if firing near 70%; alarm too near the normal firing %. Why not rec. that alarm be set @ 5% below the normal BL target % solids? Keep 70 percent or higher for 8 hour off line solids testing requirement. Leave document without any changes.

❖ Sect. 9.1.6--changing the spouts "once a year". Is this being modified to "at major scheduled outages". Will try to submit major outage interval for spout replacements again. Len and Bob.

❖ Sect. 10.2.8--Diss. Tk. explosion protection. Isn't this section being rewritten to make clear that the tank explosion protection is different from the scrubber/demister explosion by-pass damper? The Swedish BLRBAC rec. says that the tank protection (relieving area) should be =/> 1.5% of the RB floor area (30' x 30' x 1.5% = 13.5 sq. ft. or ~ 4 ft. dia.); the scrubber stack by-pass damper should NOT stay open until manually reset by the operator; How did the rec. AGAINST dis. tk. explosion doors on the top of the tank get in there? Sounds like B&W added this to agree with their position ???? The dis. tk. should also be protected! Check the tk. explosions & damage on RBs w/ sloping floors, especially, the older ones w/ spouts on front wall, unprotected by the nose arch.. Will review and resubmit with updated information for DT explosion protection section. Vern and Mark.

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.2 **SAFE FIRING OF BLACK LIQUOR REPORT** – (Cont.)

- ❖ Sect 10.5--Why not suggest a high dissolving tank temp. alarm (or at least high GL temp alarm) as an early warning of high GL density? Will add to our document in alarm section. Daniel and Vern.

- ❖ Consider DT agitators running as a aux fuel firing permissive (not as a trip). Figure 1 Common permissive starting logic with repetitive alarms for not running. Page 32. Also provide for aux fuel document. Vern.

- ➢ Continue review to document as related to AFPA documents on Dissolving Tank explosions.

We continued discussion on items working at AFPA and our possible ways to assist with our document. Mark Sargent reported that University of Toronto has many items working and he needs their results to provide information for BLRBAC SFBL to work on.

CHRIS JACKSON - Nautilus Loss Control: About the firing permissive for agitators, does that before firing liquor or before firing start up?

VERNON BLACKARD: We are thinking it might be good yet to have previous auto tank level for auxiliary fuel. We think that might be a good place to go in and start your agitators. There is no consensus on that yet. We are going to have more discussions before we recommend submitting that.

RICK SPANGLER: That was going to be a permissive, not a trip.

VERNON BLACKARD: That is correct, just a permissive. It would not be a trip. We know that during normal operation you might have an agitator go out on you and we don't want to be tripping liquor out of the boiler just because somebody has one of their two agitators fail.

Any other questions? Thank you.

CHAIRMAN: As Vernon mentioned, Safe Firing has had some proposed changes posted out on the WEB site for a couple of months now. We reviewed them, but since there have been no issues, what we need to first check is to make sure we have a quorum here in order to vote. Would all voting members, those with red ribbons, please rise. Thank you very much. We have done a quick count here and we do have a quorum. Again would all red ribbon individuals please rise. Can I get a motion the changes to the Safe Firing document Vernon went over yesterday? Can I get a second? All those in favor?

CRAIG ADERMAN - SAPPI: Disussion! We didn't really go through the reading of those items yesterday. I was wondering if we could just briefly read through the changes before we vote.

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.2 **SAFE FIRING OF BLACK LIQUOR REPORT** – (Cont.)

CHAIRMAN: Sure we can read through them again. Vernon did go through them yesterday at the Operating Problems Solving Session, but we can go through them again.

VERNON BLACKARD: I'll go through the summary and if anyone wants me to go through the details I will:

The first one was:

- Chapter 2 Chapter 2 Definitions: We revised our definition of "Managed System". Chapter 4-10, Chapter 4.10 Refractometer Calibration:
- Revised wording of refractometer calibration and refractometer standardization as presented from the Instrumentation Subcommittee

The last one was:

- Chapter 13 Item 9. Steam/water mixture for cooling liquor guns.
- Revised wording to allow steam/water mixture to cool liquor guns as long as proper use of alarms and interlocks are in place to prevent excessive use of water that could enter the furnace.

These were the three items.

CHAIRMAN: Any issues or concerns with the items? So again, can I get all red ribbon members to stand. Let's start from the top. Can I get a motion to approve the changes from Safe Firing? Can I get a second? All those in favor? Opposed? Thank you. The changes have unanimously passed.

5.3 **ESP SUBCOMMITTEE REPORT** – John Andrews

(See ***Appendix A*** – Incident List)

The ESP Subcommittee met in closed session on Monday April 4, 2016 with 12 of 14 members represented. The Subcommittee met in open session on Tuesday morning April 5, 2016 with 12 members represented and about 155 guests.

We welcome Frank Navojosky of IP and Scott Moyer of as new Operating Company representatives to the committee. John Andrews will continue as Subcommittee Chair as an Associate Member. We thank Wayne MacIntire of IP for his years of great service to the Subcommittee and wish him the best in his upcoming retirement!

During the open session, the Subcommittee reviewed 26 incident reports from North America and 4 International Incidents. Of the 26 incidents, there were no Smelt Water Explosions reported and no Dissolving Tank Explosions. Ten (10) of the reported leaks were classified as critical incidents and 16 were non-critical incidents.

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.3 **ESP SUBCOMMITTEE REPORT** – (Cont.)

There were two Smelt Spout Leaks reported and both of them were classified as critical since there was evidence that water entered the furnace cavity from the leak. An ESP was performed in 5 of the incidents including 4 of the critical incidents representing 40% of the critical incidents that should have been ESP'd. This percentage is lower than we have seen historically.

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

Explosions: Only if discernible damage has occurred. This does not include incidents where there is only evidence of puffs or blowback alone. With the new emphasis on damage, more attention will be given to the extent of damage and the amount of downtime for the damage repair (as opposed to total downtime that includes other activities).

Critical Incidents: All cases where water in any amount entered the recovery unit forward of isolating baffles (and therefore would be a similar criterion to the need to perform an ESP). This includes leaks of pressure parts of all sizes. Since small leaks often wash adjacent tubes to failure, this category is important to our learnings.

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

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

Incident Locations

The incident locations are summarized as follows:

- 12 – Economizer
- 1 – Boiler Bank
- 1 – Furnace Screen
- 3 – Upper Furnace
- 4 – Lower Furnace
- 1 – Penthouse
- 2 - Lower Vestibule
- 2 – Smelt Spout Leak

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.3 **ESP SUBCOMMITTEE REPORT** – (Cont.)

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 circles are the non-critical incidents and the red circles indicate the location of the critical incidents. The two green dots are for the Spout Leak

Incidents by Boiler Type

The incidents by the number of drums and the back end arrangement were reviewed. There were 8 incidents reported in a single drum unit and 18 incidents reported in two drum units.

One of the reported incidents was in boilers with Cascade Evaporators and 3 of the units had Cyclone Evaporators. Twenty-two of the incidents involved units with extended economizers.

Leak Cause

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

- 3 – Thermal Fatigue
- 2 - Mechanical Fatigue
- 7 - Weld Failure
- 7 - Erosion or Corrosion Thinning
- 1 - Overheat
- 6 - Stress Assisted Corrosion or Stress Corrosion Cracking

How Discovered

Operator observations during boiler walkdowns continue to be the prevalent method of detecting leaks and accounted for identification of 19 of the leaks (73%) and shows that operators are continuing to be diligent in looking for leaks. Seven of the leaks (27%) were identified by indications in the control room. No leaks were initially identified by Leak Detection Systems although six of the incidents reported that the leak detection system confirmed the presence of the leak during continued investigation

Leak detection systems were reported to be installed on units in 22 of the incidents (85%).

The committee has been reviewing the time from initial indication of the leak to the time the ESP was initiated. The incidents that provided enough information showed that the time between initial indication of the leak and the initiation of the ESP ranged from 5 minutes to 5 days. The median time to initiate the ESP was about 10.5 hours which is much worse than previous years.

5. **SUBCOMMITTEE REPORTS -** (Cont.)
   5.3 **ESP SUBCOMMITTEE REPORT** – (Cont.)

Incident Review

Figure 2 shows the critical incidents reported each year. We have 10 so far this year which is about the recent average for half the year. Figure 3 shows the history of Recovery Boiler Explosions showing the recent smelt water explosions in 2012 and 2014.

Figure 4 shows the history of reported dissolving tank explosions with the two that were reported last year but none this year so far. It looks like the problems with dissolving tanks is a continuing issue. Following the recommendations from Section 10 of the Safe Firing of Black Liquor document would prevent many of the reported dissolving than incidents that have occurred in the past.

Figure 5 shows the effect of the smelt water explosions reported in the last couple of years on the five year rolling average which is up to 0.4. Hopefully in another few years we can get back down to zero but it does appear that we have reached a plateau of one to two boiler explosions in a five-year period.

Figure 6 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 has dropped slightly to 0.481 explosions per 100 boiler operating years due to the explosions in the last couple of years, but the total explosions, which includes all boiler explosions and dissolving tank explosions, decreased slightly to .864 explosions per 100 boiler years. 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 have accumulated over 18,200 total recovery boiler operating years in the BLRBAC database for North America and have recorded 88 smelt water explosions. We all need to continue to get those trends going down.

List of Operating Boilers

The BLRBAC Boilers in Service Database currently has 190 active recovery boilers listed, 149 in the US and 41 in Canada. In the US, the average age is 38.8 years and the oldest is 63 years. The average age in Canada is 38.7 years and the oldest boiler is 69 years which is a 1947 Alstom unit at Three Rivers, PQ.

The list is available on the BLRBAC web site. We urge you to look over the list and if there are any changes or corrections, contact Dean Clay

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.3 **ESP SUBCOMMITTEE REPORT** – (Cont.)

Learnings

There are several learnings that come from review of the incident reports that may be of value for the industry. This is not a complete list but a few items that stood out during the incident review.

- Clean saltcake buildup from economizer headers to reduce corrosion from wet saltcake during outages.

- Infrared Imaging guns may be useful to identify hot spots in the bed for further probing and temperature measurement but the indicated temp from IR should not be the final criteria. You are measuring the surface temperature and there may be molten pockets of smelt below the frozen surface.

- Critical alarms should be set up to come back on if they are acknowledged but the problem continues. In the middle of a crisis it is easy to forget about an acknowledged alarm.

- Steam cooled sidewall panels need to be drained during startup to remove any condensate that has collected and allow steam to circulate to cool the panel.

- Check short radius riser tubes in the penthouse for cracking either internal Stress Assisted Corrosion or external fatigue cracking. Riser tubes that do not completely vent to the drum (rise up from the header and go back down to enter the drum) may have internal thinning issues from steam blanketing.

- It is not recommended for operators to observe leaks through open man doors to see if they are getting worse. Tube ruptures or even fan problems can cause blowback.

- There were two incidents reviewed that had leaks due to Copper Contamination Cracking. Both were from automated welding machines where the welding head struck the tube and melted the copper head into the tube metal.

- Localized deposits can cause tube thinning either external from overheat or internal from under deposit corrosion. We have had several incidents reported where the boiler was thought to be clean based on DWD readings from what was thought to be the high heat areas of the unit. Many of these deposits have been found at tube bends at airports and burner openings.

- If a spout water cooling leak is discovered, the recommended action is to cut off the cooling water and plug the spout. It is not recommended to continue operation of the unit with a known spout leak.

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.3 **ESP SUBCOMMITTEE REPORT** – (Cont.)

ESP Guideline Changes Under Consideration

The Subcommittee is working to combine the Post ESP Guidelines that covers the actions that should take place after the ESP has been initiated with the ESP Recommended Good Practice Document. We have maintained them as separate documents but have decided that it would be more useful as a single combined document. Chris Jackson has made a first draft of the combined document and the Subcommittee members will review and make further revisions before the next meeting.

Another proposed update will be to include the DCE Fire Suppression Medium as a specific exclusion to the "Stop All Water and Steam Supplies" in Section 3.8. We are also working on wording to clarify that all motor protection interlocks such as motor heater and overloads should be bypassed on the Rapid Drain Valves with the initiation of the ESP. Protection should be utilized in the close circuit to keep from burning up the motor unnecessarily. There is a guide on the BLRBAC web site for how Rotork Actuators should be set up for Rapid Drain Valves. We will also look at clarifying the intent of the provision for an "Alternate Means to Initiate ESP"

Incident Questionnaires

The Incident questionnaires are key to the operation of the ESP Subcommittee. We appreciate the good job that the mills have done in filling them out for their incidents. The current questionnaire has been updated with the contact information to send the file to Dean Clay at **dclay@fuse.net**. Anytime you have an incident that needs to be reported, I know it is very tempting to just go back in the file and pull out the report from a couple of years ago and just fill in the new information, but we really urge you to go and get the most recent version of that off the WEB site and use that for the report. I am sure Jules will be receiving some of the questionnaires for a while but he will forward them on to Dean.

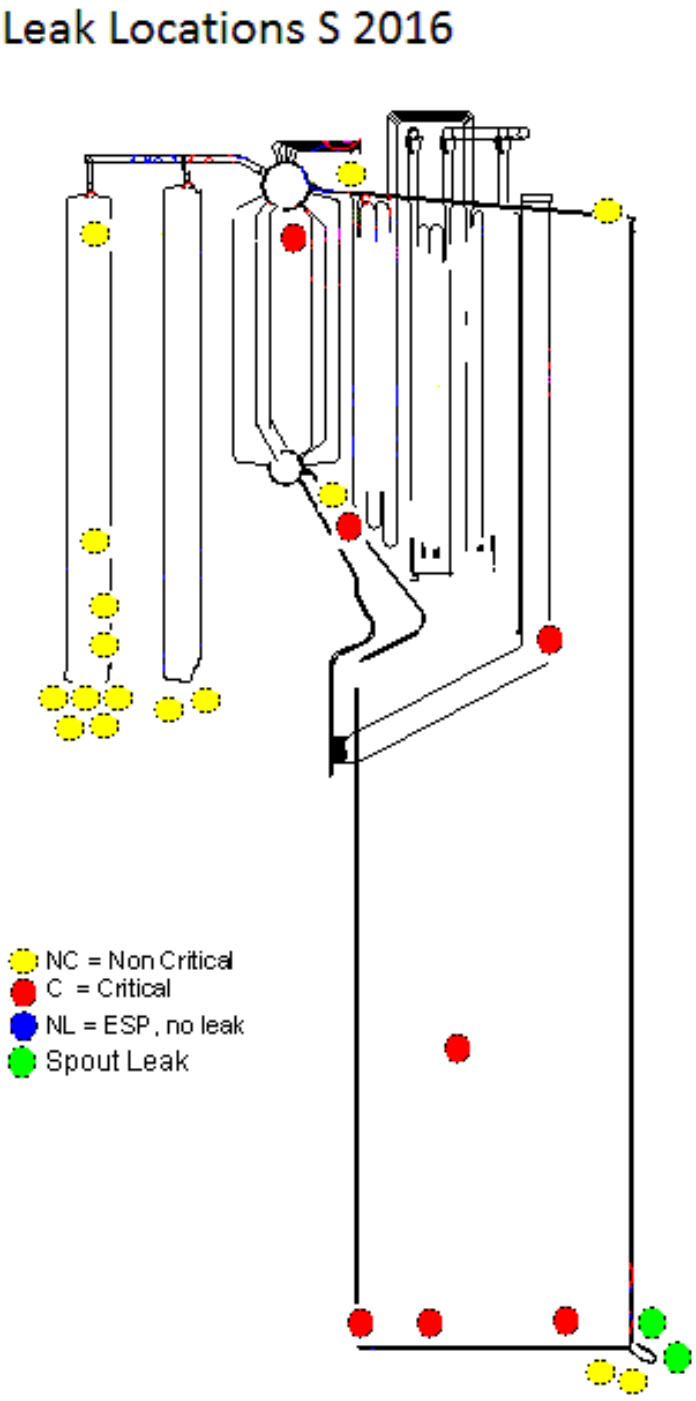
Again, a reminder that when you are adding pictures into the questionnaire document, it is best that you import the picture as .JPG files rather than cut and paste.

Dean 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?

Jose Moran - Swiss Re - Question in regards to the testing of the ESP systems. Considering some of the other Subcommittees are looking at changing their verbiage from testing at a prescriptive 12 month intervals over to testing at major outages. Has there been consideration from the committee to also change some of the wording around testing the ESP systems from 12 months to every major outage?

John Andrews: We really haven't discussed that and will put that on the agenda so we can review that at the next meeting. Thanks you.

Figure 1


Leak Locations S 2016
NC = Non Critical
C = Critical
NL = ESP, no leak
Spout Leak

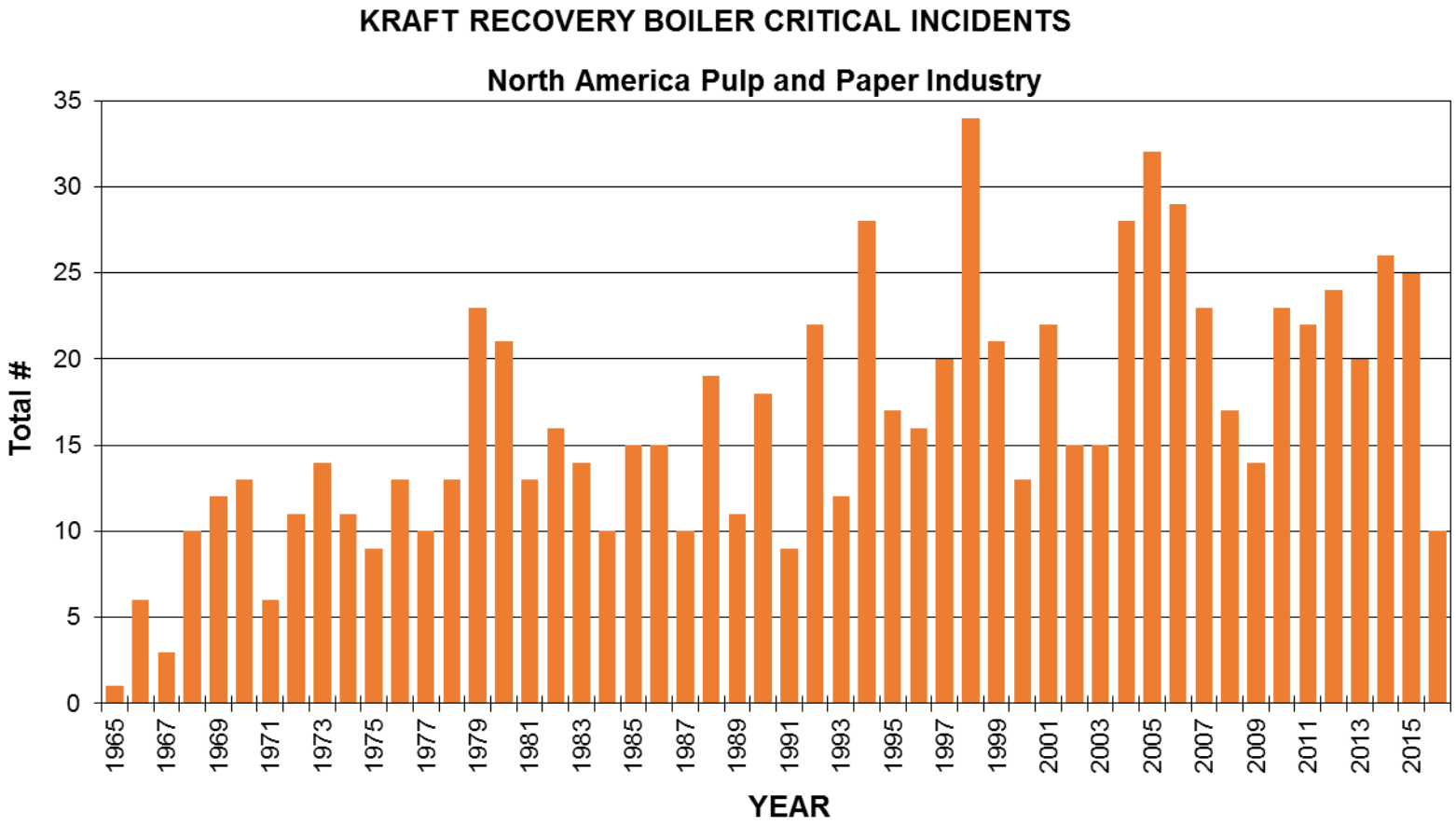
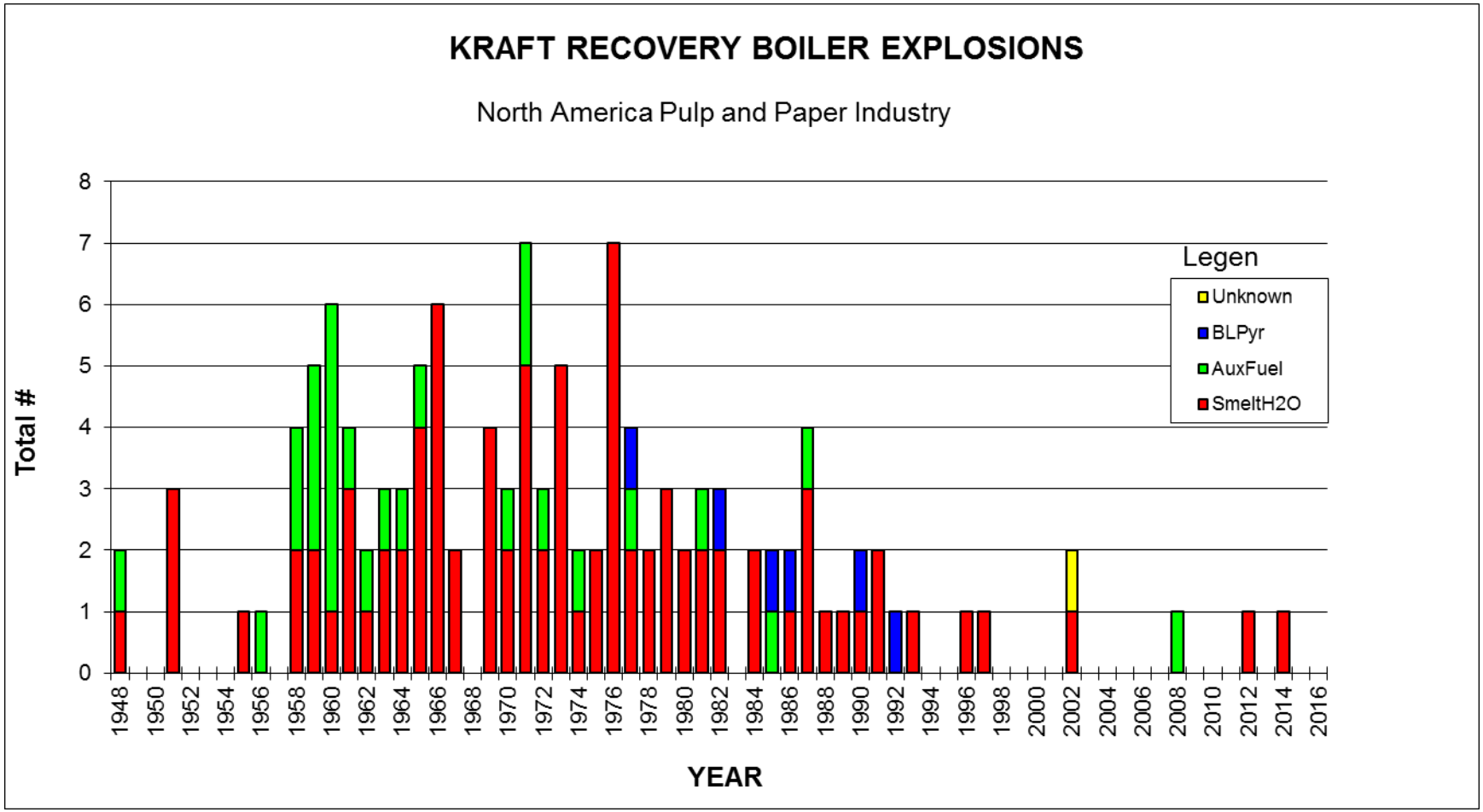


Figure 2

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


KRAFT RECOVERY BOILER EXPLOSIONS
North America Pulp and Paper Industry
Total #
YEAR
Legen
Unknown
BLPyr
AuxFuel
SmeltH2O
0
1
2
3
4
5
6
7
8
1948
1950
1952
1954
1956
1958
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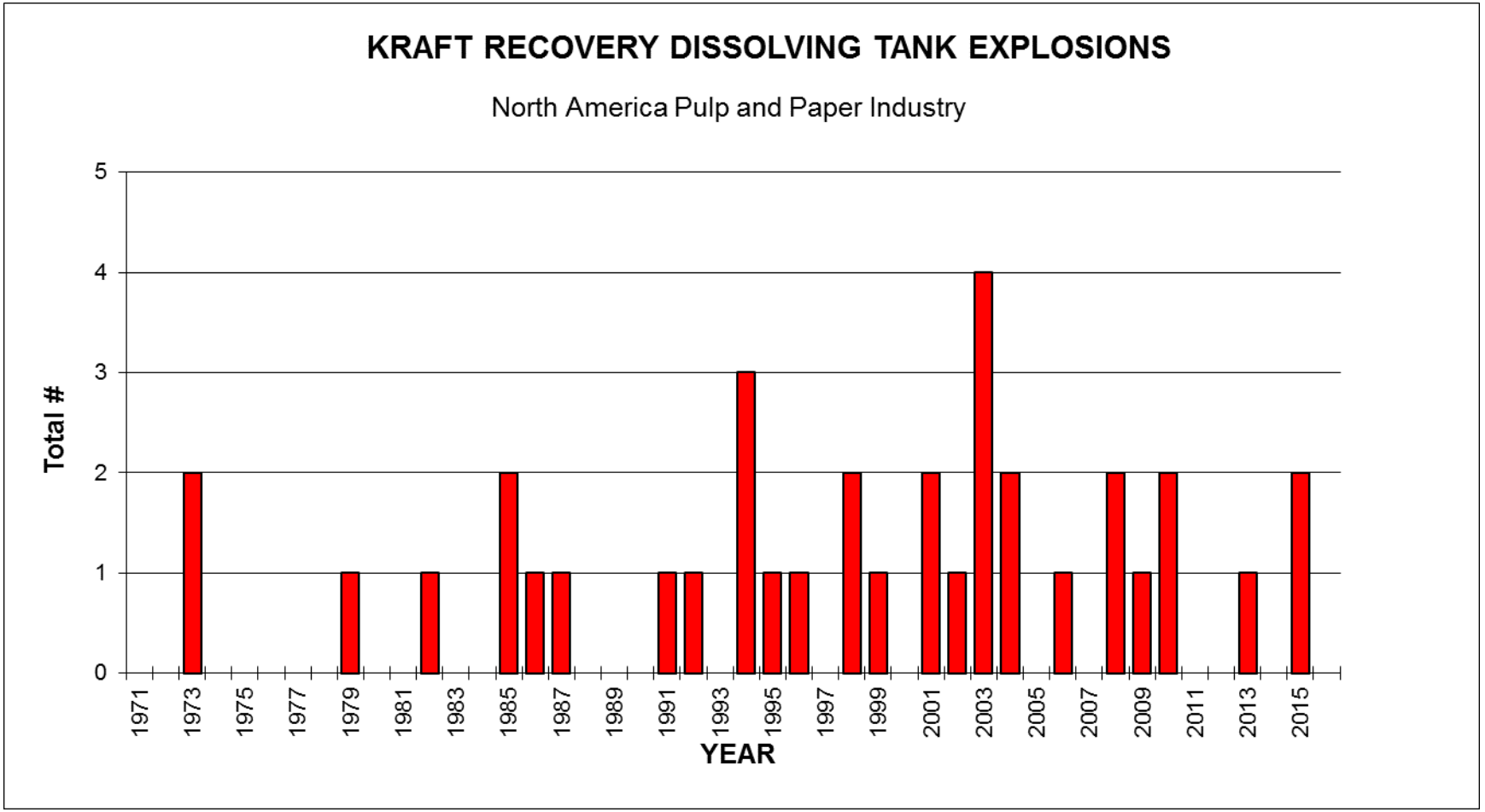
2016

Figure 3


KRAFT RECOVERY DISSOLVING TANK EXPLOSIONS
North America Pulp and Paper Industry
Total #
0
1
2
3
4
5
1971
1973
1975
1977
1979
1981
1983
1985
1987
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1997
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2013
2015
YEAR

Figure 4

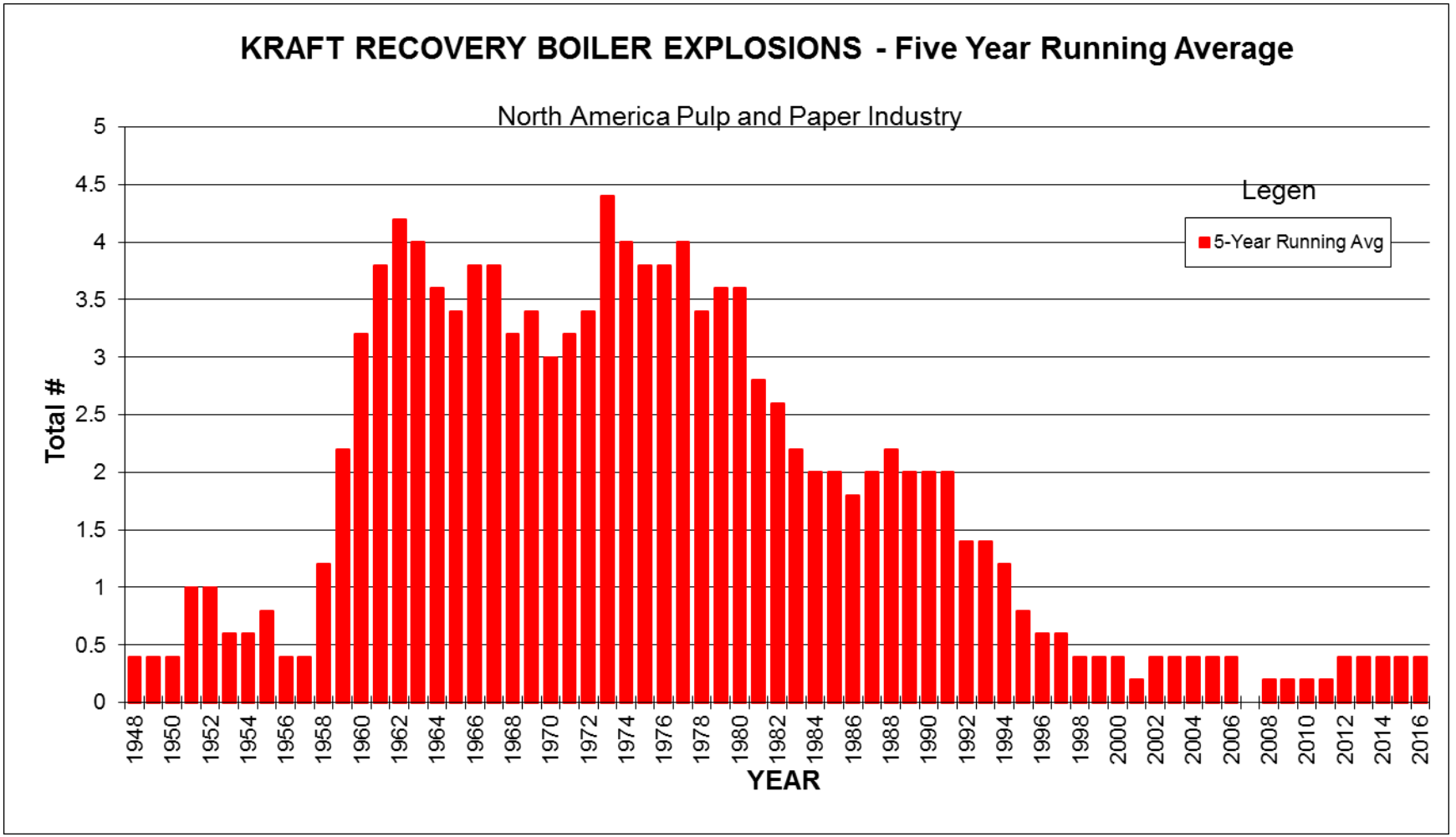
KRAFT RECOVERY BOILER EXPLOSIONS - Five Year Running Average
North America Pulp and Paper Industry
Legen
5-Year Running Avg
Total #
YEAR
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
1948
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Figure 5

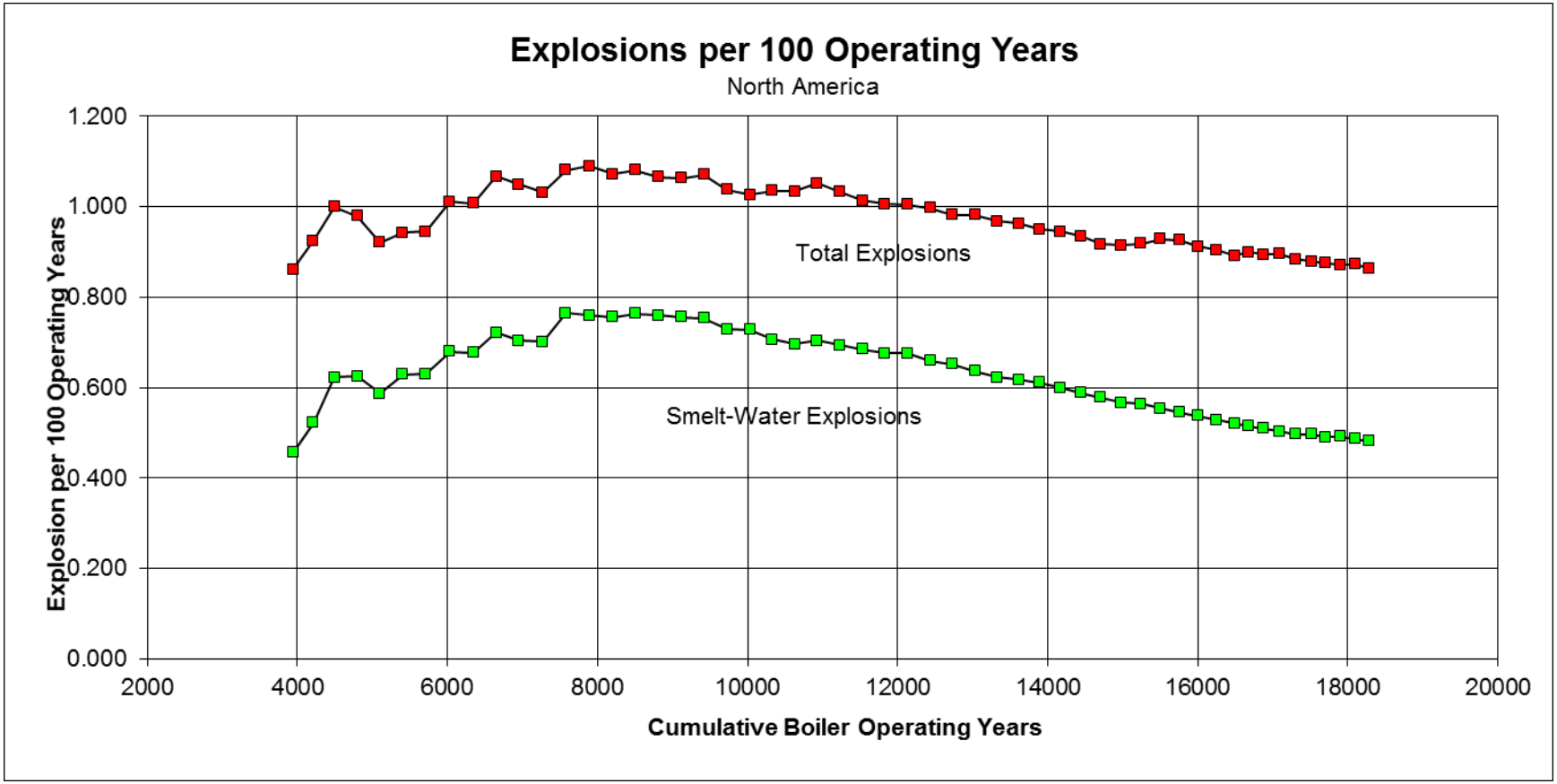

Explosions per 100 Operating Years
North America
Explosion per 100 Operating Years
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Total Explosions
Smelt-Water Explosions
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Cumulative Boiler Operating Years

Figure 6

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.4 **FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS REPORT** – Craig Cooke

The Fire Protection in Direct Contact Evaporators Subcommittee met in Open session Monday morning. We had four members and three guests in attendance. We reviewed the BLRBAC Anti-trust policy. We also reviewed and approved the April 2015 minutes. (We meet annually in the spring.)

There were no DCE fire incidents reported. This is Good News, but we urge reporting even the minor incidents. Valuable lessons can be learned from both minor incidents that are quickly and easily dealt with as well as the larger and more severe fires.

Our document revisions had previously been reviewed and accepted by the Executive Committee. The revisions were posted to the BLRBAC website for general membership review and comment since August 2015. We received no comments. The changes were further reviewed at the Operating Problems session on Tuesday. The changes focus on ways to help prevent fires, especially during upset conditions.

Our next meeting will be April 2017, always an Open Session in the morning. We encourage attendance and always welcome new members.

CHAIRMAN: Craig does have some changes, as he mentioned, that are ready for vote. Do we need
to see the changes again? Let me see your hands, please. Craig, could you briefly review the changes again?:

CRAIG COOKE: Section 3.2.2 - Cyclones specifically need flow monitor because nozzles can plug.
Section 3.2.3 - Lists a lot of various upset conditions which you have to be aware of and could potentially create a fire. We have added ESP to that list of upset conditions because it did generate a loss from fire at one point. Section 3.2.4 - is a totally new section which has about eight bullet points, but it is all a listing of possible actions to reduce the potential of fire. Each mill is going to be unique. Each mill has to look at that list and see what is appropriate to them. Then Section 3.3 - it has seven current bullet points and we are adding a comment that there should be measures to be able to clean and unplug any fire protection nozzles because they do become plugged. Just a few comments on that.

CHAIRMAN: Would all voting members with red ribbons please rise? Can I get a motion to approve the changes that Craig just reviewed? Can I get a second? All those in favor? Opposed? Thank you. The changes have been approved unanimously.

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.5 **INSTRUMENTATION REPORT -** Dave Avery

The instrumentation subcommittee met in open session on Monday morning with 12 members and 13 guests. Our session began with reading the antitrust statement continuing with introductions of members and guest.

We reviewed minutes from our October meeting and approved them as presented. Reaching out to our guest we requested topics of interest from them, topics requested were:

- Dissolving tank density controls
- Wireless / Bluetooth devices
- Need to review safe firing changes
- Firm power for ESP controls? (not valves)

- Dissolving tank density controls
  What is needed, what works best way to control? The discussion was centered around questions from Thanh Trung who is working to create a Tappi Tips on this subject. More discussion and inter action will follow.

- Wireless / Bluetooth devices – Technology is advancing everyday however the committee stands behind the principal that at our current wireless technology offering is only good at monitoring not for controls. We will add a statement in our recommended practices conveying this stance.

- We reviewed with guests what Firm power means in reference to the Instrumentation Recommended Good Practice.

- We took the time to review safe firings posted items and where the changes fit within our document.

Under Old Business:

- The group followed up on discussion on what makes a qualified I&E technician. Using a brainstorming technique we have developed a minimal knowledge and task list. We will take this list and refine it based on reality to develop reasonable definition for presentation. This should take about two meetings before we are ready for presentation.

- In the fall we discussed developing a concordance for our documents to make it easier to look up questions that the end user may have. Eladio Ruiz de Molina has agreed work on the development of this idea

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.5 **INSTRUMENTATION REPORT** - (Cont.)

The morning meeting continued with Dave Boudreau reviewing the completed update of section "G - BLACK LIQUOR AND GREEN LIQUOR SYSTEMS". Section "G" was accepted as complete and ready to present to the executive committee for post on the web site and for voting on in the fall.

The morning session concluded with a discussion about "Drum Level Measurement" and "Drum Level Protection". We will continue to work with "Aux Fuels" to develop a clear definition and good recommendation to fill a void where the current references fall short.

The afternoon session had 9 members and 4 guests in attendance.

The selection of a vice chair has been resolved John Browning will be submitted to the executive committee for approval during the fall meeting.

We redistributed the work load to complete the checklist within the next four meetings.

Section	Assigned to	Status
A. FEEDWATER AND STEAM SYSTEMS	Bill Camp/JoelByrd	
B. COMBUSTION AIR CONTROL SYSTEMS	David Avery/ C.A.Vossberg	
C. FURNACE DRAFT SYSTEM	Eladio Molina/Chris Daily	
D. FIRE PROTECTION SYSTEM	Andy Smith	
E. BOILER CLEANING SYSTEM	David Boudreau	
F. SMELT SPOUT COOLING SYSTEM	David Avery	
G. BLACK LIQUOR AND GREEN LIQUOR SYSTEMS	**David Boudreau**	**Completed 4/4/16**
H. FLUE GAS EMISSIONS	Hari Soderlund	
I. AUXILIARY FUEL AND BURNER SYSTEM	Bruce Knowlen	
J, K, L, M & N Waste Streams	Jari Sopanen/John Browning	
O. General Systems	Gordie Vandenburg	

We know that we have had an issue with the Web site concerning our recommended good practice and instrument checklist. I am working with Everett to get this corrected. We have separated the Recommended Good Practice into two documents:

The first document is Chapters 1 through 4 **- "Recommended Good Practice Instrumentation Guide for Instruments and Control Systems Used in The Operation of Black Liquor Recovery Boilers"**

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.5 **INSTRUMENTATION REPORT** - (Cont.)

The second document is the **"Recommended Good Practice – Instrumentation Checklist for Black Liquor Recovery Boilers."**

Finally, our Instrumentation Subcommittee Meetings are an open event that has all of us working together for a better product. Help us reach our goals and keep on the productive path with your help we all can get there!

5.6 **MATERIAL & WELDING REPORT** - Mike Blair for Dave Fuhrmann

MORNING SESSION:

The Materials and Welding Subcommittee met in Open Session on Monday morning, March 30,2015.

The meeting was opened with a review of the BLRBAC Anti-Trust Statement.

Attendance

16 members and 17 guest attended the morning session.

Old Business

The meeting minutes from the Fall 2015 Subcommittee meeting were reviewed and accepted.

New Business

Members

Co-Chair Jesse Worsham informed the group of his discussions with Dave Fuhrmann that Dave was planning this to be his last meeting as co-chair and that Dave had identified Michael Blair as a possible candidate for co-chair. Since Dave Fuhrmann was unable to attend this session, Jesse suggested that Michael Blair be nominated for co-chair. The nomination was made, seconded and approved by the committee members present, to be forwarded to Executive Committee. Michael Blair, therefore, assumed leadership of this session.

Presentations

Sandy Sharp (Sharpconsultant), made a presentation about near drum corrosion and NDE used to evaluate near drum corrosion.

Document Development

Briefly reviewed the Bulletin forwarded to the Executive Committee last session; 1.6 *Plugging Tubes in Drums and Headers*

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.6 **MATERIAL & WELDING REPORT** - (Cont.)

The subcommittee worked on the development of Section 2.5 Plugging Tubes in Drums and Headers.

AFTERNOON SESSION:

The afternoon session of the Materials and Welding Subcommittee was open and was attended by 8 members and 3 guests.

The meeting was opened with a review of the BLRBAC Anti-Trust Statement.

Document Development

The subcommittee worked on the development of Section 2.5 Plugging Tubes in Drums and Headers.

Next Meeting Agenda

Continue development of the document Section covering Plugging Tubes in Drums and Headers. This is document nearing completion. After addition of illustrations from AF&PA, a draft will be submitted to sub-committee membership for final clean-up next session.

5.7 **PERSONNEL SAFETY REPORT** – Robert Zawistowski

The Personnel Safety Sub-committee met in an "open" session on Monday, April 4, 2016. There were 6 members (out of 14) plus 22 guests in attendance during the meeting.

Representation at our meeting by regular members and guests included original equipment manufacturer Babcock & Wilcox. Representation from insurance and insurance service companies included FM-Global. Operating company representation was present at this meeting with representatives from Clearwater Paper, Georgia-Pacific, Glatfelter, Grief International Paper, Packaging Corporation of America, Smurfit-Kappa, Verso and Weyerhaeuser. Consultant representation included George H. Bodman, Power Specialists Assoc., Inc. and RSI.

The BLRBAC anti-trust statement was read.

The minutes of the last meeting were read.

The “Common Practices” document, now under development, had some pictures inserted following receipt of permission documents signed by Mill Managers from a couple of mills. The document is in good enough shape for an initial review by the Executive Committee following the April 2016 meeting.

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.7 **PERSONNEL SAFETY REPORT** – (Cont.)

During the last meeting we tried obtaining emails from volunteers and soliciting pictures along with permission. We did not have a good results with this method. One of my subcommittee members suggested I send him copies of pictures in my possession ready for the Mill Manager's signature. This worked great and was also done for a second mill location. Moving forward I will assemble pictures I have from known companies, attach them to the forms and forward them to the appropriate people for Mill Manager approval.

I advised the subcommittee and guests that a plan is being developed so there is a protocol for OEM photos for the Common Practices document. This will be discussed during the Executive Committee meeting at the April 2016 meeting.

We discussed web based photos and video. We will not use materials from this source because we cannot be sure permissions have been obtained for publication.

We made a small adjustment to language regarding the current recommendation to include escape respirators in elevators. This language has been adjusted to allow a mill to evaluate and determine if there is or is not a need for respirators and/or SCBA to be carried in elevators.

Between the October 2015 and April 2016 meetings there was one request for clarification/interpretation of information in the Personnel Safety document regarding pressure resistant barrier walls and elevated entries to elevators in existing buildings vs new construction. This was briefly discussed and the inquiry will be answered.

Language was developed during the October 2015 meeting on the topic of clearing plugged ash hoppers. Additional editing will be done on this language between now and October 2016. We hope to have this language ready for review by the Executive Committed following the October meeting.

Two videos were watched, "The Cost of Accidents" which discusses unsafe acts as the root cause of accidents and statistics/steps that lead to a fatality. The second video presented the "after effects" of a very severe accident in an overseas paper mill.

There was discussion about some near misses at the end of the meeting and door watch practices during outages.

There has been a shift in subcommittee membership. Frank Navojosky of International Paper has moved over to the ESP subcommittee and in his place is Sam Hendrix of International Paper. Robert Fry of Great Northern Pulp has resigned from the subcommittee. Thanks to those who have moved on and welcome to Sam.

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.7 **PERSONNEL SAFETY REPORT** – (Cont.)

In closing, we are always welcome to new committee members who can participate in any capacity even if you can only attend meeting intermittently. Simply let me know via e-mail at the address below you are interested and provide me with your contact information. (bob.zawistowski@psaengineering.com)

5.8 **PUBLICITY & NEWS REPORT** – Matt Paine

No report was given at this time.

5.9 **WASTE STREAMS REPORT** – Paul Seefeld

On April 4, 2016 the Waste Streams Subcommittee met in a closed session at 9:00 AM. There were 8 of 13 members present and with 1 substitution from an operating company member. In the afternoon session, there were 8 members and 9 guests present. At the start of both the morning and afternoon sessions the BLRBAC antitrust statement was reviewed. The October 2016 meeting's minutes were reviewed and unanimously accepted.

Morning (Closed) Session:

Chapter 4 document updates:

The subcommittee, again, spent most of the time reviewing and editing the Dissolving tank vent gas (DTVG) section. We completed the section but were debating a specific point regarding the %MCR for the permissive. In the current document, the DTVGs would fall under the established permissive of 30% MCR in the DNCG section. The questions from the subcommittee are; "Is this reasonable?", and "What are operating companies currently doing?" We decided to bring in some experienced representation in the afternoon. We found that the European installations allow DTVGs into the boiler at 15% MCR. In fact, the newest Finnish documentation uses 15% MCR for both DTVG and DNCG. We are going to ask the general membership and the Executive Committee for opinions before we submit this section for approval. For now, we are going to submit this section for review and comment.

We decided that we need to create a separate diagram for the direct contact scrubbing design of the DTVG. We will also have an additional interlock/permissive chart to add to the document, in both the DTVG subsection and the general DNCG section. The current version of this interlock description follows.

The final low point drain should be a mechanical "fail-safe" design to prevent condensate from reaching the boiler. This design should include an interlock to divert the DNCG collection system out of the boiler.

5. **SUBCOMMITTEE REPORTS -** (Cont.)

5.9 **WASTE STREAMS REPORT** - (Cont.)

Most North American mills already have this design incorporated into their DNCG transport system. The intent is that there is a way to remove the possibility of water reaching the boiler through a blocked drain. This was part of the root cause of the explosion in Sweden.

While editing Chapter 4, we discussed the need to update the tables and diagrams throughout the entire document. Even though changes to figures 4 and 5 have been approved, we are going to go through the process of replacing at least one diagram per year until completion. As the current diagrams are in a software version that is difficult to edit, we plan to use the newest version of Visio.

Afternoon (Open) Session:

In the afternoon, we reviewed DTVG section and Chapter 4 with the guests. This is where we learned of the differences in the %MCR permissive for DNCGs and DTVGs.

We had a question from Weyerhaeuser regarding verification of interlocks during a simulated ESP. We heard examples of "jumping out" controls and manually checking transmitter positions. Neither of these two methods are ideal and there is no specific guidance in the document for this procedure. As this is a common practice for operators with waste streams, the subcommittee is planning to investigate and possibly address the practice, more specifically, in the document.

The afternoon subcommittee meeting was adjourned at 1:25 PM.

MISC:

Thank you to Aimo Hakkkarainen for providing the subcommittee with the 2015 English translation of the Finnish BLRBAC waste streams document.

Mark Cooper was unanimously elected to be Vice Chairman. Arie Verloop is retiring from the subcommittee and scaling back at Jansen.

PAUL SEEFELD: This is the statement we will be voting on.

Chapter 5 - Regarding the continuous igniter for strong NCT gases. So if the boiler is operated above 50% of NCR with stable liquid firing and NCG has been safely introduced, the igniter may be disengaged, fuel shut-off and the igniter interlock either suspended or disengaged. Once the igniter has been disengaged, a drop in boiler loading below 50% of NCR with a loss of stable liquor firing should result in a system trip. NCG incineration should use a continuous igniter.

5. **SUBCOMMITTEE REPORTS -** (Cont.)

PAUL SEEFELD: (Cont.) That is really not a change from what we were after before. This is just a clarification. We talked about this the last time. This is what we are voting on -- this statement!

CHAIRMAN: Are there any questions or comments before we move to vote?

KARL MORENCY - Georgia Pacific: If you do not disengage the igniter and you drop below 50%?

PAUL SEEFLED: You are still covered, you are going to be out any way. The 50% -- that's the hard line. You are out no matter what. We just put that in there to make sure that you know that you are going to do that. This is just to clarify.

CHAIRMAN: Any other questions or comments? Would all voting members, those with red ribbons, please rise. Can I get a motion to approve this change to the Waste Streams Guideline? Can I get it seconded? All those in favor? Opposed? The change has been unanimously approved.

5.10 **WATER TREATMENT REPORT** – Tom Przybylski

Agenda—Morning

- BLRBAC Antitrust Statement/Review action Item List
- Review and Approve Minutes From October Meeting
- Membership Changes
- Final Review of Condensate Section
- Final Review of Deaerator Section

Agenda—Afternoon

- Begin Production of Chemical Cleaning Document

a. Introduction and Definitions

b. Cleaning Determination Protocols

c. Chemical Cleaning

d. Key Maintenance Practices and Protocols

5. **SUBCOMMITTEE REPORTS -** (Cont.)
5.10 **WATER TREATMENT REPORT** - (Cont.)

Item 1: BLRBAC Antitrust Policies/ Review Action Item List

- Tom Przybylski called the meeting to order around 8:30 am and reviewed the BLRBAC Antitrust Policies with attendees. Tom Przybylski quickly reviewed the agenda.

Item 2: Review Minutes From October Meeting

- Tom Przybylski reviewed the minutes from last fall's meeting with attendees. Buck Dunton motioned to accept the minutes as written. Motion seconded by Rick Morgan and carried unanimously.

Item 3: Membership Changes

- Tom Przybylski went through the current membership list and with the group's help modified the list to reflect changes in representation for current participating companies. A few folks will be contacted to determine their status.

- Tom Przybylski addressed guests, stating that the sub-committee welcomed additions to the committee, particularly from operating companies.

Item 4: Final Review of Condensate Section

- Tom Przybylski started discussion by reviewing drawing modifications done since last meeting. Tom Przybylski reviewed the condensate conductivity loop in detail, explaining the design of the conductivity loop, etc.

- Buck Dunton noted issues with conductivity loops that have occurred, and said that some customers have taken out the existing flow measurement devices and replaced them with replaceable (and reliable) probes. Kurt Parks, Jeff Fox and Susan Childress noted another way to check the validity of conductivity readings, that some mills introduce a very small amount of water from a different source (which was known to have a different conductivity than the condensate) to confirm the system was reading the difference and therefore working properly.

- Jeff Fox noted another configuration and inspection sequence.

- Tom Przybylski asked questions about frequency of checking. Varying answers.

- Tom Przybylski suggested functional testing was the goal. Attendees tended to agree.

5. **SUBCOMMITTEE REPORTS -** (Cont.)
5.10 **WATER TREATMENT REPORT** - (Cont.)

- Tom Przybylski asked if group was OK with second option depicted with new drawing. There was significant discussion, with the consensus view that malfunctions with this configuration was a source of condensate contamination, particularly during startups ? Virginia Durham noted that pluggage in sample cooler is a typical problem and something was needed, for example a rotameter or a loop. Group discussion ensued around the source of the pluggage.

- Buck Dunton suggested that the system depicted in the "new drawing" is a risky option due to pluggage. Other attendees said that this type of system is used by numerous mills. Janson Miller said that the engineering of the sampling loop and instrumentation is critical to the correct operation of the system. For example, inadequate sample line size can lead to line pluggage. He also said site specific conditions are also a consideration in the design and operation of the system.

- Tom Przybylski asked if the depicted system was an acceptable recommendation, and much discussion ensued. Potential high cost was mentioned, flow instrumentation via DCS vs. rotameter was mentioned and discussed. Buck Dunton said that without DCS instrumentation the system was a risky proposition. Tom Przybylski noted places where black liquor contamination was an issue with a poorly designed system.

- Frank D asked why the committee shouldn't say that this particular design was not recommended. Buck Dunton said hundreds of mills were using this specific design and that other reliable options were available.

- Virginia Durham suggested that perhaps the committee might suggest a recommended design and note the limitations of this particular configuration.

- After additional discussion, much on the flow measurement, Buck Dunton said that if best methods were being recommended, an alarm on low or no flow should be in the system.

5.1.4

- Tom Przybylski directed attendees to review the 5.1.4 SOP for returning condensate from Processes Returning to Service. The wording of the SOP was revised based on group interaction, recommendations and agreement. The primary issue was recommending methods that ensure the accuracy and reliability of condensate quality measurements, especially during startups and other times when equipment is brought back on line.

5. **SUBCOMMITTEE REPORTS -** (Cont.)
5.10 **WATER TREATMENT REPORT** - (Cont.)

- Comments also introduced from visitors in attendance.

- Buck Dunton motioned that the committee should recommend that there should be alarm flow monitoring on either recirculation or alternate loops. Further discussion led into the break, and Tom Przybylski made revisions to section 5.1.4 during break based on the group discussion

Break

- The group reconvened & reviewed modifications Przybylski made to 5.1.4 during break.

- Buck Dunton started the discussion by agreeing with specifics and intent of the revisions. Others agreed. After review, the group indicated approval with the revisions.

- Buck Dunton noted that the documentation in the associated recommended practices should be reviewed again to ensure consistency within the document.

- Tom Przybylski directed attendees to look at the language in 5.1.6.2, about monitoring evaporator conductivity. Group decided to add another section, now 5.1.6.3, to specifically address Evaporator Conductivity Sample Stream Flow. The item now states that sample streams should have means of verifying flow. Details on best practices (5.1.4) were copied into this section from the previous edits.

- Tom Przybylski noted that Ken Hansen had recommended a change to drawings 5.1 and 5.2. The suggestion was to show the block valve on the suction side of the sample cooler in the "open" position, and secondly, to move the block valve from the suction side to the discharge side of the sample cooler. Group agreed and action item created.

Oxygen Profiling as Troubleshooting Tool?

- Tom Przybylski asked the group to revisit at topic from previous meetings, the use and/or value of using oxygen profiling as a troubleshooting tool. No one in attendance had used such a study. Group decided to table this discussion until the next meeting.

Group Review of Condensate Document

- Tom Przybylski suggested that the group in attendance have one more look at the condensate systems document draft. Group reviewed as Przybylski scrolled through.

5. **SUBCOMMITTEE REPORTS -** (Cont.)
5.10 **WATER TREATMENT REPORT** - (Cont.)

- Przybylski noted that polishers were not addressed in this draft condensate document. Some discussion ensued. The group revisited an action item from a previous meeting, the use and/or value of using oxygen profiling as a troubleshooting tool. No one in attendance had used such a study. Group decided to table this discussion until the next meeting.

- Virginia asked if the scope of this document was just high purity systems and/or just North America. Przybylski said that the focus was recovery boiler. Przybylski suggested asked if this subcommittee needed to address polishers? Buck Dunton asked if this subcommittee recommend using polishers on condensate being returned from paper machines, or if efficiencies in cleaning practices and other options now reduced the need. Discussion ensued.

- After discussion, the group decided not to expand the discussion of polishers.

- 5.1.3. Key Maintenance Practices and Protocols Section. Przybylski went through this section slowly, inviting comment on details. Group reviewed. A few changes were made, and there was some discussion of the difference to the reader between "should" and "shall" statements.

- 5.1.4. SOPs Section. Tom Przybylski scrolled through this section for group review. There was discussion of 5.1.7.6. There was discussion of the merits and issues with double block valve configurations (no bleed). Susan Childress asked if the subcommittee shouldn't recommend some kind of valve inspection/management inventory/schedule? Various inspection techniques were noted. Group was good with adding acoustic inspection to the list of possible inspection methods. There was discussion of making a more explicit reference to valve management protocol requirements, to make sure mills put such an SOP in place. Group generally found the existing wording adequate.

- 5.1.6.4 SOP Section. Tom Przybylski asked group to review wording and content of the section on monitoring condensate stream conductivity. The word "critical" was added to signify a condensate return stream that potentially contain contaminants with the potential of shutting down the recovery boiler.

5. **SUBCOMMITTEE REPORTS -** (Cont.)
5.10 **WATER TREATMENT REPORT** - (Cont.)

- There was discussion of recommending automatic dump capability for "critical" condensate streams. Group revised the 5.1.6.4 item to recommend the auto dump capability "at some point between the contaminant and the recovery boiler feedwater. The wording is supposed to provide mills the latitude of deciding how to locate and configure it. There was some discussion on whether this would be a "should" or "shall" statement. Left as "shall" statement.

- 5.1.7 Review. No revisions made.

- Review completed of condensate document, and Tom Przybylski noted that after lunch, revised drawings for the deaerator section would be reviewed. The group will then focus on chemical cleaning.

Break For Lunch: Reconvened at 1:15 pm

Item 5: Deaerator Section Review

- After lunch, Tom Przybylski said that a thorough review of the deaerator section will be delayed until a later session. He did bring up two introductory drawings, and asked if illustrations 3.1 and 3.2 needed revision or modification. He noted that the source for the drawings will be confirmed. Group was OK with using the existing drawings if they were available or getting similar new drawings done.

Item 6: Begin Production of Chemical Cleaning Document

Introduction

- Tom Przybylski quickly reviewed the existing outline with the group and asked if it could be used as a basis for development. There were no objections.
- Tom Przybylski then started the process of working through each section. The purpose statement was revised, an intro drawing was deleted, and some editing was done to the introductory statements.

Definitions

- Group identified items to define for the target audience, and they were listed in document. Definitions to be developed.

5. **SUBCOMMITTEE REPORTS -** (Cont.)
   5.10 **WATER TREATMENT REPORT** - (Cont.)

Guidelines or Monitoring Tools

- Group began brainstorming to discover guidelines or monitoring guidelines. There was wide-ranging participation among committee members and session guests about what information should be included, the depth of detail that would be useful to the target audience, the variables in play that actually influence when and/or how to do a cleaning, etc. Rick Morgan noted that the term "DWD" is used worldwide to refer to a number of a number of things, and that the committee should develop this section with the goal of being very clear about what was being said.

- After the group generated an initial list of monitoring tools, Tom Przybylski focused the group on fleshing out the general topic of deposit weight density (DWD), as it is often a critical variable in determining when to perform a chemical cleaning.

- Wide-ranging discussion ensued. There was considerable discussion on when, where and how to collect samples to determine DWD, and on the importance of getting the right sample from the right place.

- There was considerable discussion on the analysis of the DWD results. A number of people cited the variability of data generated, and that correct sampling and interpretation were critical in the decision making process for cleaning.

- The group worked together to produce a 1st draft of guideline language for the following:
  - ❖ Deposit weight density
  - ❖ Methods for determining DWD of a tube sample
  - ❖ Tube sample analysis

- Varying opinions were expressed regarding criticality of finding copper in the DWD

- The group decided to stop the development process for the day after working through the first draft of the above items. Stopped at the guideline for "tube sample."

- Work will resume at that point and the other document components will be addressed at future meetings.

Adjournment

- There being no further new business, Buck Dunton motioned to adjourn the meeting. Rick Morgan seconded. Motion passed unanimously. Meeting adjourned at 3:25 pm.

5. **SUBCOMMITTEE REPORTS -** (Cont.)
5.10 **WATER TREATMENT REPORT** - (Cont.)

Action Items Updated April 4, 2016

Action	Owner	Due Date
Contact metallurgists regarding trends in finding copper in DWD analysis and it's importance (in pulp and paper industry)	Buck Dunton	Before 2016 Fall meeting
Show block valve in advance of sample cooler in "open" position. Move block valve to discharge side of sample cooler.	Sam and Michael W.	Before 2016 Fall meeting
Contact members that have missed meetings to see if they are still wanting to continue: Claude Gauthier/no longer active; Tom will check on others	Tom and Kelli	Before 2016 Fall meeting
Group to decide if feedwater heater deployment should be added to the scope of work of the documents under development. Large variation in design, location, use of live steam vs. recovered heat, etc.	Team	Discuss as demin section is being developed
Add "pretreatment" and "external treatment" for glossary for drum tube circuitry section	TBD	To be done towards end of development cycle
Add definition of "critical" condensate stream to glossary (stream that contains a contaminant that could shut down the recovery boiler). Possibly define "major condensate stream" in glossary depending upon further discussion	TBD	To be done towards end of development cycle
Include diagram and narrative definition for "double block and bleed" in glossary to be developed	Team	To be done towards end of development cycle
Review finished drafts of documentation to identify any conflict with Tappi Tip data. Bring any such instances to subcommittee for discussion/action.	Team	To be done towards end of development cycle
Address dryer drainage oxygen profiling as a troubleshooting tool. A bit data added, but will be reconsidered via reviews etc.	Team	Tabled until fall 2016 when more attendees are expected

Retired Items

Create deaerator circuitry showing basic configuration	Tom and Sam	DONE
Add drawing to deaerator section and submit what has been assembled to date to subcommittee members for review and comment	Tom and Sam	DONE
Revise Drawing of Condensate Sampling System per comments from team. Add sample cooler and valve in drain leg. Also add dump and divert valve "system," and caption "recommended configuration for condensate sampling of a condensate stream with the potential for liquor contamination. Add drawing to this section to illustrate the configurations that are recommended	Tom and Sam	DONE
Investigate whether there are mentions of soluble vs. particulate iron testing in any other of the completed documents, and consider discussion of the subject in the condensate section.		DONE
Finish revisions for condensate section confirmed in this meeting, and send out entire section to subcommittee for review before next meeting	Tom and Kelli	Before Spring 2016 meeting

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.

Membership

Currently, 26 companies (with the latest acquisitions) participate in the Program. We are still in contact with two other companies Evergreen [Pine Bluff AR mill] and Woodland Pulp operating recovery boilers that are not in the Program. We 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.

Operational Safety Seminars

There are two Operation Safety Seminars (both in Atlanta) scheduled for this year. We have 50 people signed up to attend in April 19 – 20th and 74 signed up to attend in May. We like to have 64 attendees but with the outages, we are going with this number. So you can see that we have room for people to attend in April. Since the seminars were first held in 1985, we have had over 3,400 people attend the seminars including operators, supervisors and superintendents. We continue to receive excellent reviews from the attendees who get valuable information from the dialogue among the attendees and monitors of the seminars. We continue to receive comments from a number of mills that with more experienced operators and supervisors moving on. They need to get the newer and less experienced people to these training sessions. We ask that all companies and mills seriously consider sending people to these valuable seminars.

Study on Smelt Dissolving Tank Explosions

Both the Operations and Maintenance Subcommittee and the Research and Development Subcommittee are working to develop best practices around dissolving tank related issues. The R & D Subcommittee is reviewing a proposal from the University of Toronto to examine various aspects of smelt shattering and dissolution that relate to the safe operation of a recovery boiler dissolving tank and to develop an approach for monitoring dissolving tanks to warn operators of potentially dangerous situations. The 2.5 year program will build on related research underway at the University currently funded by a consortium of 20 companies.

Work on Developing a Best Practice for Functional Testing of Interlocks and Trips on Recovery Boilers

The O & M Subcommittee is continuing its work on developing guidelines on functional testing of interlocks and trips procedures on recovery boilers. This will include how to conduct testing and proposed sequencing of testing interlocks. The Committee also will work on identifying best practices for clearing and preventing plugged/bridged ash hoppers, as well as external line maintenance, inspection and testing. The Committee agreed to finish work on developing guidelines on functional trip testing procedures before additional projects are considered.

6. **AMERICAN FOREST & PAPER ASOCIATION RECOVERY BOILER REPORT** - (Cont.)

Updating "Kraft Recovery Boilers" Blue Book

The revision of the "Kraft Recovery Boilers" blue book is in the final stage is expected to be completed by the end of this year.

Proposal for Research of Protective Clothing and Equipment

The R & D Subcommittee is working on an industry survey to recommend clothing that is both resistant to heat and chemical attack and enables mobility comfort for safe use around recovery boilers in Southern mill conditions.

PROPOSAL FOR RECOVERY BOILER GENERATING BANK OR SCREEN TUBE STUDY

The R & D Subcommittee is reviewing a proposal for a further study of generating bank or screen tubes and will review it again at its October meeting.

Other Research Projects Under Review

The R & D Subcommittee is discussing possible new research projects related to recovery boiler safety including: shatter jet design improvements; burning CNCG; ash hopper; develop procedures for safe inspection of boiler leaks (discuss with the BLRAC Safety Committee); boiler inspection protocols for SAC and FAC; combustible meters; and development of smelt spout burners. It is also reviewing the four major studies (Furnace Design, Floor Tubes, Economizers and Superheaters) completed to see what recommendations were made for further study.

Annual Meetings and Conference

AF&PA's annual Recovery Boiler meetings and Conference was held in Atlanta on February 2 and 3rd. As usual, the Conference was opened to all operating companies, insurers, vendors and manufacturers. We had 70 attendees and the meetings and Conference were very successful. The presentations included reports on the projects currently sponsored by the AF&PA Recovery Boiler Program and subcommittee reports on their accomplishments, reports from Sweden, Norway and Finland on their recovery boiler committees' activities, as well as other research being done outside of AF&PA 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.

Since this will be my last report for BLRBAC, I would like to say that it has been a pleasure to work with all of you over the many years. Thank you all for the help you have given me throughout these years. It has been great knowing so many of you and putting up with all my jokes. Thanks for all you have done for me.

CHAIRMAN: Tom, you will be sorely missed. We greatly appreciate your dedication and all that you have done in support of our industry. Thank you very much!

7. **TAPPI STEAM & POWER/ENERGY MANAGEMENT REPORT** - Margaret Gorog (Weyerhaeuser) reporting for Bentley Sherlock **(See Slide Presentation.)**

I am the TAPPI Engineering Division Vice-Chair and 2016 PEERS Conference Chair.

I think this is a little bit different presentation from TAPPI. I was asked to talk about the relevance to your group here at BLRBAC. To do that I'm going to talk about the Engineering Division because that is where the fit is. That is where we cover recovery boilers.

The slide I have here is the structure of the Engineering Division. We have six committees. Two are related to paper machines and they are centered around the paper conference in the spring. The majority of effort is centered around the PEERS conference. We have four committees. Our main one is the Steam & Power/Energy Management Committee. Within that we have four subcommittees which are Recovery & Power Boilers, Water Treatment and Energy Management. We have a brand new subcommittee for lime kilns and recaust. They are actually going to have their first meeting this afternoon. This came about because as part of the conference planning, we have this ambassador program where we go out and talk to mills in the area where the conference is located and ask what they are interested in and what kind of programs or information we can provide. Interestingly, lime kilns came out as one of the top topics. So we are emphasizing that in our programs right now.

The other committees include the Corrosion & Materials Committee, which I'm quite involved in. We also have the Project Management & Plant Engineering Committee. This is one where we are actually trying to boost and grow right now. We have been able to add several engineering sessions to our program coming up in the fall. Then we have an Environmental Working Group. We call it a working group because there is only one person. Guess it just can't be a committee yet!

So just going through some of the goals and things that we are working towards, of course the main efforts are around the fall and the spring conference. The spring conference PaperCon is pretty stable. They have pretty good attendance. There isn't a lot of worry there. The PEERS conference which is Pulping, Engineering, Environmental, Recycling and Sustainability is a bunch of groups combined together. It was down to being planned out one year in advance and there was the threat that it was going to be rolled into the PaperCon conference. The good news is that we are now booked out two years. So we have our next conference in Jacksonville; following that Norfolk and then out to the west coast in Portland. Then we will probably come back to this part of the world -- three years out. So we are going to be booking three years out. TAPPI has confidence in PEERS right now and they are working with us to plan out ahead.

Of course one of our main jobs is to organize the PEERS conference. We do that jointly with the Pulping Division. It is the technical committees that actually provide all the content for the conference. We have three TAPPI staff members that we work with. They do all the coordinating and meeting planning, but the technical part of it does come from the committees. We use the conference to recognize those people who made major contributions whether it is technical or those who provide leadership and service. We also have a scholarship program and we raise funds through the 5-K fun run. Last year we actually received some funding. A widow of a long time member, Charles Tibbets, donated some money to the fund.

7. **TAPPI STEAM & POWER/ENERGY MANAGEMENT REPORT** - (Cont.)

We are now able to provide two scholarships per year. TAPPI keeps track of recipients who become members and a fair number do transfer into members. It is a way of bringing new people into the industry. Of course the division supports all the committees and as I just said we are helping to build up the Project Engineering Committee right now. Always we try to maintain a committee succession plan. The actual Engineering Division council is five members and it is an eight year succession plan. So there is a bit of a commitment there. We are always trying to fill those positions. Each committee has its own council. We try to maintain those positions as well. We try to encourage mill participation and that is part of that Ambassador Program where we go out and talk to mills. Of course we try to make it relevant to the conference attendees.

We have committee meetings throughout the year. Most of the committee meetings are at the fall PEERS conference. The Steam & Power Committee meetings meet twice; so their second meeting is this afternoon. It follows BLRBAC. The Engineering Division; we had our spring meeting about three or four weeks ago. That is when we pulled together the PEERS program. We have set the program now for Jacksonville and you should be able to see it on the PEERS web page any day now. Paper Machines have their committees meetings during the spring conference.

So it is the committees that are really the heart of the division. That is where the information and knowledge is accumulated mainly in the form of TIPS. I did a count of all the engineering TIPS. There are well over 100 of them and I would say that a third are related to recovery and recaust. That is mainly through the Steam & Power Committee and Corrosion & Materials Committee. So we collect information and publish them through TIPS, courses, and conference proceedings. Anyone who is a TAPPI member, after the conference, can get those proceedings on line. They are available as part of your membership. As well as journal and book publications, within the committee meetings themselves there is always an opportunity with open forum sessions to bring questions and have discussions. So there are many ways to gather information. The committees also are the ones that organize the tracks. So Steam & Power will organize sessions around their topic; Corrosion & Materials will have several sessions. Each committee will produce sessions for the conference.

You don't have to be an expert to belong to a committee. You just have to have an interest and be a member of TAPPI. Certainly by joining a TIP group, if you want to find out more about FAC or SAC for example, joining those TIPS when they are under review is a good opportunity to actually get your hands on the information. New TIPS that come out, if you want to know firsthand, get on that TIP Working Group Committee and then you will get a copy before anyone else.

Lastly, just an update of some of the TIPS that have been produced over the last few years. Corrosion & Materials, have put two forward. One on FAC, flow accelerated corrosion and one on SAC, stress assisted corrosion. Actually the inspiration for those TIPS came from BLRBAC meetings. So the discussions here were transferred to our committee meetings and we put these TIPS together. They are just short documents that collect all the information on those subjects. There is a lot of information that is available and the TIP just pares it down to what you need to know.

7. **TAPPI STEAM & POWER/ENERGY MANAGEMENT REPORT** - (Cont.)

Steam & Power has put out three TIPS in the last year. They have an energy checklist and that is for the entire pulp mill, not just for recovery boilers. One is on NOX emissions and then one is on boiler inspections which came out last September. They have three in the works: green liquor density; boiler inspection implementation and then one on kiln brick selection; again putting more emphasis on kilns and recaust.

So that is it for the TAPPI update and we certainly welcome your participation. If you have any ideas or suggestions for TIPS, do bring them forward. Thanks.

8. **WESTERN CANADA BLRBAC REPORT** – Rinus Jellema

No report given at this meeting.

10. **ACTIVITIES OUTSIDE NORTH AMERICA REPORTS**

No report given at this meeting.

11. **OPERATING PROBLEMS SESSION REPORT** – David Slagel

The operating problem session was held the afternoon of April 5th. There was good membership attendance at this session.

We started off the session with presentations from Craig Cooke who provided an overview of the proposed changes to the Fire Protection in Direct Contact Evaporators document and Vernon Blackard who provided an overview of the proposed changes to the Safe Firing of Black Liquor document both of which have been posted on the website for the past several months and have since been approved by the membership.

Following these presentations we moved into the operating problem session where we reviewed 12 submitted questionnaires. General topics included the move towards extended time between major maintenance outages, frequency of functionally testing boiler instrumentation, and the most exciting of topics, spout operation, maintenance and design.

This concludes the operating problem session report.

I would like to remind everyone before we close the main committee meeting that we have two Technical presentations immediately following this meeting. The first is a presentation by C.A. Vossberg of Electron Machine entitled “Refractometer Implementation for Recovery Boiler Safety” followed by a presentation by Chris Hersh of Harbison Walker entitled “Refractory Solutions for Black Liquor Recovery Boilers”.

CHAIRMAN: That does concludes our Main Committee Meeting. We want to thank everyone for your attendance and your time away from home. As Dave mentioned, we do have two Technical Presentations immediately following this meeting. We encourage you to stick around for those. I'll entertain a motion to close the Main Committee meeting. Second? All in favor? The Main Committee Meeting is now closed. We will see you in October. Safe traveling!

NEXT MEETING – October 24, 25 & 26, 2016, Crowne Plaza Hotel, Atlanta, GA.

APPENDEX A
INCIDENT LIST

ECONOMIZER

SPRING 2016 – 01	
Classification:	Noncritical
Location:	**Georgia Pacific, Palatka, FL**
Unit:	RB4, 1977, CE, Contract #22974, 2 drum, 2007 Andritz long flow economizer
Unit Size:	5.04 MM lb ds/day; 850,000 lb/hr steam at 1200 psig, 900°F, 1500 psig design (MAWP)
Incident Date:	September 8, 2015
Downtime hrs, leak/total	60 hrs total
ESP?	**No**
Leak/Incident Loc:	Economizer, The leak was a 1/8" hole located on the back side of the tube at the weld that attaches the fin, rear pass
How discovered:	Operator – normal rounds
Wash adjacent tube:	No
Root cause:	Oxygen pitting
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	April 2015
Sequence of events:	The operator was performing his normal round and saw a wet area in the rear Economizer hopper. The operator turned off the water to the hopper trough and opened additional doors on the economizer hopper and on the side of the economizer. The operator determined the leak was in lower section of the economizer. The boiler was taken down in an orderly manner.
Repair procedure:	The tube was plugged
Future prevention:	Improvements have been made on the feed water system, reducing DO and improving DO monitoring. The mill is developing a plan for economizer replacement

ECONOMIZER

SPRING 2016 – 02	
Classification:	Noncritical
Location:	**WestRock Mahrt, Cottonton, AL**
Unit:	RB1, 1966, B&W, PR-97, 2-drum,front-sloped hearth,1996 large Andritz econ
Unit Size:	2.8 MM lb ds/day; 440,000 lb/hr steam at 890 psig, 825°F, 1000 psig design
Incident Date:	December 25, 2015
Downtime hrs, leak/total:	28.9
ESP?	**No**
Leak/Incident Loc:	Economizer platen supply tube, crack just above tube to large supply header weld.
How discovered:	Operator rounds / Water in ash conveyor
Wash adjacent tube:	
Root cause:	SAC. Will conduct further tube testing in area during spring shutdown
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	October 2014
Sequence of events:	Water was found leaking from economizer ash conveyor. Pulled liquor and put on aux fuel. Observation door was opened and leak located. Drained boiler. Grounded out crack and welded up. Good hydro at 890psi for 30 minutes.
Repair procedure:	Ground out crack and welded up. Thickness tests were sufficient.
Future prevention:	

ECONOMIZER

SPRING 2016 – 03	
Classification:	Noncritical
Location:	**WestRock Mahrt, Cottonton, AL**
Unit:	RB2, 1990, Tampella, Contr #337, single drum, large econ
Unit Size:	3.75 MM lb ds/day; 561,800 lb/hr steam at 890 psig, 825°F, 1,100 psig design (MAWP)
Incident Date:	February 11, 2016
Downtime hrs, leak/total	47 hours
ESP?	**No**
Leak/Incident Loc:	Economizer upper header tube plug leak
How discovered:	Operator rounds / Water in ash conveyor
Wash adjacent tube:	n/a
Root cause:	Erosion to weld that was installed on the tube plug
Leak detection:	Mass balance
Bed cooling enhance:	No
Last full inspection:	February 2015
Sequence of events:	Operator saw water in ash conveyor during his round. Leak was verified by looking through the boiler door. An orderly shutdown was triggered. Smelt bed was burned down.
Repair procedure:	The tube and plug was cleaned up with a grinder. A penetrant test was performed to ensure no cracking was present in the tube before any weld repair was started. The plug was then re-welded and a penetrant test was performed to ensure the integrity of the weld.
Future prevention:	Increase PT frequency around Economizer tubes

ECONOMIZER

SPRING 2016 – 04	
Classification:	Noncritical
Location:	**Catalyst Paper, Crofton, BC, Canada**
Unit:	RB4, 1991, CE/ABB, CA88105, 1-drum, decant, large econ
Unit Size:	4.0 MM lb ds/day; 587,000 lb/hr steam at 625 psig, 750°F, 800 psig design
Incident Date:	September 20, 2015
Downtime hrs, leak/total:	60
ESP?	**No**
Leak/Incident Loc:	Economizer, pinhole in tube just above weld to lower header, tube 70, row 17.
How discovered:	Operator walkdown, water in gen bank hopper
Wash adjacent tube:	No
Root cause:	SAC. Lack of stress relief on original fabrication + O2 in feedwater due to DA problem.
Leak detection:	Yes
Bed cooling enhanc	No
Last full inspection:	February 2015
Sequence of events:	Detected leak, proceed to orderly shutdown
Repair procedure:	Excavate and weld up leak.
Future prevention:	Replace economizer June 2016.

ECONOMIZER

SPRING 2016 – 05	
Classification:	Noncritical
Location:	**Catalyst Paper, Crofton, BC, Canada**
Unit:	RB4, 1991, CE/ABB, CA88105, 1-drum, decant, large econ
Unit Size:	4.0 MM lb ds/day; 587,000 lb/hr steam at 625 psig, 750°F, 800 psig design
Incident Date:	October 16, 2015
Downtime hrs, leak/total:	60
ESP?	**No**
Leak/Incident Loc:	Economizer, crack in tube 5” above start of fin at bottom of econ, tube 13, row 14.
How discovered:	Operator walkdown
Wash adjacent tube:	Yes
Root cause:	SAC. Lack of stress relief on original fabrication + O2 in feedwater due to DA problem.
Leak detection:	Yes
Bed cooling enhanc	No
Last full inspection:	February 2015
Sequence of events:	Detected leak, proceed to orderly shutdown
Repair procedure:	Excavate and welded up leak, weld overlay area. Weld overlay on adjacent tube thinned area.
Future prevention:	Replace economizer June 2016.

ECONOMIZER

SPRING 2016 – 06	
Classification:	Noncritical
Location:	**Catalyst Paper, Crofton, BC, Canada**
Unit:	RB4, 1991, CE/ABB CA88105, 1-drum, decant, large econ
Unit Size:	4.0 MM lb ds/day; 587,000 lb/hr steam at 625 psig, 750°F, 800 psig design
Incident Date:	October 29, 2015
Downtime hrs, leak/total:	38
ESP?	**No**
Leak/Incident Loc:	Economizer, ¼” linear crack in lower bend, tube 21, row 11.
How discovered:	Operator walkdown
Wash adjacent tube:	Yes
Root cause:	SAC. Lack of stress relief on original fabrication + O2 in feedwater due to DA problem.
Leak detection:	Yes
Bed cooling enhanc	No
Last full inspection:	February 2015
Sequence of events:	Detected leak, proceed to orderly shutdown
Repair procedure:	Excavate and weld up leak, weld overlay 1” x 6” area where UT shearwave detected ID cracking. Weld overlay on adjacent tube thinned area.
Future prevention:	Replace economizer June 2016.

ECONOMIZER

SPRING 2016 – 07	
Classification:	Noncritical
Location:	**International Paper, Bogalusa, LA**
Unit:	RB21, 1989, B&W, PR-211, Single Drum, Low Order, Large Economizer
Unit Size:	3.3 MM lb ds/day; 504,000 lb/hr steam at 850 psig, 825°F, 1050 psig design (MAWP)
Incident Date:	September 10, 2015
Downtime hrs, leak/total	37.4 Hrs
ESP?	**No**
Leak/Incident Loc:	Pinhole in tube at #2 Economizer inlet header directly inside exterior wall
How discovered:	Operator walk down
Wash adjacent tube:	No
Root cause:	Localized External Corrosion and Pitting
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	April 2015
Sequence of events:	Boiler was running normally when operator found water leaking from #2 economizer at 10:15 pm on 9/9/15. Since the leak was in the Economizer and separated by baffle - there was no way that water could reach the furnace - an ESP was not initiated. Supervisor was called to help identify the location of the leak. Crew investigated possible sources of moisture, such as IKs and mix tank vent. After shift change, on the morning round, operator observed water running out of drag conveyor. Boiler was taken off liquor that morning of 9/10/15 to locate leak. Pinhole leak was located just off the #2 Economizer inlet header on tube #86 - third tube from the north-east corner right wall. An orderly shutdown was initiated and boiler was taken off fuel at 3:00 am on 9/11/15. UT determined that there was thinning in the tube walls local to the pinhole leak. There was also pitting present.
Repair procedure:	Fourteen (14) inches of tube was cut out and replaced.
Future prevention:	Plan to replace tubes #83, #84, #85, #87 and #88 on 2016 Annual Outage. We will also perform additional NDE and PIT gauge testing in this area.

ECONOMIZER

SPRING 2016 – 08	
Classification:	Noncritical
Location:	**International Paper, Bogalusa, LA**
Unit:	RB21, 1989, Babcock & Wilcox, PR-211, Single Drum, Low Order, Large Economizer
Unit Size:	3.3 MM lb ds/day; 504,000 lb/hr steam at 850 psig, 825°F, 1050 psig design (MAWP)
Incident Date:	October 14, 2015
Downtime hrs, leak/total	39.2 Hrs
ESP?	**No**
Leak/Incident Loc:	Pinhole in tube at #2 Economizer inlet header directly inside exterior wall
How discovered:	Operator walk down
Wash adjacent tube:	No
Root cause:	Localized External Corrosion and Pitting
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	April 2015
Sequence of events:	Boiler was running normally when operator found water leaking from #2 economizer at 5:50 AM on 10/14/15. Since the leak was in the Economizer and separated by baffle - there was no way that water could reach the furnace - an ESP was not initiated. Supervisor was called to help identify the location of the leak. Crew took boiler off liquor and investigated possible sources of moisture, such as IKs and mix tank vent. An orderly shutdown was initiated and a pin hole leak was located just off the #2 Economizer inlet header on tube #88 - first tube from the north-east corner right wall. UT determined that there was thinning in the tube walls local to the pinhole leak. External corrosion and pitting was observed.
Repair procedure:	Fourteen (14) inches of tube was cut out and replaced. Also replaced tubes #84, #85, and #87.
Future prevention:	We will also perform additional NDE and PIT gauge testing in this area. We will also follow an Economizer Checklist recommended by IP Technology.

ECONOMIZER

SPRING 2016 – 09	
Classification:	CRIT 854
Location:	**International Paper, Georgetown, South Carolina**
Unit:	RB2, B&W, 1967, PR-114, 2 Drum, 1989 small econ, Direct Contact Cyclones. ,
Unit Size:	3.9 MM lb ds/day; 500,000 lb/hr steam at 1020 psig, 950°F, 1175 psig design
Incident Date:	October 13, 2015
Downtime hrs, leak/total	42 Hours
ESP?	No.
Leak/Incident Loc:	Hole in tube to header weld, top of no. 2 tube in row 58 counting from left to right of the number two economizer
How discovered:	Decrease in cyclones' outlet flue gas temperature
Wash adjacent tube:	Yes. Washing on adjacent tube: Tube two in row 57
Root cause:	Eroding on tube weld over time
Leak detection:	Yes. DCS – Delta V
Bed cooling enhanc	No
Last full inspection:	March 2015
Sequence of events:	Decreased flue gas temperatures on cyclone evaporators' outlets began on 10/10/15, followed by a cyclone bottom pluggage on 2B cyclone on 10/12/15. A boiler walkdown was done on 10/13/15 due to decreased flue gas temperatures on the cyclones. During the walkdown, water was discovered to be leaching from the economizer boiler casing. Upon further investigation, the feedwater/steam flow mass differential had been slowly increasing after the chill and blow on 9/23/15. Boiler water chemical injection is located after the economizer, and no changes in boiler chemistry were observed. This indicated that if there were a leak, the leak was prior to the generation bank section. The feedwater flow transmitter was replaced to verify flow differential increase was accurate. Liquor was removed from the boiler on 10/13/15 and a visual inspection revealed a leak at the top on the economizer section. Liquor was not re introduced and the boiler was then taken offline (orderly shutdown with bed burnout) in preparation for repairs.
Repair procedure:	An elevated preheat of 300 to 350-degree F and repair with ER-70S-D2 tig or 7018-A1 shielded electrode based on the welding method required. Old weld was ground out, new root pass weld was put in followed by several cover passes. Both the tube two in rows 58 & 57 were welded on and upon completion the area dye penetrant tested to assure no defects in the repair.
Future prevention:	Operators performing regular boiler walkdowns need to be more observant for visual indications of leaks, such as water in the boiler casing. Boiler leak urgency is apparent with the operators on the furnace side, but the same eye for detail is needed on the economizer sections. The mass flow differential was decreased from 100 gpm to 30 gpm on 2RB after the leak on 1RB the month prior.

ECONOMIZER

SPRING 2016 – 10	
Classification:	Noncritical
Location:	**International Paper, Rome, Ga**
Unit:	RB5, 1989, Tampella, 254-583, 1 drum, large economizer.
Unit Size:	5.44 MM lb ds/day; 655,000 lb/hr steam at 850 psig, 780°F, 1160 psig design (MAWP)
Incident Date:	January 24, 2016
Downtime hrs, leak/total	64.2hrs
ESP?	**No**
Leak/Incident Loc:	Pinhole in tube approx 2" below end of fin, several inches above the header, Cold Economizer
How discovered:	Operator walk down
Wash adjacent tube:	No
Root cause:	Possible internal oxygen pitting
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	Oct 2015
Sequence of events:	Operator found leak, control shutdown, made repairs. Hydro and started back up.
Repair procedure:	TIG weld repaired.
Future prevention:	More thorough NDT inspection and determine path forward.

ECONOMIZER HH

SPRING 2016 – 11	
Classification:	Noncritical
Location:	**International Paper, Georgetown, South Carolina**
Unit:	RB1, B&W, 1964, PR-81, 2 Drum, 1983 small econ, Direct Contact Cyclones. ,
Unit Size:	4.5 MM lb ds/day; 425,000 lb/hr steam at 1020 psig, 950°F, 1175 psig design
Incident Date:	September 9, 2015
Downtime hrs, leak/total	30 Hours
ESP?	**No.**
Leak/Incident Loc:	Crack in weld No. 2 hand hole of the number one economizer bottom header
How discovered:	Decrease in cyclones' outlet flue gas temperature
Wash adjacent tube:	No
Root cause:	Poor welding quality on the no. 2 hand hole cap
Leak detection:	Yes. DCS – Delta V
Bed cooling enhanc	No
Last full inspection:	March 2015
Sequence of events:	Cyclone bottom plugging issues beginning on 9/6/15. The cyclone pluggage investigation on 9/9/15 revealed decreased flue gas temperatures on cyclone outlets beginning after the chill and blow on 8/20/15. It was also discovered the steam/feed water differential increased after the chill and blow by about 25-30 gallons. When walking the boiler down, no distinctive sounds were observed that would indicate a leak. Boiler water chemical injection is located after the economizer, and no changes in boiler chemistry were observed. This indicated that if there were a leak, the leak was prior to the generation bank section. The feedwater flow transmitter was replaced to verify flow differential increase was accurate. Liquor was removed from the boiler on 9/10/15 and a visual inspection revealed a leak in the bottom on the economizer section. Liquor was not re introduced and the boiler was then taken offline (orderly shutdown with bed burnout) in preparation for repairs.
Repair procedure:	The 80MM SM-16 hand hole cap was removed and replaced in accordance with IP procedural guidelines. The cap was centered in the header opening which gave approximately 1/16 or slightly greater than the desired 1/32 gap but was still within the procedure guidelines of 3/32 gap giving to the mill by RMR. No. 4 hand hole was also replaced due to excessive porosity. This was a preventative measure. Repairs were made by stick weld using a 7018 A1 rod.
Future prevention:	Leak detection flow differential alarm was lowered to capture potential leaks sooner while still not creating a nuisance alarm

ECONOMIZER HH

SPRING 2016 – 12	
Classification:	Noncritical
Location:	**International Paper, Orange Mill, Orange , TX,**
Unit:	RB2, 1967, B&W, PR-108B, 2 drum, 1974 small econ, direct contact cyclone evaporator
Unit Size:	2.7 MM lb ds/day; 254,000 lb/hr steam at 850 psig, 835°F, 975 psig design (MAWP)
Incident Date:	February 19, 2016
Downtime hrs, leak/total	74
ESP?	**No**
Leak/Incident Loc:	Economizer hand hole cap leak in weld, washed hole in supply pipe to header.
How discovered:	Decreasing solids and O2, boiler walkdown
Wash adjacent tube:	Yes
Root cause:	Suspect improper installation procedures but this was proven not the case as evidence indicates proper procedures were used.
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	April 2015
Sequence of events:	O2 meter went out, solids dropped, operator reviewed boiler data, operator walked down unit and noticed water leaking from the dum, gas burners tripped, liquor diverted, boiler repaired
Repair procedure:	Hand hole cap replaced by IP procedures, economizer lower header washed areas had weld metal build up, supply water header had dutchman replaced.
Future prevention:	Review of leak detection system has been completed and issues resolved, review of QC and procedures on hand hole cap installation has been completed

BOILER BANK & SUPERHEATER

SPRING 2016 – 13

Classification:	CRIT 855
Location:	**Domtar Hawesville, KY.**
Unit:	RB3, 1987, Ahlstrom, Contract# 39445, 2 Drum, Large Econ
Unit Size:	2.1 MM lb ds/day; 360,000 lb/hr steam at 1250 psig, 860°F, 1475 psig design (MAWP)
Incident Date:	September 13, 2015
Downtime hrs, leak/total	16hr 24min extra leading into annual outage
ESP?	**Yes**
Leak/Incident Loc:	Boiler bank just below the steam drum just over center one row toward the rear; 1 SH tube sheared at pressure induction weld.
How discovered:	Helper noted trouble in boiler maintaining PO4 residual.
Wash adjacent tube:	1/2" x 1" hole in tube caused by spray from an adjacent tube where a tube plug had failed
Root cause:	Failed tube plug weld
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	September 2014
Sequence of events:	On Sunday September 13th at 2:00 a.m., the "A" shift recovery 1st helper tested each boiler water sample. At this point he realized the boiler water conductivity had dropped to the lower end of the spec and the P04 test had fallen to 10.5 ppm. This prompted him to increase chemical feed and discuss with the boiler operator. It was noted that we were blowing the boilers down due to hardness found on September 9th. Operators closed the blowdowns and communicated these details at shift change (between 5:45 a.m. and 6:00 a.m.) At 6:00 a.m. on September 13th, the "B" shift recovery 1st helper tested each boiler water sample. He noted that the conductivity had fallen to 13 umhos. He immediately added chemical to the make-down chambers and notified his operator and the supervisor. He retested at 10:00 a.m. and again at 2:00 p.m. The conductivity had come up to 18 umhos and the PO4 increases slightly. At this point, they contacted the on call person and found the high drum dump valve on the steam drum to be leaking through. Operators valved it out and added more chemical. Shift change took place at 6:00 p.m. and these details were shared. The recovery day shift recovery boiler operator said he never received a steam/feedwater split alarm. Alarm records indicate that there were alarms in the control room that were acknowledged. At 7:00 p.m. on September 13th, other parts of the mill began to be taken offline for annual maintenance and inspections. The alarms generated clouded the operator's ability to recognize the leak related alarms that were being generated. The "D" shift 1st helper tested boiler water and immediately added more chemical to increase PO4 residuals. Each time the chemicals were added the PO4 residuals increased but only temporarily. The 1st helper noted this and communicated it with the recovery boiler operator and his supervisor. The recovery boiler operator noted that he thought he should be steaming more at the current liquor burning rates. This was discussed but no leak was suspected. At 7:30 a.m. on September 14th the "B" crew 1st helper discussed the previous day's boiler water issues with the recovery superintendent. At this point, trends were analyzed. It was noted that a steam to feedwater split had occurred at approximately 5:21 a.m. on September 13th. This was accompanied by a quick spike in furnace pressure, rapid increase of ID fan speed and a rapid decrease in economizer gas inlet temperature. This information was quickly discussed with the recovery boiler operator and the ESP was initiated at the hard wired panel at approximately 7:40 a.m. The adjacent areas were barricaded per our Emergency Shutdown procedures. At 7:50 p.m. on September 14th (12 hrs after successful ESP) the recovery superintendent entered the boiler house. Temperatures were measured using IR. The lower furnace temps averaged 190 deg F. There was little to no bed remaining but the surface temperature was measured at 155 deg F. Upper furnace temperatures averaged 165 deg F. The ESP horns were reset at 8:15 p.m.

	Treated water was used to refill the boiler following building re-entry. The boiler was secured and entry was made on the morning of September 15th. The leak was found on the hot side of the generating bank just below the steam drum. The boiler was water washed until 9:00 p.m. on September 15th. Boiler inspections were conducted by mill employees and a PSA rep. A bad weld in an adjacent tube plug was discovered. This allowed water to spray on a generating bank tube and caused a ½" by 1" hole leading to the ESP. Inspections were completed and one additional SH tube was found to be sheared as a result of the ESP. The tube was repaired along with the already scheduled annual outage. The boiler passed hydro at 1:07 a.m. on September 26th.
Repair procedure:	Repair tube plug weld and plugged the leaking tube.
Future prevention:	To aid in operator response, leak detection trends were developed and displayed on a permanent monitor above the recovery operator stations. These trends include a calculated leak index with visual alarm indications, online PO4 measurements, ID fan speeds, flue gas temperatures, and furnace pressures. The steam to feedwater DCS alarms were made critical and are now reoccurring alarms.

UPPER FURNACE (ROOF)

SPRING 2016 – 14	
Classification:	Noncritical
Location:	**Georgia Pacific- Leaf River Cellulose, New Augusta, MS**
Unit:	1983, Gotaverken, 4142, Single Drum, Large Economizer, Sloped Floor, 5 Spouts
Unit Size:	6.4 MM lb ds/day; 983,900 lb/hr steam at 1250 psig, 900°F, 1490 psig design (MAWP)
Incident Date:	November 17, 2015
Downtime hrs, leak/total	51.83 hrs.
ESP?	**No**
Leak/Incident Loc:	Roof tube on the penthouse side near primary superheater inlet
How discovered:	Utilities operator noted vapor coming from the roof of the boiler
Wash adjacent tube:	No
Root cause:	Weld was hand repaired improperly during fabrication and exhibited porosity
Leak detection:	Recovery Boiler Advisor – Mass Balance
Bed cooling enhanc	No
Last full inspection:	May 2015
Sequence of events:	An operator first noticed vapor/flue gas coming from the top of the boiler roof on 11/14/2015. The vapor flow appeared to decrease over the next day, and operators collected a sample to try to identify the source of the vapor. The condition was monitored, and the decision was made to bring down the boiler beginning on 11/16/2015 after the possible leak was determined to not be in danger of leaking over the bed. From 11/14/15 until the 16th when the boiler was taken out of service, there were no indications of a tube leak other than the vapor from the penthouse roof. Operators kept a close eye on changes in the water mass balance, ID fan speeds, flue gas temperatures, and tube leak alarm. None of these indicators showed that water or steam was entering the furnace. After the boiler was washed and cooled for entry, the leak was found using an ultrasonic device. A pinhole leak had developed at the membrane weld between the second and third roof tubes from the right-hand side wall near the primary superheater inlet. The hole was on the second tube side of the membrane. Because the leak was located on the penthouse side of the roof, no furnace condition changes were detected to prove a leak was present. Madison personnel were able to grind out and repair the weld in place. Applied Technical Services checked the weld repair and the thickness of the tubes around the leak to ensure no steam washing had occurred.
Repair procedure:	Weld repaired in place
Future prevention:	

SCREEN

SPRING 2016 – 15	
Classification:	CRIT 856
Location:	**Weyerhaeuser, New Bern, NC**
Unit:	RB1, 1969, CE contract #11667, 2 drum, decanting hearth. Capacity rebuild by Andritz 2009.
Unit Size:	4.5 MM lb ds/day; 630,000 lb/hr steam at 835 psig, 825°F, 1000 psig design (MAWP)
Incident Date:	January 29. 2015
Downtime hrs, leak/total	Total downtime 103 hrs
ESP?	**Yes**
Leak/Incident Loc:	Leak in screen tube
How discovered:	Operator performing walkdown
Wash adjacent tube:	no
Root cause:	flint striker found in the screen tube at annual outage, overheat, creep rupture
Leak detection:	yes
Bed cooling enhance:	no
Last full inspection:	3/2014
Sequence of events:	Area process engineer noted possibility of a leak in the boiler on 1/23 from water and chemical mass balances. The data suggested a possible leak dated back to 1/9, which was the startup from a mill PMO. Started frequent walkdowns on the boiler at that time, but were not able to locate the leak. The rate was reduced on 1/26 and doors were opened on the upper floors to allow for hearing the leak. On the night of 1/28, heard what was thought to be a leak on the 5th floor. Liquor was pulled, leak identified in the screen section and boiler was ESP'd at 12:15am. The leak was in the first screen tube on the right of the boiler with steam blowing on water walls. Operators followed the procedure and verified that all equipment responded as needed. The 12 hour waiting period was completed and the bed allowed to cool for an additional 17 hours before starting the boiler wash. Interestingly, the size of the leak did not change (grow) during this time period.
Repair procedure:	Replaced tube section from below bend up to the roof.
Future prevention:	

UPPER FURNACE

Spring 2016 - 16	
Classification:	Noncritical
Location:	**Weyerhaeuser, Columbus, MS**
Unit:	1989, Babcock and Wilcox, PR-212, Single Drum, large economizer, sloped floor
Unit Size:	6.2 MM lb ds/day; 943,000 lb/hr steam at 1500 psig, 925°F, 1825 psig design (MAWP)
Incident Date:	February 11, 2015
Downtime hrs,leak/total	56/66
ESP?	**No**
Leak/Incident Loc:	Steam cooled tube panel under nose arch cavity
How discovered:	Operations walkdown, loud noise and condensate dripping behind insulation
Wash adjacent tube:	No
Root cause:	SAC
Leak detection:	Yes
Bed cooling enhanc	No
Last full inspection:	October 2013 (prior to leak, and recently during major outage in March 2015)
Sequence of events:	Firing black liquor at steam flow of 841,000 lb/hr 2/11/15 10:32 Pull soot blowers out of boiler and operator performed his walk down 2/11/15 10:35 Recovery operator called the control room and reported noise and steam coming from boiler casing north side 10th floor 2/11/15 10:36 Leadership went to area and determined that it was a steam leak outside of the boiler 2/11/15 11:36 Started pulling liquor 2/11/15 13:36 Recovery off Line ---------- Lockout, Boiler cool down, Maintenance work, Unlock (~ 55 hours) 2/13/15 20:53 Startup
Repair procedure:	Replaced failed (bent) tube
Future prevention:	Ensure proper drainage of steam cooled sidewall lower header during start-up and shutdown

UPPER FURNACE

Spring 2016- 17	
Classification:	CRIT 857
Location:	**Verso Corporation, Androscoggin, Jay, ME**
Unit:	RB2, PR-182, 1976, B&W, 2 drum, large economizer Tampella 1991, sloped to rear floor
Unit Size:	2.8 MM lb ds/day; 360,000 lb/hr steam at 900 psig,830°F, 1000 psig design (MAWP)
Incident Date:	June 19, 2015
Downtime hrs, leak/total	76.2/92.7
ESP?	**No**
Leak/Incident Loc:	3 inch longitudinal crack on the nose arch tube, on furnace side, at toe of weld of a side wall filler block at the rear most left hand side wall tube.
How discovered:	Operator during normal rounds
Wash adjacent tube:	No
Root cause:	SAC
Leak detection:	Yes. Buckman Recovery Boiler Advisor
Bed cooling enhance:	Not required
Last full inspection:	June 2015
Sequence of events:	Two days after startup from the annual outage, RB2 was operating at normal load, 2.5MMlb/hr BL, 4 liquor guns , 241 gpm, steaming at 360Klb/hr. Liquor solids were 67%. Boiler had been at normal liquor burning for 36 hours after startup from annual outage. At 1245, while performing his normal boiler rounds, the RB2 boiler operator observed a small amount of water dripping out from under the boiler cladding at the mud drum hopper/boiler interface. The control room operator did not observe any spread in the steam/feed water differential trends. The Buckman Recovery Boiler advisor (RBA) leak detection system did show a “Low grade leak” that alarmed simultaneously while the RB operator noticed the leak while doing his rounds. Process of removing liquor and installing auxiliary NG burners commenced immediately. Sootblowers were removed from service and manually valved out of service. A sample of the water was taken to the water lab and confirmed it had phosphate present. By 1316, all liquor was removed from the boiler. Through an inspection door on the front wall, there was no evidence of water present on the nose arch or in the furnace of the boiler. Inspection of the nose arch rear cavity also showed no evidence of water present. At 1318, auxiliary fuel was removed and an upper furnace inspection was performed to check for the presence of water in the furnace. None was observed. . At 1357, auxiliary fuel (NG) was reintroduced to the furnace to burn out the bed. An operator was stationed at the 6th floor (bottom of nose arch elevation) front wall man door (open) continuously observing the nose arch area during the bed burnout process. At 1751, auxiliary fuel was removed from the furnace when it became difficult to keep the smelt spouts open. Bed was 90% removed. During the cool down period, an additional boiler man door was opened directly opposite from the affected area and an operator stationed for observation. After 2200, once pressure was off the boiler, the boiler was drained. External cladding/insulation/skin was removed to determine exact leak location. Leak was determined to be on outer most #1 nose arch Rear wall tube next to left hand side wall, where the side wall seal filler bar was located. The #1 & #2 left hand side wall tubes were removed to access the leak. Leak was a 3 inch longitudinal crack on nose arch tube. 1 nose arch Dutchman and 2 sidewall Dutchmen were installed according to ASME and Verso Corporation standards.
Repair procedure:	70’s tig wire/ Tig weld 3 dutchmen
Future prevention:	Will replace both nose arch tubes at both side walls during 2016 April outage. Enhance SAC radiography shots in this area of the boiler on both sides.

LOWER FURNACE

SPRING 2016 – 18	
Classification:	CRIT 858
Location:	**Canfor-Northwood Pulp, Prince George, British Columbia**
Unit:	RB5, 1982, Combustion Engineering, CA-79120, 2 Drums, Cross Flow Large Economizer,
Unit Size:	3.60 MM lb ds/day; 480,000 lb/hr steam at 652 psig, 752°F, 800 psig design (MAWP)
Incident Date:	April 29, 2015
Downtime hrs, leak/total	Total time off liquor 181 hours
ESP?	**No**
Leak/Incident Loc:	Lower furnace, mid elevation of primary airport at LW tube 104
How discovered:	Visual inspection
Wash adjacent tube:	No
Root cause:	Thermal expansion difference between core carbon steel and stainless steel weld overlay materials resulting from heavy hot side water deposit buildup in area of the leaks.
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	October 2014
Sequence of events:	"A" Digester outlet device rake failure necessitated the shutdown of "A" side of the Fiberline. #5 RB taken off liquor at 17:48 April 28 and off gas at 00:10 April 29. Smelt bed had been burned off long before the leak was found. The leak was found visually through a liquor gun port at 04:30 while fire was still out. No ESP was executed.
Repair procedure:	Remove damaged tube and install a tube pup. Extensive VT & PT was conducted on other water wall tubes to check for other potential indications. Additional indications observed on the rear wall tube #84 were addressed by replacing the tube.
Future prevention:	Full inspection in September 2015 shutdown with chemical cleaning following inspection.

LOWER FURNACE

SPRING 2016 – 19	
Classification:	CRIT 859
Location:	**Canfor-Northwood Pulp, Prince George, British Columbia, Canada**
Unit:	RB1, 1966, Combustion Engineering, CA-64127, 2 Drums, Long Flow, Large Economizer, Steam Coil Air Heater, Forced Recirculation High Solids Concentrator
Unit Size:	4.00 MM lb ds/day; 658,000 lb/hr steam at 656 psig, 752°F, 750 psig design (MAWP)
Incident Date:	July 3, 2015
Downtime hrs, leak/total	Total time off liquor after knowledge of the leak was 179.5 hours
ESP?	**No.**
Leak/Incident Loc:	Rear wall Primary Airport Tube #44
How discovered:	Small amount of weak black liquor found running out of SE spout ~1 hour after off liquor, visual inspection from liquor gun port confirmed location
Wash adjacent tube:	There was severe localized pitting on the tuck tube adjacent to the leak that resulted in removing and replacing the tube.
Root cause:	Thermal fatigue
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	October 2014
Sequence of events:	Boiler taken off liquor to repair a leak on a West Dissolver steam agitator nozzle; firing natural gas at 88,000 lb/hr steam rate. Once off liquor for ~ 1 hour, small amount of weak black liquor found running out of left side rear most spout. Visual inspection from NE liquor gun port confirmed location of the tube leak.
Repair procedure:	Tube was removed, section replaced
Future prevention:	Routine dye penetrant inspections of all Primary Airports as well as castable inserts on rear wall to remove crotch plates. Future consideration given to other walls pending next visual inspection (May/June 2016).

LOWER FURNACE

SPRING 2016 – 20	
Classification:	CRIT 860
Location:	**Canfor-Northwood Pulp, Prince George, British Columbia, Canada**
Unit:	RB1, 1966, Combustion Engineering, CA-64127, 2 Drums, Long Flow, Large Economizer
Unit Size:	4.00 MM lb ds/day; 658,000 lb/hr steam at 656 psig, 752°F, 750 psig design (MAWP)
Incident Date:	February 2, 2016
Downtime hrs, leak/total	Total time off liquor after knowledge of the leak was 179.75 hours
ESP?	**Yes.**
Leak/Incident Loc:	West (left) sidewall Primary Airport Tube #20
How discovered:	Dropping feedwater residuals found during routine testing led to further investigation culminating finding a dark spot on the smelt bed
Wash adjacent tube:	Adjacent tube #19 found to have indication at its crotch plate attachment; excavation resulted in below Tmin thickness at site and resulted in tube replacement
Root cause:	Thermal fatigue
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	October 2015
Sequence of events:	Day shift Mill Field Engineer (MFE) noticed boiler feedwater residuals trending down at 3PM testing round. Systems checks made and information passed onto Shift Engineer and his shift relief. Around 7 pm the shift engineer observed PO4, OH ALK, and boiler water conductivity continuing to drop. Mill Field Engineer was instructed to check chemical feed lines for leaks and do draw down. No leaks found, chemical feed rates confirmed. Process explorer H2O to steam flow (Mass balance leak detection) showed < 2 t/hr deviation. At about 12:45AM the Recover Field Engineer 4th noticed a black out and what appeared to be a liquid inside primary port south side west end. He informed the Shift Engineer who also observed the same liquid .The primary air heater tell tails were dry showing no sign of a leak. The Steam Chief Engineer was called at 1AM; on his way in at 1:05AM. Assistant Shift Engineer went down to second floor RB#1 observation port, observed a cleaning bar being removed from west side south end of primary port covered in a thin clear liquid. The Shift Engineer initiated ESP 1:15AM. Physical indications of tube leak, PO4 residual dropping, OH alkaloid dropping, boiler water conductivity dropping, and black-out south primary west side, liquid observed inside primary port, port cleaning bar wet when inserted and removed from port. Nonessential personal evacuated to muster station. PG shift engineer notified ATG down, BTG curtailed (lack of steam). ESP check sheet 5-30 completed. Steam Plant Chief, Fiberline supervisors, Recaust operation, and Protection Office notified. CNCG & DNCG venting environmental notified.
Repair procedure:	Two tubes were removed and replaced
Future prevention:	Routine dye penetrant inspections of all Primary Airports. Evaluate opportunities and merits to retrofit the primary airport with cast nozzles that do not require attachment welds as was implemented on the rear wall.

LOWER FURNACE & SUPERHEATER

SPRING 2016 – 21	
Classification:	CRIT 861
Location:	**KapStone Paper & Packaging, North Charleston, SC**
Unit:	Recovery #9, 1964, Combustion Engineering, 564, 2 drums, cascade direct contact evap
Unit Size:	3.45 MM lb ds/day; 471,000 lb/hr steam at 600 psig, 715°F, 700 psig design
Incident Date:	May 14, 2015
Downtime hrs, leak/total	111 hours (total)
ESP?	**Yes**
Leak/Incident Loc:	Water wall leak at no. 7 load carrying oil burner; plus 7 Superheater leaks were found at stitch tie welds on hydro and repaired (not unusual to find on boiler hydros).
How discovered:	Loss of chemicals, blowing noise in general area,
Wash adjacent tube:	N/A
Root cause:	Under deposit corrosion, determined at next annual outage.
Leak detection:	N/A
Bed cooling enhance	Southland fire and safety with the use of NaHCO3
Last full inspection:	NDE inspection February 2015, no thickness readings below code
Sequence of events:	Water treatment vendor advised that R9 was losing chemicals, blowing noise was heard, ESP at 10:30AM, 12hr evac period, bed cooling, inspection, repairs.
Repair procedure:	Weld repair. Did NDT on similar tubes, no thinning found.
Future prevention:	Acid wash cleaning update, water treatment emergency training, leak detection training, TRASAR system and added alarms to logic. Replaced tube section Feb 2016 outage and acid cleaned the boiler.

BELOW FLOOR, LOWER FURNACE

SPRING 2016 – 22	
Classification:	Noncritical
Location:	**International Paper, Franklin, VA**
Unit:	RB6, 1977, B&W, PR-185, 2 Drums, Large Economizer, sloped to rear floor
Unit Size:	5.0 MM lb ds/day; 655,000 lb/hr steam at 1500 psig, 900°F, 1700 psig design (MAWP)
Incident Date:	January 26, 2016
Downtime hrs, leak/total	
ESP?	**No**
Leak/Incident Loc:	#1 spout panel tube to lower rear wall header weld
How discovered:	Observation on rounds
Wash adjacent tube:	No
Root cause:	Full penetration weld had not been made previously
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	September 2015
Sequence of events:	On 1/26/16 around 11:00 AM, water was observed spraying externally from the lower vestibule area above the east green liquor recirculation pump. Liquor firing was reduced at 12:00 PM and bed burn out begun. The boiler was taken offline at 4:50 PM for repairs using an orderly shutdown.
Repair procedure:	Installed a root weld with cap passes and seal weld the ends of the affected area.
Future prevention:	Replace lower headers on next annual outage.

BELOW FLOOR, LOWER FURNACE

SPRING 2016 –23	
Classification:	Noncritical
Location:	**International Paper, Franklin, VA**
Unit:	RB6, 1977, B&W, PR-185, 2 Drums, Large Economizer, sloped to rear floor
Unit Size:	5.0 MM lb ds/day; 655,000 lb/hr steam at 1500 psig, 900°F, 1700 psig design (MAWP)
Incident Date:	February 15, 2016
Downtime hrs, leak/total	
ESP?	**No**
Leak/Incident Loc:	Pinhole leak in rear wall tube above lower header
How discovered:	Observation on rounds
Wash adjacent tube:	No
Root cause:	Possible grinder knick on previous repair. Appeared to be a location of a previous repair. Tube had also been reduced to below ASME minimum when composite layer was removed.
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	September 2015
Sequence of events:	On 2/15/16 steam was observed coming from skirting at rear wall in lower vestibule. An air lance was used to get a clear visual confirmation that leak was coming from tube on lower wall header. Began backing down liquor and proceeding with orderly shutdown at 6:30 p.m. Boiler taken offline at 12:55 a.m. 2/16/16 for inspection/repairs.
Repair procedure:	Weld Repair
Future prevention:	On next annual outage install new lower wall headers with stubs to address the area of poor weld workmanship.

RISER

SPRING 2016 –24	
Classification:	Noncritical
Location:	**International Paper, Riverdale Mill, Selma, AL**
Unit:	RB2, 1981, Combustion Engineering, 28679, 2 Drum, Large econ, decant floor
Unit Size:	2.70 MM lb ds/day; 425,000 lb/hr steam at 1440 psig, 860°F, 1720 psig design (MAWP)
Incident Date:	November 27, 2015
Downtime hrs, leak/total	40.5 steam / 44 liquor
ESP?	**Yes**
Leak/Incident Loc:	Riser tube to steam drum, right hand sidewall, leak at riser side toe of weld to header
How discovered:	Operator round
Wash adjacent tube:	No
Root cause:	SAC
Leak detection:	Yes
Bed cooling enhance:	Yes
Last full inspection:	November 2015
Sequence of events:	Steam and condensate observed by first helper at steam drum on morning of November 27th. Could not confirm where leak was coming from. ESP of boiler. Found leak on right hand side wall at riser tube nearest steam drum. MT of adjacent tubes on RHSW did not find anything. MT of tube in same position on LHSW detected a crack. Repaired both tubes nearest steam drum. Performed bed cooling while repair took place. Performed successful hydro. No issues on boiler start-up.
Repair procedure:	TIG weld of root and fill passes.
Future prevention:	Perform additional NDT of all riser tubes at weld connections to header.

SPOUT

Spring 2016 - 25	
Classification:	CRIT 862
Location:	**Hood Container of LA, St. Francisville, LA**
Unit:	RB1, 1965, B&W, PR-85, 2-Drum, Large Economizer, Front-slope floor
Unit Size:	3.0 MM lb ds/day; 481,000 lb/hr steam at 600 psig, 750°F, 675 psig design (MAWP)
Incident Date:	March 21, 2015
Downtime hrs, leak/total:	0/21.5
ESP?	**No**
Leak/Incident Loc:	Crack in weld on inserted end of Valmet spout
How discovered:	Operator Rounds
Wash adjacent tube:	No
Root cause:	Thermal fatigue cracking initiating in an area of LOF (lack of fusion) in a weld on face of spout insert. Spout was installed April 2014.
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	April 2014
Sequence of events:	**3/19/15 - 3/21/15** Periodically having smelt rushes from both spouts with cooling water temperatures and flows reacting accordingly. **3/21/15** 23:30 – Operator was tending the spouts and noticed what he thought was water running down the trough along with smelt on the right spout. He notified his shift supervisor and control room operator of his suspicions. 23:45 – The shift supervisor and another operator verified that water was in the trough and at this time smelt was popping outside the doghouse. **3/22/15** 00:15 – The department manager was notified of the situation and with the information provided instructed the operator to pull liquor and burn the bed out while keeping everyone away from the spout deck. 00:30 – Pulled liquor 06:00 – Department management arrived and inspected the spout. The spout opening had crusted over and water was running down the trough. At this time it appeared that the leak was on the bottom of the trough. 10:00 – The char bed was burnt out and gas firing was reduced to begin cool down of the boiler. 11:00 – Gas fire out of boiler 13:30 – Performed LOTO of boiler and spouts 16:00 – Spout was removed and examined. The leak was on the spout face and not in the trough as first thought. The leak was at the 10:00 position of the spout insert and the water was running under the refractory and exiting on the bottom of the spout. 18:00 – The spout opening was inspected and no problems were detected. The refractory was intact and was decided that the replacement spout could be installed without pouring new refractory. 22:00 – Replacement spout installed, started cooling water system. Spout deemed ready for service.
Repair procedure:	Replaced spout.
Future prevention:	

SPOUT

Spring 2016 – 26	
Classification:	CRIT 863
Location:	**Hood Container of LA, St. Francisville, LA**
Unit:	RB1, 1965, B&W, PR-85, 2-Drum, Large Economizer, Front-slope floor
Unit Size:	3.0 MM lb ds/day; 481,000 lb/hr steam at 600 psig, 750°F, 675 psig design (MAWP)
Incident Date:	March 29, 2015
Downtime hrs, leak/total:	0/70
ESP?	**No**
Leak/Incident Loc:	Crack in weld on inserted end of Valmet spout
How discovered:	Operator Rounds
Wash adjacent tube:	No
Root cause:	Thermal fatigue cracking initiating in an area of LOF (lack of fusion) in a weld on face of spout insert. Spout was installed 3/22/15.
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	April 2014
Sequence of events:	**3/26/15 - 3/28/15** Periodically having smelt rushes from both spouts with cooling water temperatures and flows reacting accordingly. **3/28/15** 22:30 – Operator was tending the spouts and noticed what he thought was water running down the trough along with smelt on the right spout. He notified his shift supervisor and control room operator of his suspicions. 22:45 – The shift supervisor and another operator verified that water was in the trough and at this time smelt was popping outside the doghouse. 23:00 – The department manager was notified of the situation and with the information provided instructed the operator to pull liquor and burn the bed out while keeping everyone away from the spout deck. 23:30 – Pulled liquor **3/29/15** 06:00 – Department management arrived and inspected the spout. The spout opening had crusted over and water was running down the trough. At this time it appeared that the leak was also on the bottom of the trough. During the investigation it was determined that the left spout also had a pin hole leak on the upper flange where the hood was attached. 09:30 – Gas fire out of boiler 11:30 – Right spout leak was positively identified and the decision was made to replace both spouts due to leaks. 20:30 – Started water wash **3/30/15** 04:30 – Water wash complete: Initiated LOTO of boiler and spout systems 08:00 – Started removal of spouts and erecting scaffolding in the lower furnace 22:00 – Spout repairs complete, locks off, filling for hydro **3/31/15** 00:45 – Successful hydro: Locks off systems 03:00 – Gas fire in boiler 09:30 – Boiler on line 21:30 – Liquor to boiler (Liquor firing was delayed due to unrelated tankage issues).
Repair procedure:	Replaced both spouts.
Future prevention:	Sent failed spout out for analysis.

International ECONOMIZER

SPRING 2016 – x1143	
Classification:	
Location:	**Mondi Swiecie NA, Swiecie, Poland**
Unit:	RB4, 2015, Andritz A10169, 1 drum, large economizer, decant
Unit Size:	5.1 MMLB/d (2300tDS/d), 969,000 LB/HR (122.3 kg/s) steam, 1580 psig (109 bar(g)), 960F (515C)
Incident Date:	July 29, 2015
Downtime hrs, leak/total	54 h
ESP?	**No**
Leak/Incident Loc:	Economizer, pinhole in supply tube at weld to miniheader
How discovered:	Operator walkdown, water in economizer hopper.
Wash adjacent tube:	No
Root cause:	Shop weld porosity
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	July 2015
Sequence of events:	28.07.2015 – boiler was stopped because of disturbance on TG5 (turbine) 28.07.2015 – problem with ash conveyor (21413009) under economizer no. 2 29.07.2015 – Mondi and Andritz did the inspection of ash conveyor under economizer no. 2 (first shift) 29.07.2015 – Mondi and Andritz team found wet ash during inspection of ash conveyor under economizer no. 2 30.07.2015 – RB4 normal shutdown to repair the suspected leakage
Repair procedure:	Grind out defect, reweld.
Future prevention:	

International FLOOR

SPRING 2016 – x1144	
Classification:	
Location:	**Mondi Swiecie NA, Swiecie, Poland**
Unit:	RB4, 2015, Andritz A10169, 1 drum, large economizer, decant
Unit Size:	5.1 MMLB/d (2300tDS/d), 969,000 LB/HR (122.3 kg/s) steam, 1580 psig (109 bar(g)), 960F (515C)
Incident Date:	November 6, 2015
Downtime hrs, leak/total	138 h
ESP?	**Yes**
Leak/Incident Loc:	Floor tube 1/8" hole, The location of the leaking hole was found to be in the 17th bottom tube calculated from the right side wall to the left, just to front of boiler from floor center.
How discovered:	Control room, bed disturbance on char bed camera.
Wash adjacent tube:	Yes
Root cause:	Copper contamination cracking (liquid metal embrittlement) in a tube shop repair weld area, per lab report.
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	July 2015
Sequence of events:	06.11.2015 05:00 AM shift leader found a disturbance on smelt bed camera view (colder place than the rest of the smelt bed looking like a small„ volcano eruptions). During this time operators checked the trends in DCS (especially water-steam balance, flue gas temperature, pressure, etc.) - they didn't find any deviations. Additionally, they checked the boiler (walked down and listened to the difference in noise in the boiler house) - also nothing special was found. After a short discussion with operators and manager, recovery manager made the decision to push the buttons based only on the view/pictures from char bed camera. - 06.11.2015 09:22 ESP/RD activation! - 06-09.11.2015 – boiler cooling, water washing, inspection platform installation, inspection of cleanness of the superheaters, HPWW of the furnace floor in area of suspected leakage. - 09.11.2015 19:30 – leakage was located on the floor tube.
Repair procedure:	Replaced sections of 2 tubes.
Future prevention:	Improve the monitoring of the char bed area by adding one furnace camera (there will be 3 total bed cameras installed). A temporary third furnace camera is being installed to one of the existing B/L gun openings can be utilized. Plan is to install a permanent new camera in the annual shut-down 2016. Inspection of the welds between the floor panel sections welded by SAW tractor in the shop during the next planned shutdown.

International SPOUT

SPRING 2016 – x1145	
Location:	**Oji Fibre Solutions, Kinleith, New Zealand**
Unit:	RB4, 1972, CE CA70108, 2 drum, DCE, decant
Unit Size:	2.5 MMLB/d, 397,000 LB/HR steam, 650 psig, 752F
Incident Date:	March 31, 2015
Downtime hrs, leak/total	5.75 h
ESP?	**No**
Leak/Incident Loc:	Pinhole leak in side of spout trough, about half way down trough
How discovered:	By spoutman doing a round.
Wash adjacent tube:	
Root cause:	Thinning, unknown why. Discharge end of trough is weld overlaid, carbon steel was thinned before overlay, which had not been seen before on other spouts. Weld overlay starts with 1 to 10 smooth taper.
Leak detection:	Yes
Bed cooling enhance:	No

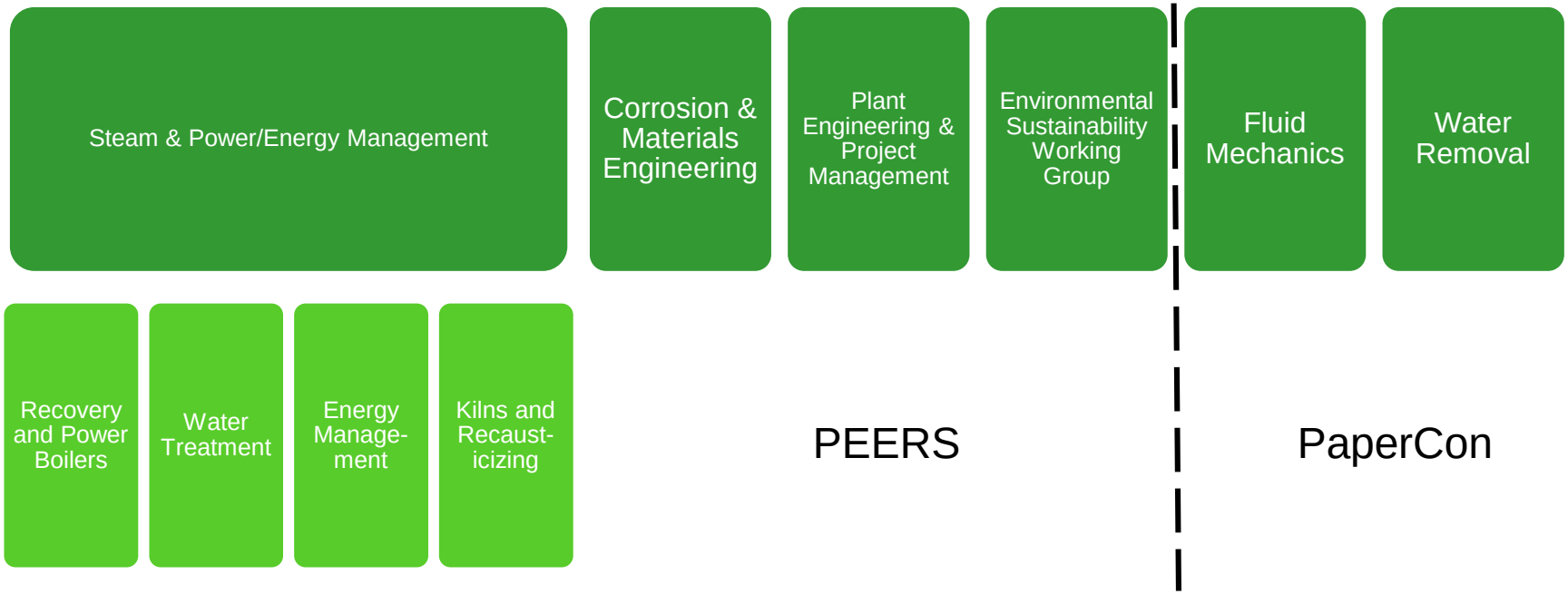
Last full inspection:	May 2014
Sequence of events:	The Recovery Boiler Operator called the Area Manager to report that he felt there was a spout leak on the boiler. This was immediately confirmed. Within the hour the boiler was taken off liquor, the spout water isolated after smelt flow stopped (and valve handle removed) and the leaking spout was plugged with refractory per the Mill standard procedure. The boiler continued to run on 3 spouts through to its planned annual outage which commenced May 3rd; the refractory plug did not leak. As is our standard practice all spouts were replaced in the annual outage. There have been no high smelt cooling water temperature excursions from the annual outage in May 2014 up to this incident
Repair procedure:	Replaced spout at annual outage.
Future prevention:	

International SUPERHEATER

SPRING 2016 – x1146	
Location:	**International Paper, Mogi Mill, Mogi Guaçu-SP, Brazil**
Unit:	RB#4, 1985, B&W, PR-208, 2 drums w/ cyclone DCE
Unit Size:	0,64 MM lb ds/day; 77,161 lb/hr steam at 400 psig, 622°F, 550 psig design (MAWP)
Incident Date:	August 30, 2015
Downtime hrs, leak/total	4h during ESP, 102.5h out for maintenance.
ESP?	**YES**
Leak/Incident Loc:	Sheared Second Bank Superheater 8th loop at roof penetration.
How discovered:	Pressure profile, field inspection.
Wash adjacent tube:	No.
Root cause:	Wear due to contact between tube and nearby plate.
Leak detection:	Not available.
Bed cooling enhance:	Not used.
Last full inspection:	Sep/2014.
Sequence of events:	At 3:37pm the boiler tripped due to high furnace pressure. To start up the boiler, the operator had difficulties to release the air draft fan and tertiary fan. Furnace pressure sustained high values and pressure tapping was clean, with steam valve to cyclone closed. After the furnace pressure was normalized, the operator started to purge the boiler, turned on the fuel oil burner when he realized that the boiler pressure and outlet steam pressure were low. The oil burner was then shutdown, steam to sootblowers closed, and the air fan for sootblower sealing was stopped to inspect the boiler, which showed other signs of internal water release due to noise and vibration. The inspection was made by the field operator and shift supervisor. The panel operator was asked to perform the ESP and all personnel left the boiler using the emergency exit route. The graph below taken from the boiler panel shows the pressure and temperature profiles during the incident. Four hours after the ESP was activated, the area was safe and we inspected the boiler by inspection doors with no unusual conditions detected. The thermocouples were installed to monitor char bed temperature until it achieved 420 °C (788 °F). The boiler was later waterwashed and proceeded to a major outage previously scheduled for maintenance. During this outage, the interior was inspected and the fracture point detected between the boiler and penthouse, at secondary superheater's 8th loop. 6 tubes were replaced and the structure was reinforced to prevent future incidents. No further damage detected.
Repair procedure:	Tubes replaced, total of 6
Future prevention:	Support beam and clamps to hold tubes added during the outage.

APPENDIX B
TAPPI REPORT
SLIDES

Engineering Division



Division Goals

- Work with TAPPI staff to keep Fall & Spring conferences serving the needs of membership and financially sustainable
- Organize the PEERS Conference jointly with the Pulp Manufacturing Division
- Recognize outstanding technical contributions, leadership & service, and support student education through annual awards
  - ensure viable funding for major awards and scholarships
- Support the division committees
- Maintain succession plans for council positions
- Encourage Mill participation in conferences, committees and TIPS

Maintain Technical Relevance to Mills,
Research Institutions and Suppliers!

Committee Meetings

	Spring			Fall
	TAPPI HQ	BLRBAC	PaperCon	PEERS
Engineering	✓			✓
Steam & Power/Energy		✓		✓
Corrosion & Materials				✓
Plant Project Engineering				✓
Environmental, Sustainability				✓
Fluid Mechanics			✓	
Water Removal			✓	

Committee Activities

- Anticipate problem areas and develop new task group activities and TIPS to address the issues
- Provide information on relevant manufacturing operations and equipment
  - 111 Engineering TIPS
  - Conference proceedings
  - Journal or book publications
  - Committee meeting presentations and discussions
- Organize the conference tracks
- Any TAPPI member can participate in committee activities

TIP Update

Recent C&ME TIPS

- 0402-36 Guidelines for detection, monitoring and prevention of flow accelerated corrosion (FAC) in the pulp and paper mill
- 0402-38 Best practice guidelines for detecting and mitigating waterside cracking (stress-assisted corrosion) in power and recovery boilers

Last three S&P/EM TIPs published:

- 0416-24 Energy Checklist for the Pulp Mill
- 0416-25 NOx Emission Control in Biomass and Recovery Boilers
- 0416-26 Optimizing Recovery Boiler Inspection Scope

S&P/EM TIPs in the works:

- Green Liquor Density Measurement
- Boiler Inspection Implementation
- Kiln Brick Selection