BLACK LIQUOR RECOVERY BOILER
ADVISORY COMMITTEE

MINUTES OF MEETING
Crowne Plaza Hotel/Atlanta Airport
October 5, 6 & 7, 2015

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

Spring	**April**	**4, 5 & 6**	**--**	**2016**
Fall	**October**	**3, 4 & 5**	**--**	**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**

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

■ Past Chairman Lon Schroeder

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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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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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No meeting was held in October 2015.

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‡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** International Paper 568 Shore Airport Road Ticonderoga, NY 12883-9699 Tel: 518-585-5305 tom.wranosky@ipaper.com	**Tanakit Chummontean** Phoenix Pulp & Paper Knonkaen, Thailand Tel: +66 4343 3104-6, Ext. 5302 tanakich@scg.co tanakich@scg.co.th

‡ Denotes attendance at the October 2015 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**	**Meville Hedges** Babcock & Wilcox 2302 Parklake Drive, NE, Suite 300 Atlanta, GA 30345 Tel: 770-621-3907 **mhedges@babcock.com**	‡**Olli Kujanpaa** Georgia Pacific Corp. Address: City, State Tel: **olli.kujanpaa@andritz.com**
‡**John Lewis** Fluor Daniel Forest Products 100 Fluor Daniel Drive Greenville, SC 29607-2762 Tel: 864-517-1683 **john.lewis@fluor.com**	‡**Pasi Miikkulainen** **Andritz** **(need info.)**	‡**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**	Thomas Gray Weyerhaeuser Address: City/State Zip Tel: **thomas.gray@weyerhaeuser.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** **(need info.)**

‡ Denotes attendance at the October 2015 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**
Claude Gauthier, P.E. The Purolite Company P.O. Box 308, Paris, Ontario Canada N3L 3G2 Tel: 800-461-1500 Tel: 519-448-4512 **cgauthier@puroliteUSA.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**
Steve Hoefs Nalco Company 1601 W. Diehl Road Naperville, IL 60563-1198 Tel: 630-305-1461 Cell: 262-313-8036 **shoefs@nalco.com**	‡**Norris Johnston** Solenis LLC 37 Hough Road Lacey's Spring, AL 35754 Tel: 256-650-0049 Cell: 256-520-1011 **nnjohnston@ashland.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**

‡ Denotes attendance at the October 2015 meeting.

WATER TREATMENT SUBCOMMITTEE - (Cont.)

‡**Sam Lewis** Delta Training Partners, Inc. 4020 Oleander Drive Wilmington, NC 28403 Tel: 910-790-1988 **slewis@deltatraining.com**	‡**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 October 2015 meeting.

Registered for the meeting were:

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

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

Acuren
Griffin, Timothy, Neenah, WI
Leonard, Mike, Sandston, VA

AHR Metals
Rettig, Mark, Bessemer, AL
Rettig, Shari, Bessemer, AL
Sullivan, Mike, Bessemer, AL

AirTek Construction
Baines, Troy, Troy, AL
Shanahan, Dennis, Summerfield, FL

Alstom Power
Bush, Joe, Chattanooga, TN
Harmon, John, Windsor, CT
Hollenbach, Dennis, Windsor, CT
Kistka, Gerry, Jacksonville, FL

AMEC Foster Wheeler
Wasson, Eric, Charlote, NC

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

American International Group (AIG)
DeBeer, Thomas, Woodstock, GA

Andritz
Antikainen, Mikko, Alpharetta, GA
Burnner, Ben, Alpharetta, GA
Carter, Tim, Alpharetta, GA
Deegan, Bill, Alpharetta, GA
Freitas, Fabio, Curitiba - Brazil
Gazsi, Andrew, Enfield, CT
Herod, Chris, Alpharetta, GA
Imig, Greg, Alpharetta, GA
Andritz (Cont.)
LeBel, Mark, Alpharetta, GA
Merriman, Nick, Graz, Austria
Miikkulainen, Pasi, Alpharetta, GA
Phillips, John, Alpharetta, GA
Pulkka, Antti, Varkaus, Finland
Reddinger, Melissa, Iron Mountain, MI
Ribeiro, Christian, Curitiba - Brazil

Andritz (Cont.)
Silva, Ageu, Curitiba, Brazil
Soderlund, Harri, Alpharetta, GA
Timotheo, Alvaro, Alpharetta, GA
Wolfe, Jeff, Alpharetta, GA

Arcole Power
Krushinski, Jay, Cheyenne, WY
Vernes, Phil, Cheyenne, WY

Atlantic Combustion Technologies
Digdon, David, Amherst, NS, Canada

ATS Lab
Thomas, Brad, Marietta, GA

AZZ
Fair, Lewis, Winston, GA
Power, Stacy, St. Petersburg, FL

Babcock & Wilcox
Blair, Michael, Loveland, OH
Blazer, Phil, Charlette, NC
Coley, Lance, Atlanta, GA
Hansen, Kenneth, Barberton, OH
Jenny, Paul, Atlanta, GA
LeClair, Amber, Barberton, OH
Muckley, Heather, Barberton, OH
Osborne, Steve, Barberton, OH
Phinney, Michael, Fordland, MO
Schwartz, Eric, Barberton, OH
Trivett, Michael, Vancouver, BC
Youssef, Simon, Lancaster, OH

Beecher Carlson
Eaves, Dennis, Berkeley Lake, GA

Buckman Laboratories
Call, Fred, Newry, ME
Ruemmele, Colin, Memphis, TN

ChemTreat
Graham, Jim, Collierville, TN

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

Clearwater Paper Corporation
Beck, Justin, Lewiston, ID

Clyde Bergemann
Miller, Mark, Atlanta, GA
Tandra, Danny, Atlanta, GA

Registered for the meeting were:

Delta Training Partners
Lewis, Sam, Wilmington, NC

Des Global, LLC
McClain, Cliff, Greenville, SC

Diamond Power Specialty
Bergstrom, Henrik, Stockholm, Sweden
Stubbings, Mike, Halifax, NS

Domtar
Davenport, George, Plymouth, NC
Dunn, Jonathan, Plymouth, NC
Modlin, Mike, Plymouth, NC
Roscoe, Michael, Plymouth, NC
Worsham, Jesse, Bennettsville, SC

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

Energy & Environmental Tech
Brown, Michael, Jacksonville, AL

Envirovac
Baxter, Rick, Fruitdale, AL
Bishop, Fred, Atlanta, GA
Owens, Ed, Fruitdale, AL
Williams, Kenny, Savannah, GA

Expera Specialty Solutions
Nichols, Terry, Old Town, ME

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

Flotech
Gorny, Thomas, Jacksonville, FL

Fluor Daniel Forest Products
Lewis, John, Greenville, SC

FM Global
Cooke, Craig, Oconomowoc, WI
Crysel, Scott, Plano, TX
Hoffman, Daryl, Plano, TX
Huelsbeck, Kevin, Sherwood, WI
Hume, Everett, Norwood, MA
Labonté, Guy, Montreal, Que.
Lang, Dave, Plano, TX
Matarrese, Rick, Alpharetta, GA
Matarrese, Rick, Alpharetta, GA
Morgan, Rick, Plano, TX
Onstead, Jimmy, Plano, TX
Paine, Matt, Norwood, MA

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

Fuel Tech
Bohlen, Scott, Warrenville, IL

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

Georgia-Pacific
Flach, Don, Phoenix, AZ
Guerrero, Alexander, Cedar Springs, GA
Hill, Wes, Atlanta, GA
Jelinek, David, Green Bay, WI
Kirkland, Aaron, Cedar Springs, GA
Kujanpaa, Olli, Atlanta, GA
Lane, Terry, Brunswick, GA
Miller, William K., Brunswick, GA
Morency, Karl, Atlanta, GA
Sherlock, Bentley, Atlanta, GA

Glatfelter, P.H.
Forry, Jeffrey, Spring Grove, PA
Plappert, William, Spring Grove, PA

Global Risk Consultants
Garfield, Michael, Lowell, ME
Macaulay, Charles, Snoqualmie, WA
Smith, Andy, Woodstock, GA

GT Consulting Services
Thorslund, Gunnar, Stockholm, Sweden

Harbison Walker International (HWI)
Hersh, Chris, Pittsburgh, PA

Harmac Pacific
Jellema, Marinus (Rinus), Nanaimo, BC

Hood Container of Louisiana (prev. KPAQ)
Boatner, Bryan, St. Francisville, LA
Terrell, Carl, St. Francisville, LA

International Paper
Adams, Wayne, Clinton, NC
Blackard, Vernon, Loveland, OH
Byrd, Joel, Loveland, OH
Camp, William, Prattville, AL
Franklin, Charles, Pine Hill, AL
Frazier, David, Evans, GA
Fuhrmann, Dave, Loveland, OH
Krekeler, Daniel, Loveland, OH

Registered for the meeting were:

International Paper (Cont.)
MacIntire, Wayne, Loveland, OH
Navojosky, Frank, Loveland, OH
Stevens, Jeff, Memphis, TN
Vieira, Leonardo, Luiz Antonio, Brazil
Wranosky, Tom, Ticonderoga, NY

Interstate Paper
Helmuth, David, Townsend, GA

Irving Pulp & Paper
Clark, Chris, Saint John, NB
Glenn, Matthew, Saint John, NB

Jansen Combustion
Berz, Marcel, Kirkland, WA
La Fond, John, Kirkland, WA
Verloop, Arie, Kirkland, WA

Kapstone Paper
Burns, Gregory, Charleston, SC
Coyne, Joe, Charleston, SC
George, Tim, Roanoke Rapids, NC
Judy, Gary, Charleston, SC
Putman, Robert, Charleston, SC
Simmons, Leroy, Charleston, SC
Walker, Steve, Roanoke Rapids, NC

K-Patents
Betts, Herb, Naperville, IL
Pyörälä, Keijo, Naperville, IL

Lewis B. Bringmann
Bringman, Lewis, Baltimore, MD

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

Marsh & McLennan
Gobin, Nick, Vancouver, BC

MPW Industrial Services
Chandler, Nathan, Hebron, OH
Elam, Monty, Hebron, OH
Houseal, Bradford, Hebron, OH
Houseal, Bradford, Richmond Hill, GA
McGraw, Bob, Hebron, OH

Nalco
Olavessen, Len, Nederland, TX
Vittum, Michael, Winterport, ME

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

Packaging Corp. of America
Fiala, Brian, Tomahawk, WI
Lykins, Michael, South Elgin, IL
Parks, Kurt, Valdosta, GA
VanDyke, Alan, Valdosta, GA

Peerless (Prev: CCA Combustion)
Schindler, Nathan, Monroe, CT

Phoenix Pulp & Paper
Chummontean, Tanakit, Bangkok, Thailand

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

Process Engineering
Ray, Allen, Birmingham, AL

Purolite
Burinsky, Frank, Bala Cynwyd, PA
DeStefano, Frank, Bala Cynwyd, PA
Downey, Don, Bala Cynwyd, PA

Rayonier
Dean, Sam, Jesup, GA
Gray, John, Fernandina Beach, FL
Porter, Daniel, Fernandina Beach, FL

Resolute Forest Products
Boisvert, André, Montreal, Que.

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

Registered for the meeting were:

Robius & Morton
Lawton, Roger, Atlanta, GA

Sappi Fine Paper
Aderman, Craig, Westbrook, ME
Edgcumbe, Chris, Cloquet, MN
Voltzke, Richard, Westbrook, ME

Smurfit Kappa
Franco, Daniel, Cali, Columbia

Solenis
Durham, Virginia, Wilmington, DE
Hollimon, Lee, Pensacola, FL
Johnston, Norris, Lacey's Spring, AL

Thompson Construction Group
Halbig, John, Hanahan, SC
Long, Al, Greenville, SC

Thompson Industrial Services
Harry, Todd, Sumter, SC
Jackson, Dwayne, Sumter, SC

United Dynamics
Cavote, Jon, Brooks, KY

Valmet Automation
Borduas, Pierre, Charlotte, NC
Burelle, Raymond, Charlotte, NC
Farmer, Robert, Charlotte, NC
Johnson, Dewey, Charlotte, NC
Karjunen, Timo, Charlotte, NC
Ries, Nancy, Charlotte, NC
South, John, Charlotte, NC
Swayne, Greg, Charlotte, NC
Weikmann, John, Charlotte, NC

Verso
Ashbeck, Steven, Wisconsin Rapids, WI
Hicks, Tim, Orrville, OH
Hutchins, Matt, Wisconsin Rapids, WI
Ja'arah, Majed, Memphis, TN

WestRock
Albert, Bruce, West Point, VA
Andrews, John, Charleston, SC
Campbell, Robert, West Point, VA
Fullington, Scott, Tacoma, WA
Lanier, Dustin, West Point, VA
Madison, Brad, Panama City, FL
Moyer, Scott, Green Cove Springs, FL
Murch, Doug, Richmond, VA
Sanders, Doug, Cottonton, AL
Sargent, Caleb, Covington, VA
Shirley, Wade, Cottonton, AL
von Oepen, David, Demopolis, AL
Walker, Sayed, Fernandina Beach, FL
Wood, Jason, Covington, VA

Weyerhaeuser
Bahng, Thomas, Grande Prairie, Alberta
Benning, Rick, Grande Prairie, Alberta
Bilodeau, Joe, Grande Prairie, Alberta
Bouchard, Henri, Grande Prairie, Alberta
Holley, Steven, Columbus, MS
Knowlen, Bruce, Federal Way, WA
Thomas, Chris, Columbus, MS

XL GAPS (XL Global Asset Protection Services)
Franks, James, Somerville, TN
Sides, Michael, Ocoee, FL

Zeeco
Langstine, Robert, Lawrenceville, GA

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MAIN COMMITTEE MEETING

INTRODUCTION – John Gray - Chairman: Good morning! Welcome to the Fall 2015 BLRBAC Main Committee Meeting!. Thank you all for being here and participating 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 all meetings, including this session, are to be held in strict compliance. Discussions involving pricing, pricing policy or any restraints on competition are not allowed.

We will begin with some introductions. I'm John Gray, Rayonier Advanced Materials, Chairman; David VonOepen of RockTenn, Operating Company Representative and I will be filling the role of Vice Chair this session; Everett Hume, FM Global, Secretary; Len Olavessen, Nalco, Treasurer; John Phillips, Andritz, Manufacturer Company Representative; Jimmy Onstead, FM Global, Insurance Company Representative; Everett Hume , FM Global, Secretary. Not with us today is David Slagel, Weyerhaeuser, Vice Chairman.

OLD BUSINESS

1. **ACCEPTANCE OF THE FALL 2014 MEETING MINUTES** – John Gray

   Acceptance of Minutes from the Spring 2015 Session. The Meeting Minutes from the Spring 2015 Session were posted on the BLRBAC web site for review. It has been up for approximately 3-1/2 months. Does anyone have corrections to those minutes as posted? Can I get a motion to accept those Minutes? Can I get a second? All in favor? All opposed? Thank you – The Spring 2015 Meeting Minutes have been unanimously approved.

   Any other old business that anyone would like to discuss? Moving on……

NEW BUSINESS

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

NEW REGULAR MEMBERSHIP - None at this time.

NEW ASSOCIATE MEMBERSHIPS

Thompson Construction Group - South Carolina
John Halbig has been designated as the Associate Representative
Al Long has been designated as the Alternate Associate Representative

NEW CORRESPONDING MEMBERSHIPS – None Reported

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

REGULAR REPRESENTATIVE CHANGES

Swiss Re

Joe Lynch is the designated Representative
Jose Moran is the new named designated Alternate Representative

ASSOCIATE REPRESENTATIVE CHANGES

Peerless Manufacturing

Nathan Schindler remains the designated as the Representative
Allen Adiani replaced Brian Clapper as Alternate Associate Representative

CORRESPONDING MEMBERSHIP CHANGES - None Reported

MEMBERSHIP COMPANY NAME CHANGES

Hood Container of Louisiana - Previously known as KPAQ Industries
Carl Terrell has been designated as the Representative
Van Strahan has been designated as the Alternate Representative

Peerless Manufacturing - CCA Combustion Systems now a division of Peerless Mfg.
Nathan Schindler has been designated as the Representative
Allen Adriani has been designated as the Alternate Representative

WestRock - Merger of Rock-Tenn and Mead Westvaco
Scott Moyer has been designated as the Representative
David VonOepen has been designated as the Alternate Representative

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 6 of 7 members present. We discussed a host of administrative items. A couple of the highlights:

- First, relative to recent questions brought up about the procedures and protocols for approving proposed Subcommittee document changes: Appendix B, Section 6 of the our Operating Policies and Procedures states that proposed changes must have been posted on the website for at least two months ahead of any vote by membership. But Appendix B further states that if during that two month period no changes are made, or changes are only editorial in nature, the document can be presented at the Wednesday Main Committee meeting for a vote.

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

Looking specifically at the proposed changes to the Waste Streams document discussed during the Operating Problem Solving Session yesterday – the Executive Committee feels the membership comments on Item 3 of Paul's list of proposed changes (and Item 3, remember, pertains to when it is acceptable to disengage the igniter when burning CNCG's) - we deem yesterday's membership comments to only require editorial changes to Paul's document.

However, after further review the Executive Committee has an additional concern around the some of the other wording of this item, and so we have asked Paul and his subcommittee to review it one more time prior to a vote. So what Paul will present later on in this meeting for membership vote will only be the first two proposed changes he reviewed yesterday. You will see this in just a few minutes. But moving forward, editorial changes made as a result of a Tuesday review will not automatically preclude a document from being voted on the following day.

- BLRBAC Registration – This meeting we were able to process at door credit card payments for the first time, and by all accounts that process went very smoothly and was very well accepted. The Executive Committee will be working to expand this to include the ability for members to register in advance via the BLRBAC Website. This option could be ready as early as Spring 2016, so keep an eye on the website as you think about registering for the next meeting.

- Lastly, the Executive Committee has been studying the possibility of altering the BLRBAC Meeting dates to better accommodate membership attendance. Specifically, we are looking at possibly moving the Spring meeting from the 1st week of April to mid-May, and the Fall meeting from the 1st week of October to either late October or very early November. For now no official changes have been made to any of the posted meeting dates on the website, but we would encourage you to visit the website often to confirm future dates as we move forward.

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

The attendance for this meeting was 201 Advance Registrations and 41 At Door Registrations. We had 19 paper companies; two insurance companies; four boiler companies; 32 Associate member companies; and four guests of member companies. Off-shore members - we had five; one each from Finland, Sweden, Austria, Brazil, and Colombia.

We discussed a 2016 budget at the Executive Committee meeting yesterday and the Executive Committee approved the following budget for 2016:

3. **TREASURER'S REPORT** – (Cont.)

We have an anticipated revenue of the same average Advance Registrations and At Door Registrations for a total of $66,000.00. The budget for 2016 includes $37,000.00 for Crowne Plaza Hotel for the year covering direct charges for use of the hotel facilities; Said & Done charges will be $13,800.00 which represents a $50.00 per month increase in 2016 over what we paid them in 2015. The ESP Secretary receives $6,000.00 per year. Travel expenses for Said & Done's support here and for the ESP Secretary's is budgeted at $3,500.00. Accounting services, since we are a corporation, we need to have really precise records was $4,000.00 per year. Credit card equipment lease is $1,000.00 per year. That $1,000.00 includes the percentage of each transaction that we pay as a service fee. We pay anywhere from about 1% of the charge to about 1-1/2%. So if you give me $200.00, we lose 1-1/2% of that to service charges.

Office expenses are $3,500.00 which is up $500.00 from last year. The reason for that is we anticipate having to replace some of the equipment as needed. Record storage - we now have a flood-proof, fire protected storage area for the old records, including the paper records from the inception of BLRBAC up to about the mid-80's or earl 90's. We keep that and it costs $864.00 per year. We are keeping a legal expense account of $1,000.00, just as a reserve. Now that total comes to $70, 664.00. So it will be necessary to draw down our checking account by $4,664.00 to balance the budget verses the budget from registration.

Our current cash-on-hand as of today in the checking account is $104,977.97. Our anticipated expenses for the remainder of the year are approximately $25,300.00; so our anticipated yearend cash on hand is $79,677.97. So you can see where we are willing to draw down our checking account rather than raise registration fees.

As I said, this budget was approved at the Executive Committee meeting yesterday. Any questions?

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

Nothing substantial to report other than I think you will see that last spring's minutes and comments and new document guidelines which were approved have been put up quickly for review. I would ask you to look at the web site frequently to see what is new and what has been posted. Starting today we are also going to make sure that when we do post comments or documents up on the web site , you will get an e-mail notification that something new has been posted. This way we can work within that 60-day period of comments so that members get an official notification that it is there. We will add that component to what is currently posted. Also if we do make any adjustments as was noted to the meeting schedules in the future, we will get those up under the "What's New" banner that is on the front of the web page as well.

Any comments that you have on the web site that you're not getting

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.

No changes are made to the database until written notification is received (letter or e-mail are acceptable). I keep a file folder for each member company that includes correspondence naming the Representative and Alternate for each organization. These letters usually contain the e-mail addresses I must have in order to maintain the BLRBAC database.

Therefore, be sure that I have your current working e-mail address. BLRBAC notice of meetings and meeting minutes will only be sent via e-mail. If an e-mailed notice is returned to me as "undeliverable," that e-mail address will be deleted from the BLRBAC database after a second attempt has been made.

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 current Registration Form.

4. **SECRETARY'S REPORT** – (Cont.)
SECRETARIAL SERVICES REPORT – (Cont.)

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.

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 –** Tom DeBeer reporting for Bruce Knowlen

The subcommittee meeting opened at 1:07 PM on October 5, 2015. It began with a reminder of the BLRBAC Anti-Trust Policy. The minutes from the Spring 2015 meeting were also read and unanimously approved by all members present.

Introductions were then made of all in attendance. There were 5 of 10 members and 15 guests present.

Membership changes:

Removed	Lino DiLeonardo, Zurich, sent word that he could not attend future BLRBAC meetings and requested to be removed from the subcommittee
New*	Bentley Sherlock, Georgia Pacific, requested to be a member.
	Dan Krekeler, International Paper, requested to be a member.
	*Additions to be voted on at the Spring 2016 meeting
Vice Chairman:	Chad Harrod has requested to be removed from this position. Tom DeBeer agreed to serve as Vice Chairman of Auxiliary Fuels to replace Chad.

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

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

New Business

No new items for discussion were brought forward for discussion

Old Business

Several document changes have been worked on and previously agreed to in previous meetings. At this Fall meeting, placement of these in specific locations in the SFAF document were resolved and approved by vote. These will be forwarded on to the Executive Committee and then to the membership for consideration and publication. Changes are as follow:

a) Major Maintenance Outage –

Add the definition of maintenance outage in Chapter 2, Definitions.

Replace term "annual type outage" and reference to "12 months"with this term in three sections of the document. This is to remove the specific period.

b) Managed System –

To explain the term "Managed System", which has been used in the SFAF document, a definition for will be added to Chapter 2. The text was agreed on by the committee at the Spring 2015 meeting.

c) Furnace Purge Revision –

A clarification of the SFAF Section 4.1, Furnace Purge, will replace similar text. An addition to the same section will address precipitator power. The text was also included in the Spring 2015 meeting minutes.

d) Precipitator –

The subcommittee agreed that a definition of a precipitator is needed. The one from the Instrumentation Subcommittee document is being copied and will be added to SFAF, Chapter 2.

Superheater Clearing at Start-Up

Another topic discussed briefly at a previously meeting was the interest in warning operators about the importance of clearing the superheater and avoiding overheating. Using existing text from SFBL, a new section will be added in Chapter 6.1.14, as follows:

Prior to the recovery boiler coming on line and producing steam, flue gas temperatures entering the superheater must not exceed OEM recommended levels (typically < 900°F) regardless of fuel being fired. Operators should ensure that all superheater tubes have been cleared of condensate allowing cooling steam flow through all superheater tubes prior to allowing flue gas temperatures to exceed the manufacturer's recommended level. Most recovery boilers are equipped with superheater outlet tube thermocouples. These thermocouple readings will tell the operator when the individual platen clears of condensate

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

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

with a characteristic "pop" or jump of approx. 50-75°F in the metal temperature. Operating procedures and practices should be developed and operators trained to recognize that the boiler should not be placed in the header until all superheater tubes are cleared of condensate.

This text was passed by vote.

It was also recognized that this should also appear in the SFAF logic charts. Under consideration were placements in Figures 4, 10, 17, and 21 as a dotted box, operator action. Explanation as follows:

Logic Diagram Block	**Purpose**	**Hazard Protected Against**
Superheater cleared of condensate, Boiler on-Line Refer to Section 6.1.14	Superheater loops/platens all cleared of condensate. Boiler on-line and in the header producing steam. Ensure boiler is stable on auxiliary fuel firing.	Prevent possible short term overheat of superheater tubes as a result of water/condensate blocking cooling steam flow through the superheater circuits

Completion of this work is planned in the Spring 2016.

Chapter 5 Tables, AUDIBLE ALARMS AND VISUAL INDICATORS
A suggestion and an ongoing effort was given to the SFAF subcommittee to review information in Tables 11 and 12 to determine the appropriate BLRBAC subcommittee to own these particular topics. This will be an agenda item for a future meeting. Subcommittee members were asked to provide to the chairman what items can be removed from the Safe Firing of Auxiliary Fuel document for more appropriate management by another BLRBAC committee.

With several topics and additional document considerations pending, the subcommittee expects to continue work at the Spring 2016 BLRBAC meeting.

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

SFBL Subcommittee Meetings – Monday 8:30 AM (CLOSED) and 01:00 PM (OPEN). Sub-Chair meeting on Monday 4 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.

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

- Introduced members and guests. 13 of 18 members present and 25 guests in open meeting.

- Reviewed and approved the Spring 2015 meeting minutes.

- Review any open items brought up to the subcommittee before the Fall 2015 Meeting.
  - Emulsion cooled liquor guns proposed language change and review of system if needed. Ch. 13 Item 9. Proposed language from Mark Sargent and Len Erickson.

Have wording voted and approved by SFBL to submit to Executive Committee.

- Common definition discussion status.

Have wording voted and approved by SFBL for new "managed system" definition to submit to Executive Committee.

- Refract wording proposal from Instrumentation Subcommittee.

Have wording voted and approved by SFBL to submit to Executive Committee.

- Discussion with Dave Bordeau on SFBL RGP document proposed changes.

Agree with additional alarms listed and figure updates. Majed Ja'ah and Vernon Blackard will work on document to vote on next meeting.

- Open item discussion from members and guests.
  - Reviewed DT explosion incident from Orange Texas mill on July 10 2015.

Mark Sargent to work on wording for stopping sootblowers for any MFT due to Orange Mill running sootblowers for several hours after boiler tripped and contributed to spout plugging issue and DT explosion.

Rick Spangler and Daniel Franco presented information on the spout flow restrictors used at Columbia.

Reviewed follow up item status from Dissolving tank incident from RockTenn by Scott Moyer.
Feb 24, 2015, incident date. Two dissolving tank CE unit at Panama City Mill. Majad Ja'arah and Vernon Blackard to submit proposed figure and alarm updates for vote on next meeting.

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

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

- 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.

- Propose Tom Wranosky of International Paper Ticonderoga RB manager as vice chair of SFBL Subcommittee with Executive Committee approval requested.

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

The ESP Subcommittee met in closed session on Monday October 5, 2015 with 11 of 13 members represented. The Subcommittee met in open session on Tuesday morning October 6th, 2015 with 11 members represented and about 160 guests.

During the closed session, the committee discussed several membership changes. With the retirement of John Andrews and the coming retirement of Wayne MacIntire, Frank Navojosky and Scott Moyer were recommended as new Operating Company representatives. John Andrews has agreed to continue as Subcommittee Chair as an Associate Member.

During the open session, the Subcommittee reviewed 33 incident reports from North America and 4 International Incidents. Of the 33 incidents, there were no Smelt Water Explosions reported. Two Dissolving Tank Explosions were reported, one of which had been reviewed in the Spring Meeting but the report was not received in time. Ten (10) of the reported leaks were classified as critical incidents and 16 were non-critical incidents. There was one Smelt Spout Leak reported. Three of the reports were for incidents where an Emergency Shutdown Procedure (ESP) was performed but no leak was found. An ESP was performed in 11 of the incidents including 6 of the critical incidents representing 60% of the critical incidents that should have been ESP'd.

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:

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

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:

- 10 – Economizer
- 2 – Superheater
- 5 – Upper Furnace
- 4 – Boiler Bank
- 2 – Lower Furnace
- 2 – Penthouse
- 2 – Dissolving Tank Explosions
- 1 – Smelt Spout Leak
- 3 - ESP with No Leak Found

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 green dot is for the Spout Leak and the two brown dots represent the Dissolving Tank Explosions. The blue dots represent the suspected location of the leak for the incidents of an ESP with no leak found.

Incidents by Boiler Type

The incidents by the number of drums and the back end arrangement were reviewed. There were 6 incidents reported in a single drum unit and 27 incidents reported in two drum units.

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

Seven of the reported incidents were in boilers with Cascade Evaporators and 4 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:

- 8 – Thermal or Mechanical Fatigue
- 9 - Weld Failure
- 3 - Erosion or Corrosion Thinning
- 4 - Mechanical Damage
- 4 - 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 21 of the leaks (64%) and shows that operators are continuing to be diligent in looking for leaks. Seven of the leaks (21%) were identified by indications in the control room. Two leaks (6%) were initially indicated by the leak detection system installed. Three leaks (9%) were found during a hydrostatic test during an outage.

Leak detection systems were reported to be installed on units in 22 of the incidents (67%). The leak detection systems were credited with providing the initial indication of 2 leaks and confirmed 2 additional leaks.

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 less than 1 minute to 4:01 hours. The median time to initiate the ESP was about 15 minutes which is shorter than previous years.

Incident Review

Figure 2 shows the critical incidents reported each year. We had a total of 25 for the year which is about at the recent average. Figure 3 shows the history of Recovery Boiler Explosions showing the recent smelt water explosions in 2012 and 2014.

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

Figure 4 shows the history of reported dissolving tank explosions with the two that were reported at the meeting. 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 0.486 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, remained under 0.9 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 18,000 total recovery boiler operating years in the BLRBAC data base 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 191 active recovery boilers listed, 150 in the US and 41 in Canada. In the US, the average age is 37.8 years and the oldest is 63 years. The average age in Canada is 37.7 years and the oldest boiler is 68 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.

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.

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

- If operating two dissolving tanks in series, review system to assure dilution is going to proper tank at all times – including emergency dilution
- Make sure condensate contamination protection systems are adequate and functional – including check valves for direct steam injection
- Use "Guard Goose" to watch furnace conditions during spout pluggage episodes to watch inside the furnace for smelt pools and saltcake dams.
- Long stubs for plugging tubes can be problem with concentration of chemical or steam blanketing. Plugs should be as close to the header as possible.
- Check riser tubes between upper headers and drum in penthouse for thinning. Especially tubes that have a high point that does not vent entirely.
- Management of Change is extremely important when modifying RB systems – including soot blower nozzles and pressures.
- Condensate dripping from at rest sootblowers can drip on membrane and tubes below causing thermal fatigue. Consider extending the wall box sleeve a little way into the furnace cavity so condensate will drip into the furnace rather than on the wall tubes.
- A summary of many of the recovery boiler leak indications can be found in the TAPPI Technical Information Paper "Explanation of Recovery Boiler Leak Indications", TIP 0416-23 (2014)

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

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

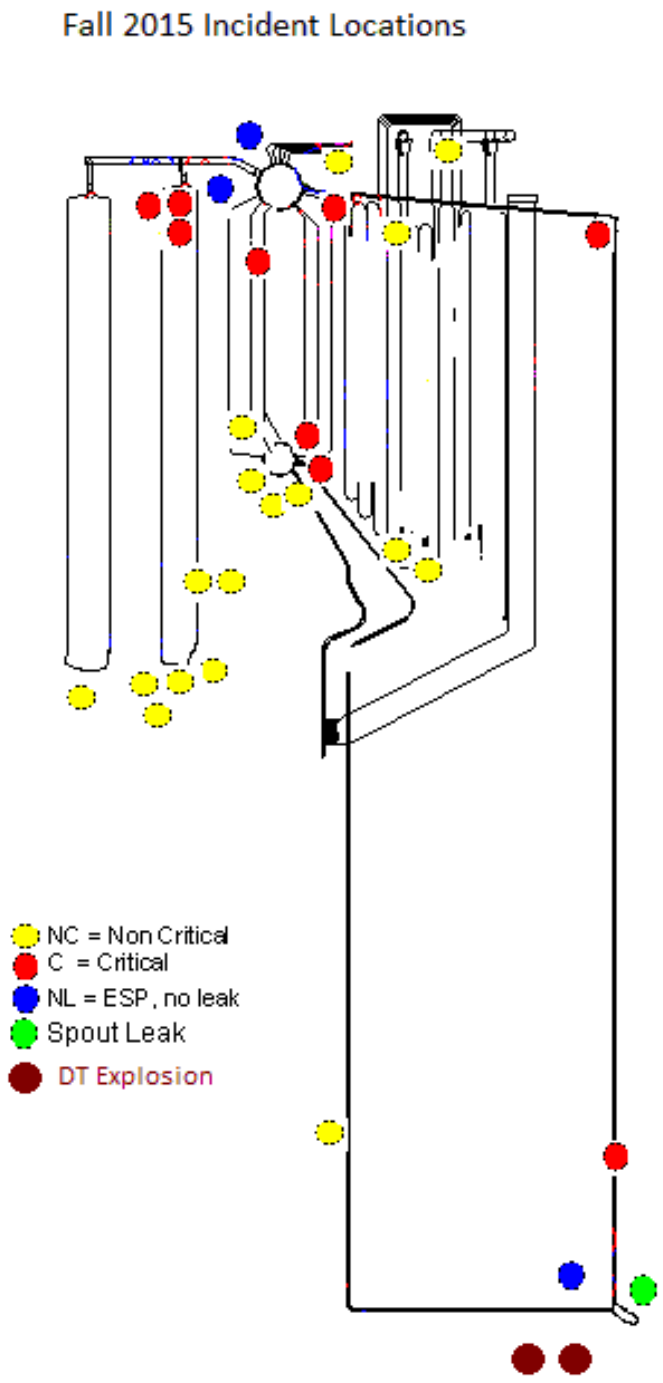
reported, I know it is very tempting to just go back in the file and pull out the report from a couple of years ago and just fill in the new information, but we really urge you to go and get the most recent version of that off the WEB site and use that for the report. I am sure Jules will be receiving 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.

There were no questions or comments.

Figure 1


Fall 2015 Incident Locations
NC = Non Critical
C = Critical
NL = ESP, no leak
Spout Leak
DT Explosion

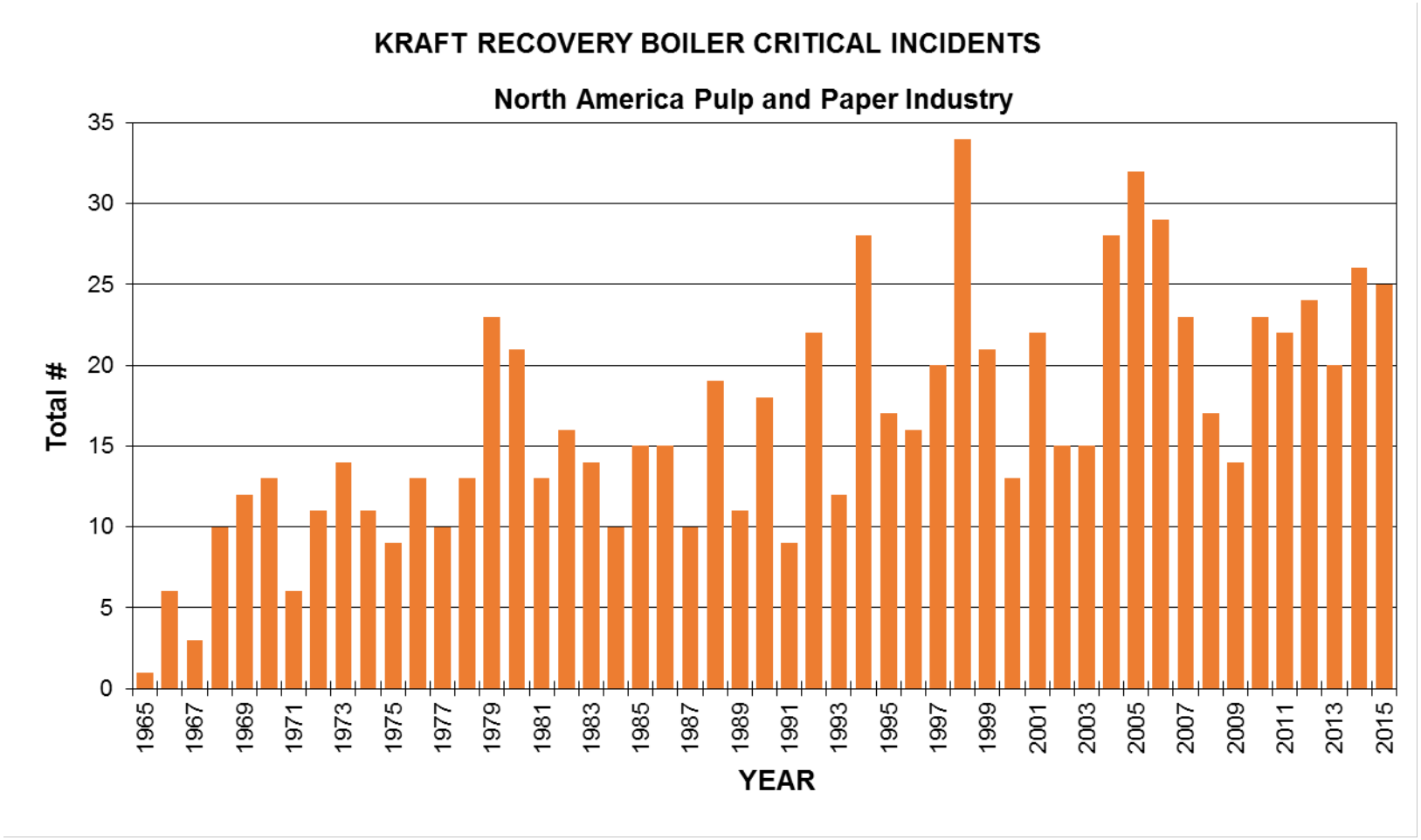


Figure 2

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

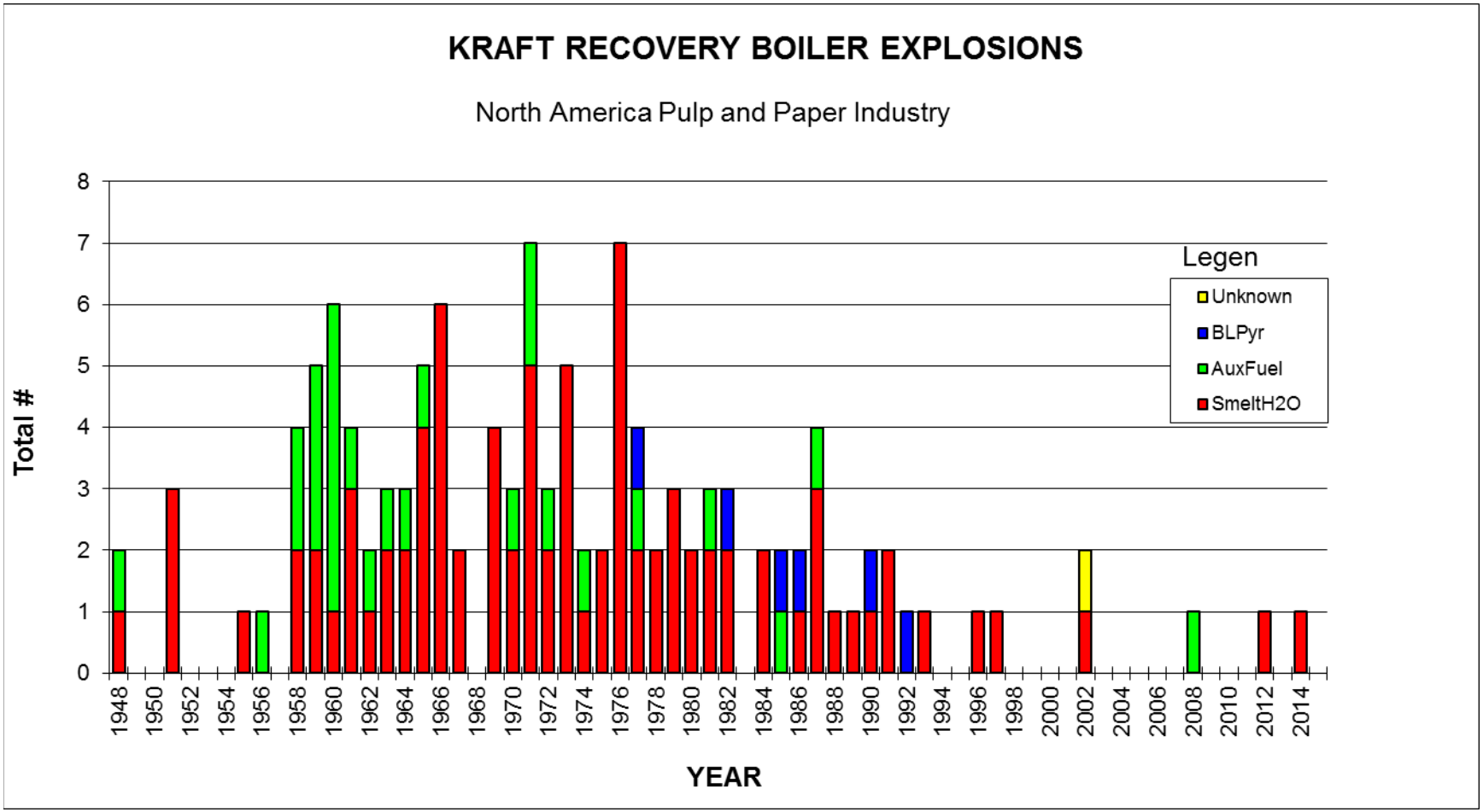

KRAFT RECOVERY BOILER EXPLOSIONS
North America Pulp and Paper Industry
Total #
YEAR
Legen
Unknown
BLPyr
AuxFuel
SmeltH2O
0
1
2
3
4
5
6
7
8
1948
1950
1952
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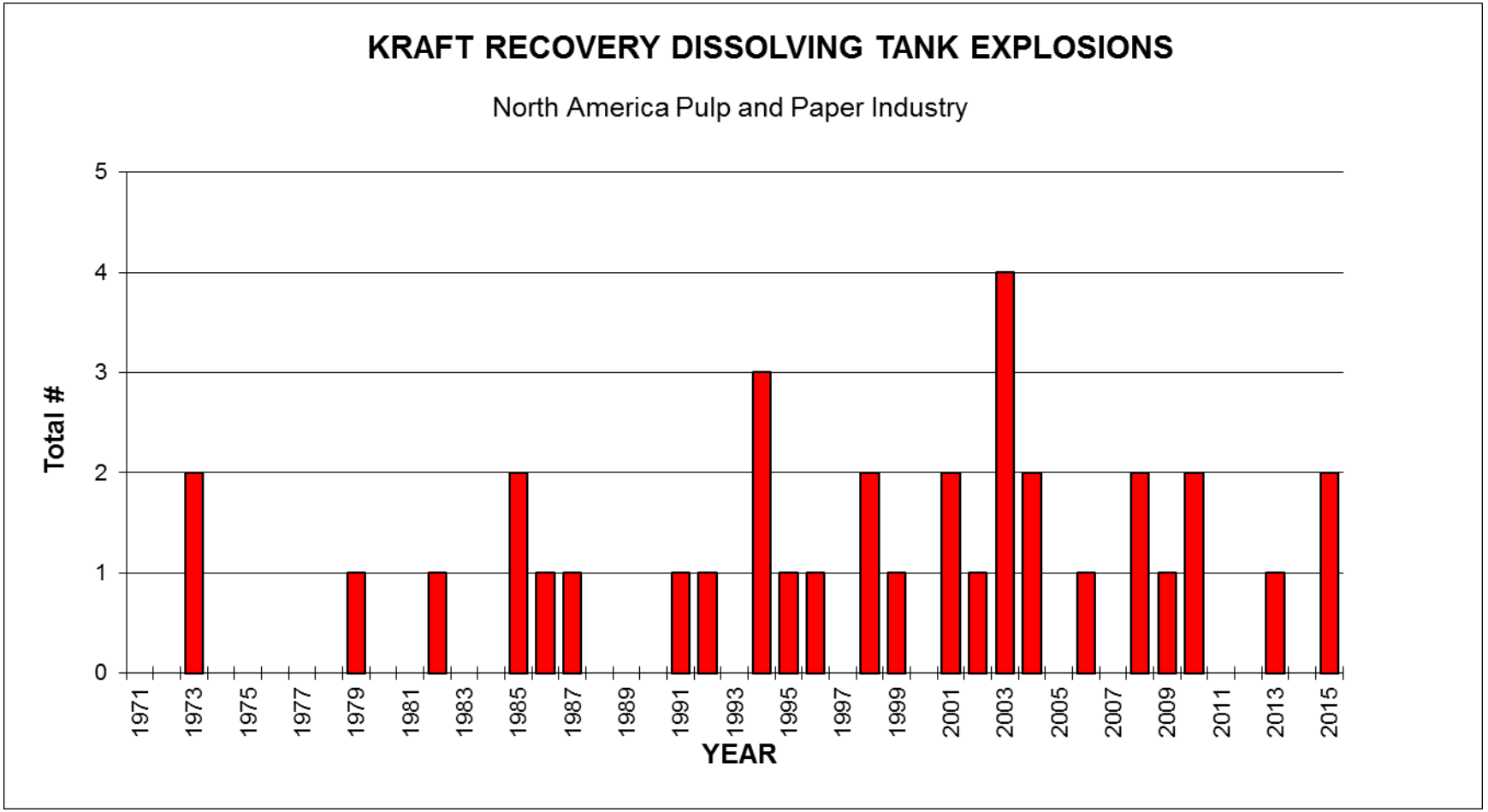
Figure 3


KRAFT RECOVERY DISSOLVING TANK EXPLOSIONS
North America Pulp and Paper Industry
Total #
0
1
2
3
4
5
1971
1973
1975
1977
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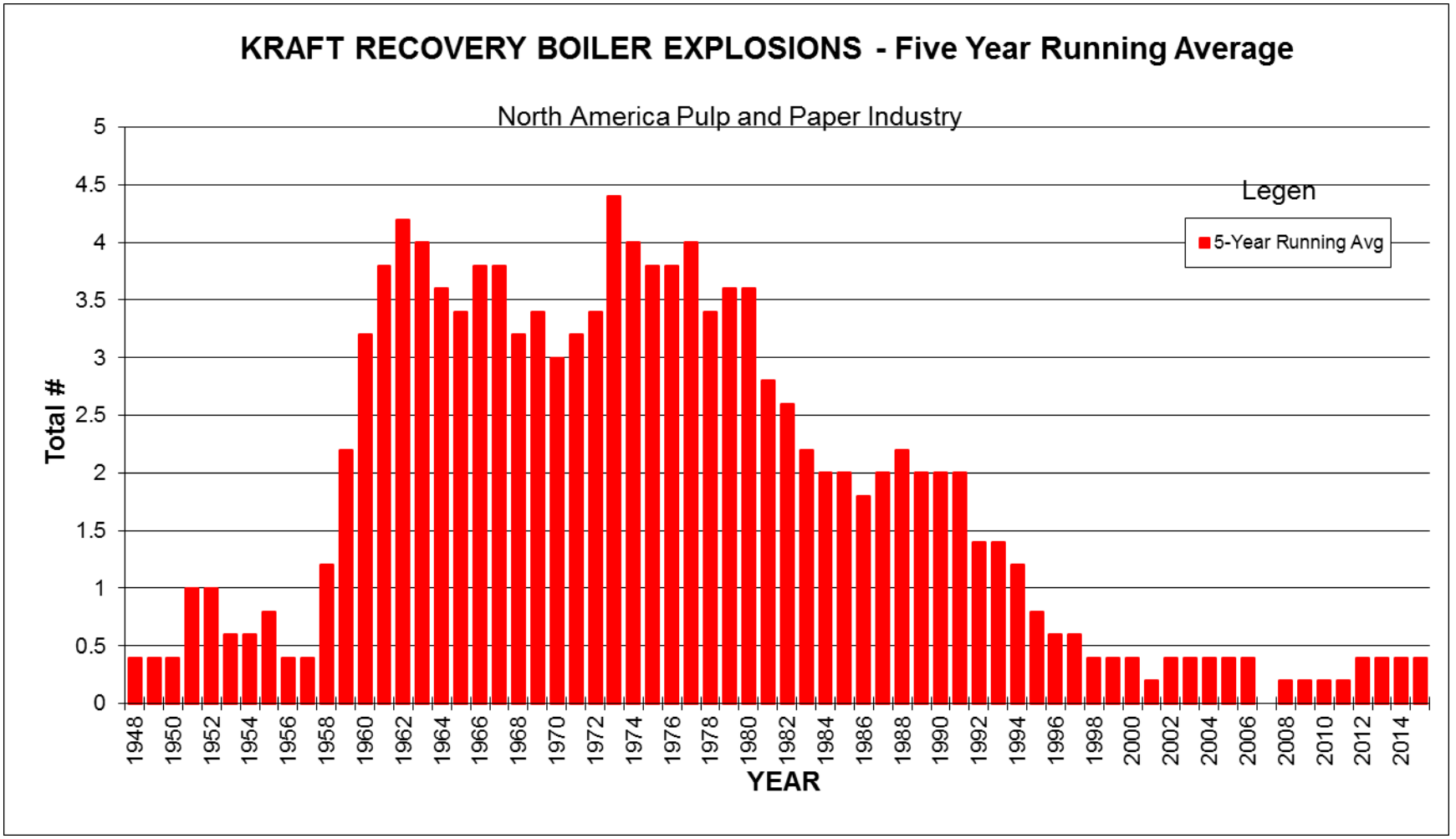
YEAR

Figure 4


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

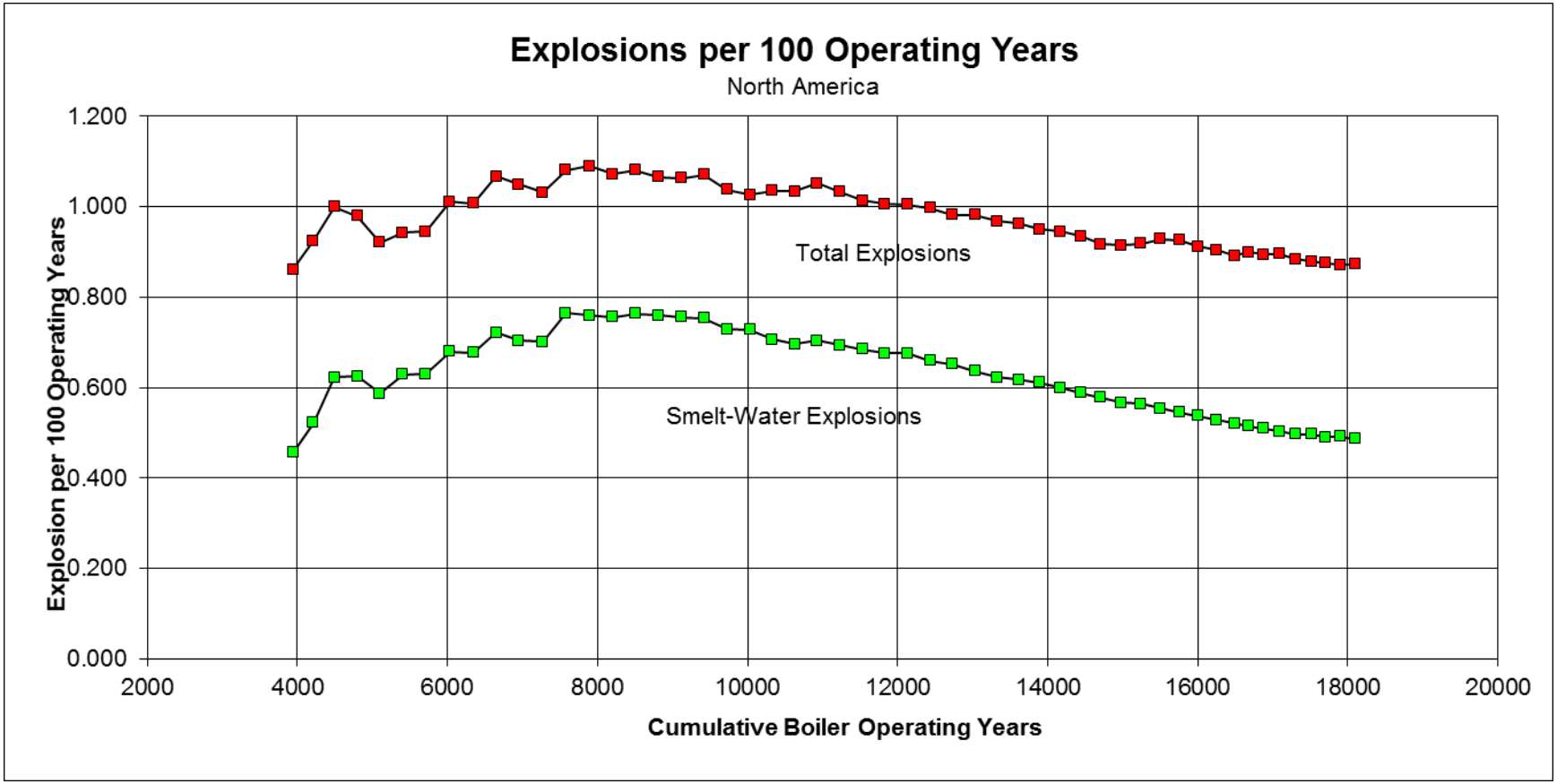

Explosions per 100 Operating Years
North America
Explosion per 100 Operating Years
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Total Explosions
Smelt-Water Explosions
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Cumulative Boiler Operating Years

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 did not meet and there was no report. Note that revisions to our document have been posted on the BLRBAC WEB site and should be reviewed by the membership.

5.5 **INSTRUMENTATION REPORT** – Rick Matteresse reporting for Dave Avery

The Instrumentation Subcommittee met in open session on both Monday morning and afternoon. There were nine members and 11 guests in the morning session and five members and nine guests in the afternoon. After reading the antitrust statement and approving the previous meeting minutes it was noted that the checklist section of our document was missing on the website. This is being worked on and will be corrected soon.

Work on updating this part of our document continues to assure it is complete, accurate and consistent with other BLRBAC documents continues. We are working with other subcommittees to assure our interpretations are accurate and appropriate. Due to many missing key committee members, no additional in-house work was conducted during this meeting. Our goal is to have a final document update to present within 2 years (4 meetings).

Discussions on what constitutes a qualified E&I technician were then entertained. Based on contributions from the group a raw template of guidelines was developed for everyone to review and work on during the next 6 months. Anyone who feels they have something to contribute on this subject is encouraged to attend our spring meeting session.

The next issue discussed was the need to differentiate between instrument calibration and standardization. After some discussion it was determined that standardization is comparing outputs to a known authoritative reference. This usually involves a minor (typically online) adjustment, but not a full blown calibration. For example liquor solids being compared to a known sample test and adjusted accordingly. A calibration is testing the inputs to the outputs based on the manufacturer's specifications for the entire span of an instruments range for proper performance and adjusting accordingly to be within tolerance (typically offline). This differentiation was being discussed so that we can better define our standards on refractometer "calibration/standardization" as called out for in BLRBAC RGPs, but it was also mentioned that the same differentiation applies to other devices such as various flow meters. It was decided that any wording on this subject would need to be incorporated into our document (along with an example) which then can be applied to other committee documents (such as safe firing of black liquor) as they deem appropriate.

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

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

New technologies were then discussed, primarily focusing on wireless communication. The use of this technology is expanding in industry. It is mostly limited to indications and alarms only with very limited use for simple non critical control type loops at this time. However it is possible to apply this to recovery boiler control systems and even safety systems. Some vendors are even marketing SIL compliant devices. It was decided that our document should address and likely restrict this. Also "remote access" for recovery operations as well as "smart instruments with blue tooth capabilities" for smart phone maintenance were discussed and the possible need for guidelines on these two subject. These will all be discussed further at our next meeting and we again encourage anyone with something to contribute on this subject to attend our spring meeting session.

Finally, the issue of drum level measurement, control and interlocking was revisited. It is felt that more definition is needed on what constitutes acceptable measuring technologies (i.e. guided wave measurement) and what constitutes the 2 trips as called out for in our document. A review of ASME 60.1.1 will be needed on this subject.

Note: We have had one change in membership Michael Kiper has retired from IP and Joel Byrd is the new IP representative replacing Mike.

5.6 **MATERIAL & WELDING REPORT** - David Fuhrmann

Both the morning and afternoon sessions of the Materials & Welding Subcommittee were called to order using the BLRBAC Anti-trust Statement. At the morning meeting we had 11 members represented and 27 guests.

Old Business:

The minutes from the last meeting, the spring of 2015, were reviewed and approved. There were some changes that had been submitted for Executive Committee review. It was the Technical Bulletin for plugging tubes and drums and headers; however, we have not heard of any action back. Follow--up revealed that I had inadvertently submitted them to the outgoing Secretary and Chairman. So I subsequently forwarded that information on to the current Chairman and Secretary.

Membership:

Dan Tutro was removed as the Alternate for FM Global per his request. Michael Blair was added as the Alternate for Dave Fuhrmann for International Paper. Michael Mesamore replaced Dave Duplissey as the Alternate Member for National Boiler Services.

Communications:

We have received permission from the AF&PA to use figures from their document for illustrations in our document. We have received written permission and I will submit that along with my report.

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

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

New Business:

Membership listings were reviewed. We have several people that haven't been attending for a couple of meetings and so we will be looking at reducing the membership overall in the next session. No new communications were received and we continued development of the procedure -- not the bulletin -- but the procedure .5 for plugging tubes and drums and headers.

In the afternoon session, we met with 11 members present. We had a presentation on procedures for plugging drums and tubes by Mark Rettig with AHR Metals, Inc. This presentation kind of focused on a little bit different design of plug that facilitated rapid removal by expansion -- rapid removal by expansion -- rapid replacement of the plug with an expansion detection.

Plans for the next meeting:

We will continue development for the procedure on plugging tubs and drums and headers. We will consider the recent spout failures reported at this session in the ESP Subcommittee Report and also possibly some discussions on superheater tied attachment welds. We will also soliciting another presentation based on folks experiences in the field.

5.7 **PERSONNEL SAFETY REPORT** – Robert Zawistowski

The Personnel Safety Subcommittee met in an "open" session on Monday, October 5, 2015. There were 9 members (out of 12) plus 30 guests in attendance during the meeting.

Representation at our meeting by regular members and guests included original equipment manufacturer Andritz, Andritz/Brazil, Babcock & Wilcox and Diamond Power. Representation from insurance and insurance service companies included FM-Global. Operating company representation was present at this meeting with representatives from Domtar, Georgia-Pacific, Glatfelter, Hood Container Corporation of Louisiana, International Paper, Irving Pulp & Paper, Kapstone, Packaging Corporation of America, Rayonier AM, WestRock, and Weyerhaeuser. Contractor representation included HWI, 3S Team. Consultant representation included Power Specialists Assoc., Inc. and RSI.

The BLRBAC anti-trust statement and the minutes of the last meeting were read.

The “Common Practices” document, now under development, was reviewed with an additional request for photos from the entire audience. A list of e-mail addresses was obtained. An e-mail will be sent out to those in attendance at the meeting who provided e-mails along with a list of photos needed for the document. Also included in this e-mail will be a copy of the photo permission form so photos that are provided have been signed off at each location by the Mill Manager. Some photos have arrived since the last meeting and we will insert OEM photos without reference to company names.

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

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

We discussed initial language for our main document for personnel safety around the topic of hopper inspection and clearing. There was a lot of active discussion and input from the membership and audience on this topic. We will continue developing language over the winter for review and editing by the Subcommittee during the April 2016 meeting.

Between the March 2015 and October 2015 meetings there were no requests for clarification/interpretation of information in the Personnel Safety document.

An incident report involving an injury as the result of a failure of a cast "T" in a black liquor line was reviewed. In the incident report it was noted a worker did obtain first degree burns and black liquor in the eyes. Full recovery without scarring was expected. The incident was fully investigated along with corrective actions to be taken.

A video of a recovery boiler recently going positive pressure was presented by a mill and the incident was described by a representative of that mill.

A simply black liquor gun stand fabricated by a machine shop was show via photograph. The photograph illustrated how a relatively simple stand can be fabricated to improve safety when servicing liquor guns. The concept of the stand was explained by the mill representative who provided the photograph.

A video of Lake Peigneur - Louisiana disaster was watched to illustrate an example of unintended consequences.

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.

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

No report was given at this time.

5.9 **WASTE STREAMS REPORT** – Paul Seefeld

On October 5, 2015, the Waste Streams Subcommittee met in a closed session at 9:00 AM. There were 8 of 14 members present and two guest operating company representatives. In the afternoon session, there were 8 members and 7 guests present. At the start of both the morning and afternoon sessions the BLRBAC antitrust statement was reviewed. The April 2015 meeting's minutes were reviewed and unanimously accepted.

5. **SUBCOMMITTEE REPORTS** - (Cont.)
   5.9 **WASTE STREAMS REPORT** - (Cont.)

Chapter 4 document updates:
The subcommittee spent most of the time establishing and editing the Dissolving tank vent gas (DTVG) section. We consolidated the many references to DTVG in chapter 4 to one section and began the iterative process of editing operational parameters. Since there have been numerous corrections and changes to this section, it was decided that a separate review copy would be issued to the subcommittee members and interested parties for comment and suggestions. It is our goal to come out of the April 2016 meeting with the text portion of the document finished.

We will have two separate diagrams for this section; one to cover DTVG systems combined with DNCG sources and one for dedicated DTVG systems. We will also have an additional interlock/permissive chart to add to the document.

Chapter 5 document updates:
We reviewed the E.C. approved changes to the document and the presentation for the operating problems session on Tuesday afternoon. We made a clarification to the continuous igniter statement as shown in red.

If the boiler is above 50% MCR (with liquor firing stably) and CNCG has been safely introduced, the igniter may be disengaged. SOG incineration should still use a continuous igniter.

Our intent was that by saying "CNCG has been safely introduced", this would imply that the boiler was firing liquor stably. However, it could be interpreted in a way that an operator could introduce CNCG using load burners at 50% MCR.

MISC:
We have had a couple of people swap positions on different subcommittees in the recent meetings and we will be updating our member list to reflect this and a couple of retirements.

The subcommittee still needs to obtain the translations of the most recent updates to the Finnish and Swedish operational guidelines.

A Vice-Chairman needs to be identified and there is a dearth of interest...

In the afternoon, we reviewed the Chapter 5 final product with the guests and discussed the ongoing work with the DTVG section. There were no questions, but there were requests to share information on the new DTVG section as it is being developed. The section will be emailed out within the next week.

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

Chairman: So these two proposed changes to Waste Streams have been posted on the WEB site. They were reviewed in detail yesterday and we just clarified that we are voting on the first two items that were covered yesterday , not Item #3, and typos and clarifications which are editorial in nature. Would voting members hose with red ribbons) please rise. Can I get a motion to approve the changes to the Waste Stream Document? Second? All in favor? All opposed. The changes have been approved unanimously

5.10 **WATER TREATMENT REPORT** – Tom Przybylski

The Water Treatment Subcommittee met Monday morning and Monday afternoon in open sessions.

Eleven (11) subcommittee members and approximately twenty (20) guests attended the morning and afternoon sessions. The subcommittee membership profile for those in attendance was as follows:

- One (1) OEM
- Four (4) mill representatives
- Six (6) BLRBAC Associate Members (two of the six in attendance represented water treatment companies).

The spring meeting activities were as follows:

- In the morning session, the BLRBAC Anti-trust Policy was reviewed, the membership lists updated, and the spring meeting minutes accepted.

- The subcommittee discussed some edits to the drum, tube and header circuitry document completed over the summer and now currently out for vote.

- The rest of the morning was spent continuing production of the condensate section, Two illustrations inserted into the document over the summer, were reviewed. One is for a preferred method of measuring condensate conductivity in streams susceptible to liquor fouling. The other is a method for validating the function of a check valve. Some edits will be implemented on the conductivity drawing. The group also asked for a drawing ensure clarity of an alternate condensate conductivity arrangement.

- Discussion also covered condensate receivers on paper machines. In particular, discussion centered around the termination of drains into sewers that have the potential to submerge that drain.

- The condensate section will be sent to all subcommittee members for comment with the intention of sending it to the Executive Committee in 2016.

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

- The afternoon session was dedicated to creation of the deaerator section This subcommittee produced basic configuration, control equipment descriptions, water purity impact assessments, key chemical control variables and key maintenance practices.

- Recommendations for SOPs around the deaerator were created, as were instrumentation, and inspection procedures and intervals.

- A typical deaerator sketch will be inserted and then the deaerator section will be sent to the all subcommittee members for comment with the intention of sending it to the Executive Committee in 2016.

Chairman: The proposed changes to Water Treatment Document have been posted on the WEB site, were reviewed with membership yesterday afternoon, and there are no issues. Would voting members those with red ribbons) please rise. Can I get a motion to approve the drums, tubes and header circuitry to the Water Treatment Documents? Second? All in favor? All opposed. Let the records show that the documentation has been approved unanimously.

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, main-tenancy, 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. All companies operating recovery boilers benefit directly from the Program's activities, including the research. The present Program members represent over 98% of the total production of sulphate pulp in the U. S.

Operational Safety Seminars

Two seminars (both in Atlanta) were held this year. We had 59 people attend in April and 60 in May. Since the seminars were first held in 1985, we have had over 3,400 people attend the two seminars with operators, supervisors and superintendents from 17 companies (with mergers we have fewer companies) and 34 mills. 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. Two seminars are planned for next year in Atlanta.

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

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 Program is sponsoring further study into the dissolving tank area, originally completed by Dr. Grace in Phase I of the study. BLRBAC's Safe Firing Subcommittee is looking into similar issues in this area. The R & D Subcommittee is working on proposals for additional research in smelt spouts and dissolving tank in conjunction with the University of Toronto. These involve research related to acoustic signature of the smelt shattering/dissolving process shatter jet interaction in the dissolving tanks and how to melt high sulfate slag that sheds from the upper furnace.

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.

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 "soon."

Proposal for Research of Protective Clothing and Equipment

The R & D Subcommittee is continuing to seek review of materials that are available for use for personnel protection around black liquor recovery boilers.

Other Research Projects Under Review

The Committee 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.

The Committee is 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 is scheduled to be held in Atlanta on February 2 and 3rd. As usual, the Conference is open to all operating companies, insurers, vendors and manufacturers. The presentations include 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.

7. **TAPPI STEAM & POWER/ENERGY MANAGEMENT REPORT** - Bentley Sherlock
   (See Appendix B Slide Presentation.)

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 VonOepen

    Operating Problems Solving Session was held on Tuesday afternoon. There was good membership attendance at this session. We reviewed 13 questionnaires submitted by the membership. Covered topics ranged from general boiler equipment issues, like smelt spout reliability, to questions about various maintenance and operational practices.

    We had 2 presentations on some proposed changes to our guidelines. Paul Seefeld presented some proposed changes to the Waste Stream Guidelines and Tom P. presented some proposed additions to the Water Treatment Guidelines.

    I did remind everyone about our 2 technical presentations that followed the closing of the main committee meeting. They were

    - Using Drones to inspect confined spaces by John Cavote from United Aerobotics
    - Automated technology for removal of fouling associated with a Recovery Boiler by Jimmie Peck from Industrial Cleaning Group.

    This concludes the Operating Problem Solving Session Report.

Chairman: That concludes our Main Committee Meeting. Thank you all for your attendance and your time away from home. As a reminder we have two Technical Presentations which will begin shortly, and we encourage all members to stick around for a few extra minutes for those. I'll entertain a motion to close the Main Committee meeting. Second? All in favor?

NEXT MEETING – April 4, 5 & 6, 2016, Crowne Plaza Hotel, Atlanta, GA.

Appendix A
INCIDENT LIST

NO LEAK

Fall 2015 – 01	
Classification:	**NA**
Location:	**WestRock, Mahrt, AL**
Unit:	RB2, 1990, Tampella, 337, 1-Drum, Large Economizer, Decant
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:	January 27, 2015
Downtime hrs, leak/total:	14.5/14.5
ESP?	**YES**
Leak/Incident Loc:	No Leak
How discovered:	n/a
Wash adjacent tube:	n/a
Root cause:	-
Leak detection:	Mass balance
Bed cooling enhance:	n/a
Last full inspection:	October 2013
Sequence of events:	Injection pump malfunctioned. Boiler tripped on low BL flow. Operator believed there was a tube leak due to rapidly increasing feed water / steam differential. Boiler was evacuated. Management and engineers reviewed boiler alarms and confirmed that the injection pump was primary cause of the incident. ESP was deemed unwarranted by mill management and the 8 hour post-ESP boiler evacuation was waived. Hydrostatic test at 850psi for 30 minutes was successfully completed at 7:57PM.
Repair procedure:	n/a
Future prevention:	Improved boiler trip recognition training. Will have more reviews on boiler trip scenarios in quarterly refresher training, specifically around how process variables (feed water valve, w/s diff) react when a trip occurs.

NO LEAK

Fall 2015 – 02	
Classification:	**NA**
Location:	**International Paper, Prattville, AL**
Unit:	RB1, 1967, CE, 1965, 2 drums, Cascade DCE, Decant
Unit Size:	2.1 MM lb ds/day; 320,000 lb/hr steam at 900 psig, 830°F, 1040 psig design (MAWP)
Incident Date:	May 2, 2014
Downtime hrs, leak/total	53/73
ESP?	**Yes**
Leak/Incident Loc:	No leak
How discovered:	Walkdown and control room indications
Wash adjacent tube:	NA
Root cause:	Operators evaluated indication as leak; no leak was found.
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	October 2013
Sequence of events:	At 19:30 Recovery tender operator noticed higher than normal furnace pressure at the liquor gun ports. This was soon followed by a high vibration and low oil level alarm on the ID fan. The fan steam cleaners were manually run and the vibration did not improve. Operators notified their supervision and at 19:35 boiler was walked down with sootblowers on hold. An unusual noise was detected on the 8th floor upper right side in the economizer section. The steam supply was valved out on the sootblowers in the area and the unusual noise persisted. This

	noise along with higher than normal furnace pressure led to the decision to ESP the boiler from the control room push buttons at 20:10. After 6 hours an Area Manager followed the mill established check list for entering the boiler area following an ESP and checked for signs of water in the lower furnace. Critical ESP devices were checked for proper operation. Personnel put on high temperature PPE and doors were opened in the area of the suspected leak in the economizer where a heavy build-up of saltcake was observed in the sootblower passes and on top of the economizer bypass damper. Smelt bed temperature probes were inserted and monitored until the temperature was below 800 deg F and drum metal temperatures were within 100 F of hydro water supply temperature. The boiler was refilled and hydro tested with no leaks found. The boiler was water washed, fired, and brought back online.
Repair procedure:	
Future prevention:	Need to track liquor cycle sulfidity and develop more measures for detecting boiler pluggage.

NO LEAK

Fall 2015 – 03	
Classification:	**NA**
Location:	**Canfor Pulp Limited-Northwood, Prince George, BC**
Unit:	RB1, 1966, CE, CA64127, 2-Drum, Large Economizer, Decant
Unit Size:	4.3 MM lb ds/day; 658,000 lb/hr steam at 650 psig, 752°F, 750 psig design (MAWP)
Incident Date:	October 1, 2014 7pm
Downtime hrs, leak/total:	81.5 hours from the time the boiler was taken out of service for a thermal shed.
ESP?	**No**
Leak/Incident Loc:	No leak was found or detected. Deformation of the top screen tube on platens 11 and 15.
How discovered:	Photographs taken during the course of the day revealed deformed tubes
Wash adjacent tube:	NA
Root cause:	NA
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	July 2013
Sequence of events:	Saltcake buildup on the upper furnace detected via online camera inspections led to the decision to take a planned outage for a boiler thermal shed, a process used with good success in the past. RB1 taken off liquor at 715am and off gas (offline) at 8am. Due to the nature of the buildup, the RB1 boiler house was restricted to authorized personnel only. 1030am, first inspection through small inspection ports at 7th floor showed visible superheater platens to have shed material. No photos taken, no access. 1pm, second inspection from small access door under sootblower on the right side of the boiler confirmed large shed of material on left wall of the boiler, opening access to larger door. Opening the larger door revealed that ~70% of the material had shed. Further inspections at 4pm and 6pm showed more of the material was dropping off. A larger mass located on the roof toward the middle of the boiler and spanning ~6 feet had not fallen but was showing some separation from the roof and superheater platen. The go-ahead to begin gas firing and warming up the boiler was given at 620pm. The first starting burner went in at 631pm. The large mass dislodged at ~7pm and struck #34 sootblower bending the lance tube. Photos were taken again from the 7th floor left doorway at ~8pm. It was from these pictures that deformation to 2 screen tubes was discovered. The boiler was shut down for cooling starting at 9pm.
Repair procedure:	The top 2 tubes on platens 11 and 15 were removed from service by plugging at the 4th floor and penthouse levels. October 1, 2014; 2 tubes each on platens 11 and 15 were plugged after the incident. All 4 tubes were replaced during the annual shut down mid- October 2014
Future prevention:	

NO LEAK

Fall 2015 – 04	
Classification:	**NA**
Location:	**Canfor Pulp Limited-Northwood, Prince George, BC**
Unit:	RB1, 1966, CE, CA64127, 2-Drum, Large Economizer, Decant
Unit Size:	4.3 MM lb ds/day; 658,000 lb/hr steam at 650 psig, 752°F, 750 psig design (MAWP)
Incident Date:	January 6, 2015
Downtime hrs, leak/total:	146.92 hours from the time the boiler was taken out of service for a thermal shed.
ESP?	**No.**
Leak/Incident Loc:	No leak at the time of the incident. 1 upper screen tube dented on 7, 1 upper and 1 lower screen tube dented with deflection on platen 5
How discovered:	Visual inspection following a thermal shed revealed a large mass resting on platens 5 and 7 screen tubes. Damage assessed once access to location was reached with scaffolding.
Wash adjacent tube:	NA
Root cause:	NA
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	October 2014
Sequence of events:	Saltcake buildup on the upper furnace detected via online camera inspections led to the decision to take a planned outage for a boiler thermal shed. RB1 taken off liquor at 8am and off gas (offline) at 915am. Due to the nature of the buildup, the RB1 boiler house was restricted to authorized personnel only. 1030am, first inspection through small inspection ports at 7th floor showed visible superheater platens to have shed material. No photos taken, no access. 1pm, second inspection from small access door under sootblower on the right side of the boiler confirmed large shed of material on left wall of the boiler, opening access to larger door. Opening the larger door revealed that ~70% of the material had shed. Further inspections at 4pm and 6pm showed more of the material was dropping off. A larger mass located on the roof toward the left of the boiler and spanning ~4-5 feet had not fallen but was showing some separation from the roof and superheater platen. Based on our experience in October 2014, we elected to fill the boiler with water and bring the pressure to 500psi to protect the screen tubes, and use a superheater waterwash via the sootblowers to wash the buildup down in a controlled fashion. This was not started until the bed temperature was below 120C. The waterwash with #34 sootblower started at 845pm, 13.75 hours after liquor was pulled from RB1. The waterwash created a thick vapour fog through the upper furnace section making visibility low. The waterwash IK was set in at ½ its travel distance to remove a small portion of the mass at a time, and allow the lance tube to serve as a barrier between the buildup and the screen tubes. The waterwash was stopped at 915pm, inspection at ~925pm. The majority of the buildup had come down at some point during the 30 minute wash. A large section of the buildup was resting on platens 5 and 7. We made the call to waterwash the remainder of the boiler so that scaffolding could be put in to access and assess the damage. Photos were taken again from the 7th floor left doorway at ~930pm.
Repair procedure:	A section of the damaged tube was removed in all 3 locations and replaced.
Future prevention:	Closer monitoring of out of service critical sootblowers, and mill chloride cycle.

NO LEAK

Fall 2015 – 05	
Classification:	**NA**
Location:(Mill, city, ST)	**Weyerhaeuser, Flint River Mill, Oglethorpe Georgia**
Unit:	RB1, 1980, B&W, PR-198, 2 drum, large economizer, decant (Andritz)
Unit Size:	5.4 MM lb ds/day; 778,000 lb/hr steam at 900 psig, 900°F, 1175 psig design (MAWP)
Incident Date:	May 19, 2015
Downtime hrs, leak/total	33 hrs 40 min
ESP?	**Yes**
Leak/Incident Loc:	No leak found
How discovered:	Operators observing smelt pool for the first time, didn't know if it was smelt or water
Wash adjacent tube:	No
Root cause:	NA
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	May 2015
Sequence of events:	The recovery boiler was started up on liquor at 00:30 on 5-19-15 after shutdown and burned liquor until approximately 13:30 when liquor was taken out of the boiler due to plant problems. Over the next few hours operators experienced drum level control problems at low steam rates firing #2 fuel oil burners only. The boiler has a new decanting hearth furnace installed during the shutdown. At around 16:35 operators looked into the furnace through liquor gun openings and saw the smelt pool on the floor and (for the first time seeing a smelt pool) did not know if it was a pool of water or a smelt pool. Resources were contacted and also looked into the furnace. The boiler was ESP'd at 16:50 to make sure the pool was not water.
Repair procedure:	N/A
Future prevention:	Operator were re-trained on the new furnace operating conditions and especially what to expect when looking in the furnace after the smelt bed had been burned out.

ECONOMIZER

Fall 2015 – 06	
Classification:	**Noncritical**
Location:	**Sappi NA – Somerset, Skowhegan, ME**
Unit:	RB1, 1976, CE, 21774, 2-Drum, Large Economizer, Decant
Unit Size:	5.2 MM lb ds/day; 775 lb/hr steam at 900 psig, 855°F, 1050 psig design (MAWP)
Incident Date:	March 15, 2015
Downtime hrs, leak/total:	94 hours (includes repairs to a leak in the penthouse discovered during hydro)
ESP?	**No**
Leak/Incident Loc:	Crack of ½" -¾"at the top fin attached to the tube, Economizer II (front, hot)
How discovered:	Operator rounds
Wash adjacent tube:	No
Root cause:	Stress, fatigue. The fin to tube attachment weld was around the end of the fin.
Leak detection:	Yes, but did not detect however it did confirm
Bed cooling enhance:	N/A
Last full inspection:	October 2014
Sequence of events:	Operator round discovery followed by normal boiler shutdown. Sunday night, March 15, at approximately 18:30 the Recovery Boiler Operator was inspecting the outlet of the wet bottom chemical ash hopper. The hopper was on hot water at the time and not black liquor. When he opened the inspection door he noticed a small amount of water "raining" down from above. A closer inspection from the floor above the hopper indicated some water weeping through the boiler casing around the economizer II (front, hot) lower water header seal. The sootblowers were shutoff and a near-by door was opened. The leak was confirmed though the exact location was not immediately identified. At the time the boiler was firing liquor at full rate. There were no detectable changes in water chemistry. A closer look at the Nalco RBLI system indicated a mass balance abnormality.
Repair procedure:	Typical standard repair per code. Grind to remove crack, weld repair.
Future prevention:	Inspect and PT similar areas; indentify cause of tube binding and/or stress. The following are corrective actions to prevent future occurrences: • Check the slip joint between the front tube and side wall casing for binding. • Confirm the sootblowers are starting to blow soon enough to keep the area of the slip joint clean. • Check the main inlet header for binding where it goes thru the casing wall. This is already a routine annual check and no binding was observed during the previous inspection. • Investigate the possibility of installing "hoppers" to minimize the amount of flue gas short circuiting. Remove the casing in the area of other fin attachments on the front wall of the economizer for inspection and PT.

ECONOMIZER

Fall 2015 – 07	
Classification:	**Noncritical**
Location:	**Sappi NA – Somerset, Skowhegan, ME**
Unit:	RB1, 1976, CE, 21774, 2-Drum, Large Economizer, Decant
Unit Size:	5.2 MM lb ds/day; 775 lb/hr steam at 900 psig, 855°F, 1050 psig design (MAWP)
Incident Date:	August 12, 2015
Downtime hrs, leak/total:	48 hours
ESP?	**No**
Leak/Incident Loc:	Crack of ¾"at the top fin attached to the tube, Economizer II (front, hot). This leak was 1" - 1 ½" below the welded repair of a previous leak. A sootblower is fitted approximately 3' away. The tube is the first tube towards the front on the pendant that is located on the farthest right side of the economizer.
How discovered:	Operator rounds
Wash adjacent tube:	No
Root cause:	Stress, fatigue. The exact cause of the these stresses may be: binding causing the front tube to be restrained and thus the second tube wants to pull the attachment fin or thermal due to differential temperature between the first and second tubes
Leak detection:	Yes, but did not detect however it did confirmed
Bed cooling enhance:	N/A
Last full inspection:	October 2014
Sequence of events:	Wednesday morning, August 12, at approximately 10:30 the Recovery Boiler Operator was inspecting the outlet of the wet bottom chemical ash hopper. The hopper was on hot water at the time and not black liquor. As he went to open the inspection door he noticed a small amount of water "dripping" down from metal casing. A closer inspection from the floor above the hopper indicated some water weeping through the boiler casing around the economizer II (front, hot) lower water header seal. The sootblowers were shutoff and a near-by door was opened. The leak was confirmed though the exact location was not immediately identified. However, the leak was coming from the same area as a previous leak in March. At the time the boiler was firing liquor at 85% rate. There were no detectable changes in water chemistry. A closer look at the Nalco RBLI system indicated a very slight mass balance abnormality. A normal boiler shutdown was followed.
Repair procedure:	Typical standard repair per code. Grind to remove crack, weld repair.
Future prevention:	The following are corrective actions to prevent future occurrences: • Check the actual dimensions of the slip joint compared to design • Check the slip joint between the front tube and side wall casing for binding. • Confirm the sootblowers are starting to blow soon enough to keep the area of the slip joint clean. • Remove the casing in the area of other fin attachments on the front wall of the economizer for inspection and PT.

ECONOMIZER

Fall 2015 – 08	
Classification:	**Critical 844**
Location:	**KPAQ Industries, 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:	April 18, 2015
Downtime hrs, leak/total:	0/21.5
ESP?	**No**
Leak/Incident Loc:	1/8" pinhole in primary economizer tube @ just below upper header tube weld. Same tube leaked 12/15/14 just above lower header.
How discovered:	Operator Rounds
Wash adjacent tube:	No
Root cause:	External pitting, corrosion
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	April 2014
Sequence of events:	**4/18/15** 01:15 - I.D. Fan sped up from 693 rpm to 723 rpm and opacity increased (discovered post-mortem) 03:00 - 04:00 – While unplugging generating/economizer ash hopper operators discovered water in the right (West) ash hopper. 05:00- Area duty personnel were notified 06:00 – Duty personnel on site, reduced liquor burn rate • Checked ash hoppers. Water leaking down south east corner of west ash hopper. • Opened doors on the economizer and determined that there was a leak toward the top of the economizer. 08:25 – Pulled liquor out of Recovery 10:30 – Removed primary economizer top header access door on 11th floor and determined that the leak was near the header. 12:55 – Fire out of the boiler for cool down. Contractor started removing insulation and skin atop the economizer to expose header. 16:30 – Identified the leak and starting securing the boiler for repairs (LOTO, Hot Work). 22:30 – Weld repairs complete. Performed PT of weld and UT of the surrounding areas. Prepped boiler for hydro. 23:00 – Successful hydro on boiler, contractor welding skin atop the economizer. 23:45 – Locks off, prepping boiler for start-up
Repair procedure:	Ground out hole, weld repair. Overlayed surrounding area; ultrasonic testing revealing no generalized thinning; penetrant testing verified weld.
Future prevention:	Future Replacement of Components

ECONOMIZER

Fall 2015 – 09	
Classification:	**Noncritical**
Location:	**WestRock, Panama City, FL**
Unit:	RB1, 1970, CE, 26669, 2-Drum, Cascade, Decant
Unit Size:	2.97 MM lb ds/day; 398,000 lb/hr steam at 450 psig, 750°F, 570 psig design (MAWP)
Incident Date:	February 16, 2015
Downtime hrs, leak/total:	21/24
ESP?	**No**
Leak/Incident Loc:	1/2" circumferential crack, in economizer tube 1" above lower header, tube 76, row 3; end tube on header, front side of sootblower pass
How discovered:	Operator Round
Wash adjacent tube:	No
Root cause:	Fatigue
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	February 2014
Sequence of events:	Operator in the area observed the leak during his normal round at 11:30 pm on 2/15/15. The mill operation was slowed back to allow the boiler to be taken down to repair the leak. Liquor was out of the boiler at 3:15 am on 2/16/15 and the boiler was down at 4:19 am for cooling and repairs.
Repair procedure:	Ground out crack, weld repair. Tube was plugged at headers in outage March 2015.
Future prevention:	Future Replacement of Components

ECONOMIZER INSPECTION STUB

FALL – 10	
Classification:	**Noncritical**
Location:	**International Paper, Mansfield, LA**
Unit:	RB2, 1981, B&W, PR-200, 2-Drum, Large Economizer, Rear-slope floor
Unit Size:	3.4 MM lb ds/day; 486,000 lb/hr steam at 1250 psig, 900°F, 1475 psig design (MAWP)
Incident Date:	December 9, 2014
Downtime hrs, leak/total:	46 hours, 20 minutes
ESP?	**No**
Leak/Incident Loc:	Economizer inspection stub weld to header. Rear Wall
How discovered:	Operations while washing out hoppers during scheduled maintenance outage.
Wash adjacent tube:	No
Root cause:	Weld procedure
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	Annual Outage 2014
Sequence of events:	RB2 was taken down for a scheduled maintenance outage to make repairs to both Dissolving Tank Agitators. While washing Economizer Hoppers the leak was found. No water had been observed prior to the outage during operator walkdowns. The Economizer Hopper had been plugged due to walkboards falling out and plugging up the downlegs.
Repair procedure:	Followed IP weld procedure
Future prevention:	Waiting on newest IP approved weld procedure

ECONOMIZER INSPECTION STUB

FALL – 11	
Classification:	**Noncritical**
Location:	**International Paper, Mansfield, LA**
Unit:	RB2, 1981, B&W, PR-200, 2-Drum, Large Economizer, Rear-slope floor
Unit Size:	3.4 MM lb ds/day; 486,000 lb/hr steam at 1250 psig, 900°F, 1475 psig design (MAWP)
Incident Date:	February 21, 2015
Downtime hrs, leak/total:	31 hours, 28 minutes
ESP?	**No**
Leak/Incident Loc:	Economizer inspection stub weld to header. 1/4 " crack in weld of pipe attachment to header. Lower header
How discovered:	Operator making first walkdown on shift
Wash adjacent tube:	No
Root cause:	Weld Procedure
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	Annual Outage 2014
Sequence of events:	Operator was walking down boiler at the beginning of the shift and observed water in the economizer hopper.
Repair procedure:	Followed IP weld procedure
Future prevention:	Follow IP weld procedure

ECONOMIZER

FALL 2015 – 12	
Classification:	**Noncritical**
Location:	**International Paper, Pensacola Mill, Cantonment, FL**
Unit:	RB1, 1975, B&W, PR-171A, 2 drum, large economizer
Unit Size:	3.06 MM lb ds/day; 450,000 lb/hr steam at 850 psig, 850°F, 1000 psig design (MAWP)
Incident Date:	May 25, 2015
Downtime hrs, leak/total	2.16 for inspection, repair made during scheduled outage
ESP?	**No**
Leak/Incident Loc:	Economizer (2nd Pass) , lower bottle header, #32 supply tube from west side at buttweld
How discovered:	Water found in west hopper
Wash adjacent tube:	No
Root cause:	Weld defect, circumferential crack
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	April 2014
Sequence of events:	On May 25, 2015 an economizer tube leak was discovered by operations when water was observed in the west wet hopper. Liquor was pulled off of the boiler long enough to inspect the leak. The leak was in a weld on the 32nd tube from the west wall of the second pass of the economizer. Prior economizer tube leaks have been located in the first pass. Repairs were completed during a scheduled outage on June 2, 2015
Repair procedure:	Defect area of weld was ground out, inspected to ensure the defect was removed, reweld and PT.
Future prevention:	X-ray additional welds in 2nd pass to determine if weld repairs are required. Addressed feedwater piping growth clearance at catwalk, replaced static feedwater piping hangers with engineered can hangers, corrected all priority 1 and priority 2 weld defects

ECONOMIZER

FALL 2015 – 13	
Classification:	**Critical 845**
Location:	**International Paper, Riverdale, Selma, AL**
Unit:	RB2, CE, 1981, 28679, 2 drum, large econ, decanting hearth
Unit Size:	2.7 MM lb ds/day; 425,000 lb/hr steam at 1425 psig, 860°F, 1720 psig design (MAWP)
Incident Date:	May 25, 2015
Downtime hrs, leak/total	44 hrs off line, 53 off liquor
ESP?	**No**
Leak/Incident Loc:	Leak in weld of past repair plug. Front Economizer Upper Header
How discovered:	Walk down
Wash adjacent tube:	No
Root cause:	Weld defect in previous repair
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	5/13
Sequence of events:	During a basic care round during day shift of May 24, 2014, 1st Helper, discovered water in the 2nd Water Pass (front) Economizer Hopper. Further inspection discovered a roaring sound in the lower hopper but was unable to see the actual leak. The Power Operator was notified and after attempting to locate the leak notified Power Weekend Duty person. A thorough investigation yielded high confidence the leak was at the lower economizer header and a plan was put in place for an orderly shutdown and resources secured. Liquor was pulled at 2 p.m. on May 25, 2014 and fire at 7 p.m. on May 25, 2014. The morning of May 26, 2014 at approximately 12:30 a.m. as operations were opening doors the Power Operator located the leak at the economizer 2nd water pass upper header.
Repair procedure:	Removed old plugs, installed new plugs.
Future prevention:	More QC of plug welds

ECONOMIZER

FALL 2015 -14	
Classification:	**Critical 846**
Location:	**International Paper, Texarkana, TX**
Unit:	RB1, 1972 B&W PR-144, 2-drum, rear-slope hearth, 1984 large econ
Unit Size:	2.6 MM lb ds/day; 408,000 lb/hr steam at 650 psig, 750°F, 775 psig design
Incident Date:	August 14, 2015
Downtime hrs, leak/total:	28.67 hours off liquor
ESP?	**No**
Leak/Incident Loc:	Hole in the tube to header weld on the #2 tube in the 4th row from the LHSW. Primary (upper) economizer
How discovered:	The boiler tender saw water in the north primary economizer hopper (primary is first economizer in the gas stream).
Wash adjacent tube:	No. Adjacent tubes were checked.
Root cause:	Pocket of slag and porosity in the shop weld.
Leak detection:	Yes
Bed cooling enhanc	No
Last full inspection:	April 2013
Sequence of events:	The boiler tender saw water in the north primary economizer hopper (primary is first economizer in the gas stream). Called his operator and foreman. Walked the boiler up to the top, valving out IK's and looking in doors. There was no water in either generating bank hopper. The leak was found in the upper manway door on the left side of the boiler with the water spraying to the rear and to the left.
Repair procedure:	The defect was ground out and performed weld build up of the wasted area. Adjacent tubes were

	checked.
Future prevention:	Welds on the header will be cleaned and inspected in the next annual outage. Boroscope through the feeder tubes and inspect internally as many as possible.

ECONOMIZER

FALL 2015 -15	
Classification:	**Noncritical**
Location:	**International Paper, Valliant, OK**
Unit:	RB2, 2006, Andritz, 400084, Single Drum, large econ, decant
Unit Size:	6.3 MM lb ds/day; 943,000 lb/hr steam at 1250 psig, 925°F, 1711 psig design (MAWP)
Incident Date:	August 3, 2015
Downtime hrs, leak/total	32 hrs
ESP?	**No**
Leak/Incident Loc:	1" circumferential crack. No. 1 Economizer Heat affected zone of supply tube to distribution header weld (37th tube counted from the north, top row)
How discovered:	Operator walkdown found water in economizer hopper
Wash adjacent tube:	No
Root cause:	Fatigue. There was one tube handcuff broken above the tube that had the crack.
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	May 2014
Sequence of events:	During rounds, walkdown, the recovery operator found water in the economizer one hopper. The boiler was taken off liquor, cooled down and locked out.
Repair procedure:	The leak was repaired by grinding out the indication and pad welding (SMAW).
Future prevention:	Inspection/evaluation needed

SUPERHEATER

FALL 2015 – 16	
Classification:	**Noncritical**
Location:	**WestRock, West Point, VA**
Unit:	RB4, 1975, CE, 21975, 2 drum, decanting hearth, DCE Cascade
Unit Size:	2.7 MM lb ds/day; 427,000 lb/hr steam at 1225 psig, 900°F, 1360 psig design
Incident Date:	March 25, 2015
Downtime hrs, leak/total	NA
ESP?	**No**
Leak/Incident Loc:	2 tertiary SH tubes had thru-wall cracks adjacent to hinge pin welds and buttwelds
How discovered:	Hydro following annual outage
Wash adjacent tube:	No
Root cause:	Tubes (SA213-TP347H) failed due to stress corrosion cracking (SCC) mechanism, likely related to steam contamination to the superheater. The mill had a significant carryover event due to some liquor intrusion in early April 2014. We were able to shutdown the entire mill within 3 hrs of the event but not until after we experienced carryover from the RB4 steam drum into the SH. There were 8 leaks in August 2014 following an ESP, same root cause.
Leak detection:	No
Bed cooling enhance	No
Last full inspection:	March, 2014
Sequence of events:	During hydro at completion of annual outage two leaks were located in the outlet side of tertiary superheat section.
Repair procedure:	Installed 2 dutchmen using weld procedure GTSM8-8
Future prevention:	100% replacement

SUPERHEATER

FALL 2015 - 17	
Classification:	**Noncritical**
Location:	**Georgia Pacific Camas, Washington**
Unit:	RB4, 1975, CE, 22673, 2 drum, large economizer, decant floor.
Unit Size:	2.5 MM lb ds/day; 400,000 lb/hr steam at 650 psig, 750°F, 733 psig design (MAWP)
Incident Date:	April 30, 2015
Downtime hrs, leak/total	Extended scheduled outage 43 hours
ESP?	**No**
Leak/Incident Loc:	Upper stitch tie welds, primary superheater pendants #10 (tube 3-4 tie) & #19 (tube 2-3 tie)
How discovered:	Hydrostatic test prior to start-up
Wash adjacent tube:	No
Root cause:	Fatigue
Leak detection:	Nalco Trasar -
Bed cooling enhance:	NA
Last full inspection:	April 2014
Sequence of events:	Unit was scheduled down for water wash, lower furnace inspection and internal inspection of drums. The furnace was not scaffolded. A hydrostatic test was performed prior to start-up as a matter of routine. A wet spot was observed on the nose arch during the test that grew in size as the pressure was held. A thorough investigation led to the source of the water that had resolved into two separate spots. Waterside was re-locked-out, scaffolding erected and repairs made. Final hydro performed after repairs completed.
Repair procedure:	Crack indications were ground out and NDE was performed to indicate the crack was removed. Weld repair with PT on root and cover passes.
Future prevention:	Continue to inspect and repair tie welds during major outages. Consider replacement of primary superheater section. This is the original SH and there have been numerous cracks and leaks at stitch welds in the past.

BOILER BANK

Fall 2015 – 18	
Classification:	**Noncritical**
Location:	**International Paper, Augusta, GA**
Unit:	RB3, 1986, Gotaverken Energy, Contr #4221,1drum, large econ, sloped to rear floor)
Unit Size:	5.5 MM (virgin) lb ds/day; 817,000 lb/hr steam at 900 psig, 900°F, 1110 psig design (MAWP)
Incident Date:	June 5, 2014
Downtime hrs, leak/total	43.5 hours
ESP?	**No –** external to boiler
Leak/Incident Loc:	Generating bank enclosure sidewall tube, above lower gen bank header.
How discovered:	Visual walkdown
Wash adjacent tube:	No wash identified during inspection
Root cause:	Thermal cycling of boiler
Leak detection:	Bed cooling enhance-none required
Bed cooling enhance:	None required
Last full inspection:	February 2014
Sequence of events:	On June 5 around 2:30pm, area manager was walking down the boiler noting issues found on each floor that needed following from the maintenance resources. A pan sitting under a boiler door, on the 7th floor, was noticed having water accumulated in it and something dripping into it. Upon reaching the pan, a small stream of water was observed running down the boiler casing coming from above. At this time, investigation was being done to determine where the leak was coming. There is an IK above that was ruled out as having a poppet valve tripped in the open position. Next the area between the IK and the 7th floor, the boiler casing was noticed to have a breathing signature to it. Maintenance was contacted and a section of casing above the leak was removed and the source of the leak was identified coming from a pressure part on the external side of the tube, not sure exactly where from at this time. More thorough looking was done and the leak was identified as coming from where the membrane was welded between two tubes. The area of the boiler where this leak has been identified is in the dead air space of the nose arch, where the generating bank lower header is on the north side of the boiler. Once the location of the leak in relation to the furnace was identified (external leak) the decision was to continue to run until the mill was in a position to support taking the recovery boiler down to repair the leak. A shield was fabricated to place on the adjacent tube to protect it from direct impact of the leak to prevent any erosion from occurring. A wooden barricade was erected around the leak area to protect the outside area from a potential blow out in the event the leak became worse. On 6/30/2014, the recovery boiler was taken down following the normal operating procedure for shutting the boiler down to repair leak.
Repair procedure:	Removed 2” section of membrane and pad welded defected area on tube.
Future prevention:	Inspect similar areas, improved welding methodology for future work.

BOILER BANK

Fall 2015-19	
Classification:	**Critical 847**
Location:	**International Paper Orange Mill, Orange, TX**
Unit:	RB1, 1967, B&W, PR-108A, 2 drum, cyclone, sloped floor to front
Unit Size:	2.7 MM lb ds/day; 254,000 lb/hr steam at 850 psig, 835°F, 975 psig design (MAWP)
Incident Date:	March 17, 2015
Downtime hrs, leak/total	77hours 56 mins
ESP?	**Yes**
Leak/Incident Loc:	Gen Bank. Cold Side. IK pass. Upper elevation of vibration bars.
How discovered:	Drum Level started dropping off and boiler tripped
Wash adjacent tube:	Yes
Root cause:	Poor welds on vibration bars
Leak detection:	Yes
Bed cooling enhance:	Yes
Last full inspection:	December 2014
Sequence of events:	The boiler was at steady state producing about 220 klbs/hr and burning 212 gpm. Operators first got alarms on furnace pressure and it elevated quickly up to +1-+1.5" H2O at 1:30 PM. Operators acknowledged the furnace pressure alarm. 23 seconds later they got another alarm on low drum level. They saw that the level continued to drop. 1 minute and 23 seconds after the first alarm the boiler tripped on low steam drum level hydrastep. Operators reviewed the data and did not see a chemistry change. At this time an economizer leak was suspected At 1:36 pm the RBLI system was again reviewed and no chemistry change was noticed still suspecting an economizer leak. 1:44 PM, operators reached the 7th floor and opened the door to verify if economizer leak. At this point they determined that it was the gen bank and called on the radio to ESP the boiler. At 1:47 PM an ESP was initiated.
Repair procedure:	Plugged tubes on first repair. Made repairs to similar vibration bar welds.
Future prevention:	Inspect and repair all vibration bar welds at next opportunity, potential to install re-pad on the tube to lessen the tube stress. Adjust sootblowing pressure to reduce the force applied to the vibration bars.

BOILER BANK

Fall 2015-20	
Classification:	**Critical 848**
Location:	**International Paper Orange Mill, Orange, TX**
Unit:	RB2, 1967, B&W, PR-108B, 2 drum, cyclone, sloped floor to front
Unit Size:	2.7 MM lb ds/day; 254,000 lb/hr steam at 850 psig, 835°F, 975 psig design (MAWP)
Incident Date:	November 17, 2014
Downtime hrs, leak/total	87
ESP?	**Yes**
Leak/Incident Loc:	Generating bank at mud drum surface, hot side of drum
How discovered:	DCS mass balance alarm
Wash adjacent tube:	Yes
Root cause:	Poor tube to drum socket fit
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	April 2014
Sequence of events:	Boiler was at steady state burning 210 gpm of liquor and steaming 210,000 #/hr. Operators first received a mass balance alarm just before 11:47 AM on 11/17/14. After they received the first alarm, operators made a round and searched for any potential tube leak but couldn't find any. Operators reviewed the feedwater and steam differential and could not detect any change. Over the next 3 hours they received 2 more mass balance alarms, but couldn't find nor hear any leak on their inspection rounds nor detect it in the review of the steam/feedwater balance trends. The mass balance alarm went off again. Once again the operators could not detect any change in the feedwater and steam but this time they noticed changes in chemistry at 3:35 PM. Operators went up again to look for a tube leak and heard the faint sound of a steam leak on the 7th floor of the boiler on the on the right side of the boiler approximately in the generating bank area above the mud drum. They couldn't definitively determine the area of the leak, but assumed it was on the gen bank due to previous failure on gen bank a month ago. At 3:48 PM the boiler was ESP'd based on chemistry and location of sound. After the boiler was made safe for entry, 4 tubes were found to be leaking at drum surface at the mud drum. These 4 and 3 additional washed tubes were capped off. Investigation found that a first tube leaked at the tube to socket fit and then washed adjacent tubes.
Repair procedure:	Plug leaking and thinned tubes, then seal welded adjacent weepers
Future prevention:	Review of plan to seal weld all tubes in the lower drum

BOILER BANK

FALL 2015 -21	
Classification:	**Noncritical**
Location:	**International Paper, Valliant, OK**
Unit:	RB2, 2006, Andritz, 400084, Single Drum, large econ, decant
Unit Size:	6.3 MM lb ds/day; 943,000 lb/hr steam at 1250 psig, 925°F, 1711 psig design (MAWP)
Incident Date:	July 23, 2015
Downtime hrs, leak/total	32 hrs
ESP?	**No**
Leak/Incident Loc:	Generating Bank Sootblower Crotch Opening G-28
How discovered:	Supervisor walkdown during a start up unrelated to the leak
Wash adjacent tube:	No
Root cause:	Fatigue
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	May 2014
Sequence of events:	On 7/22/2015 the Recovery Boiler went down due to an electrical issue. As the boiler was filling up, around 10:30AM 7/23 a water wall tube leak was discovered at the crotch opening

	for Gen Bank soot blower G28.
Repair procedure:	The leak was repaired by grinding out the indication and pad welding (SMAW).
Future prevention:	Inspection/evaluation needed

UPPER FURNACE (ROOF) & SUPERHEATER

FALL 2015 - 22	
Classification:	**Critical 849**
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:	9/1/14
Downtime hrs, leak/total	163 hours
ESP?	**Yes**
Leak/Incident Loc:	Inlet side of the secondary superheaters on platens 18,19,20,21 (37 total platens across), Roof tube leaks where the roof seal boxes in the penthouse attaches to the roof tube on platens 23 and 26, and a roof tube leak the near superheater tube 18.
How discovered:	Leak Detection Software
Wash adjacent tube:	No
Root cause:	Fatigue failure from swaying superheaters, that originated at arc strike weld marks and grinding marks
Leak detection:	Recovery Boiler Advisor, water mass balance in DCS
Bed cooling enhanc	Sodium Bicarbonate, nitrogen and steam
Last full inspection:	May 2014
Sequence of events:	On August 31, 2014 the recovery boiler was running its normal rate of 945 KPPH, 69.5% as fired solids with normal salt cake recirculation. Before the ESP of the recovery boiler, the sootblowers were shut off at 9:35 PM on 8/31 to listen to any leaks in the boiler due to water mass balance alarm on the boiler. The water mass balance had alerted 21 KPPH offset. Nothing was found and sootblowers were put back in service. At 11:43 PM the sootblowers were shut off again and the water mass balance indicated 42 KPPH. Operators thought they could hear a leak at the penthouse and had a small amount of steam coming out of the penthouse. At 12:14 AM on 9/1/14 the recovery boiler ESP was initiated. At 12:45 AM, the ESP was complete without any issues with the water level in the bottom of the furnace at ~9 feet.
Repair procedure:	Replace leaking superheater tubes with 48” Dutchmen. Repaired Roof tube leaks with weld repairs.
Future prevention:	Stopped use of leading edge sootblower nozzles that contributed to the swaying of the superheater platens. The superheater penetrations were inspected during the next outage to check for any other damage that occurred to the superheater tubes at the roof penetrations under the seal boxes.

UPPER FURNACE (ROOF)

Fall 2015 - 23	
Classification:	**Critical 850**
Location:	**International Paper, Prattville, AL**
Unit:	#1 RB, 1967 CE, Contract 1965, 2-drum DCE cascade; 2007 Andritz rebuild, decant
Unit Size:	2.1 MM lb ds/day; 320,000 lb/hr steam at 900 psig, 830°F, 1040 psig design
Incident Date:	June 10, 2015
Downtime hrs,leak/total	95/101 off BL
ESP?	**Yes**
Leak/Incident Loc:	Furthest right roof tube developed a pinhole leak at field weld from 2007 rebuild that washed thin same roof tube and 2 adjacent wall tubes. It was at the location where the first butt weld from the right most front wall tube connects in the horizontal position to the roof tube.
How discovered:	Furnace blow back, feed water steam separation
Wash adjacent tube:	Yes
Root cause:	
Leak detection:	Yes. Ashland Water Mass & Chemical Balance
Bed cooling enhanc	No
Last full inspection:	November 2014
Sequence of events:	Sometime shortly after 16:00 on 6/10/15 the boiler tender observed boiler blowing back significantly at the liquor gun ports and darkening in the furnace. During this same time period the control room operator observed high furnace pressure, feed water and steam separation and drum level swing. Department management happened to enter the control room about the same time this was happening and other managers got involved as well. Feed water/steam separation, drum level swing and furnace pressure began to recover for a short period of time while a boiler walk down was initiated. An unusually noise was heard on right side of the boiler one floor below the steam drum. Sootblowing steam was isolated and the noise continued. A deviation in feed water and steam flow was noted and the ESP procedure was initiated at 16:38. Following site procedure the area was reentered after mandatory four hour wait period. No water was visible entering the lower furnace or leaving the spouts all ESP functions were confirmed to have operated properly. The smelt bed cool down period was continued and the leaks were located and repaired.
Repair procedure:	A single roof tube Dutchman was installed in the location of the leaks. A tube panel was removed and replaced on the adjacent sidewall to address two leaking tubes and thinned areas.
Future prevention:	Lack of fusion and porosity in roof tube field weld from 2007 rebuild led to a pinhole leak that washed on same roof tube and seven adjacent wall tubes thinning to the point of failure. Location against wall tubes made weld and X-ray difficult. New furnace side walls were installed prior to completing field weld on outer roof tubes being replaced. The original weld x-ray from 2007 was reviewed and found to have not covered the failed weld location but had been cleared by the technician. Subsequent to the ESP, the failed weld was x-rayed and the defects were revealed. A boiler inspector is reviewing rebuild drawings to determine if any other locations have hard to make and incomplete X-ray welds that should be looked at closer at next opportunity. Note: The pinhole leak appears to have occurred prior to this incident. Operations received the leak alarm and responded by extensive boiler walk down and data review but was convinced the leak was from boiler drains that were leaking.

UPPER FURNACE & SUPERHEATER

Fall 2015-24	
Classification:	**Critical 851**
Location:	**International Paper Orange Mill, Orange, TX**
Unit:	RB2, 1967, B&W, PR-108B, 2 drum, cyclone, sloped floor to front
Unit Size:	2.7 MM lb ds/day; 254,000 lb/hr steam at 850 psig, 835°F, 975 psig design (MAWP)
Incident Date:	April 6, 2015
Downtime hrs, leak/total	74.67
ESP?	**No**
Leak/Incident Loc:	Primary Superheater platen 1 loop row 1, fishmouth, short term overheat. Pinhole leak left side wall on tube 3 at top of nose arch.
How discovered:	High Fan Speed and Increase in furnace pressure
Wash adjacent tube:	No
Root cause:	External corrosion on wall tube; SH short term overheat, lack of cooling steam flow due to failure to clear condensate on startup
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	April 2014
Sequence of events:	Recovery boiler #2 was starting up after a water contamination issue. A small amount of black liquor contaminated the boiler feed water. The boiler was shutdown, cooled, and then clean condensate was used back flush the superheater and wall tubes until 20 micro S was reached on rear wall drain. The boiler was being started up from dirty conditions (saltcake buildup on tubes especially the sidewall to 1st superheater platen on both sides of the boiler. At 6:05 am the intermediate loop on the PSH 1st platen on the hot side of the IK pass failed. The operators recognized that it was a superheater failure from the increase in fan speed and the increase in feedwater demand and immediately shut down. On the hydro from the superheater leak a pinhole leak was discovered on the left side wall on tube 3. It was a leak at an external corrosion pit. The tube was tested for thickness. It was above ASME minimum. The pit was ground clean and weld repaired. This section is scheduled to be replaced during April 2015 annual outage – 14 days away.
Repair procedure:	Replaced bottom of SH loop. Wall tube pit was ground clean and weld repaired.
Future prevention:	Revise tube clearing procedure and methods.

UPPER FURNACE

FALL 2015 – 25	
Classification:	**Noncritical**
Location:	**WestRock, West Point, VA**
Unit:	RB5, 1992, B&W, PR-219, Single drum, large economizer, Rear-slope floor
Unit Size:	3.0 MM lb ds/day; 492,000 lb/hr steam at 1225 psig, 900°F, 1450 psig design (MAWP)
Incident Date:	March 29, 2015
Downtime hrs, leak/total	31/31
ESP?	**No**
Leak/Incident Loc:	Small crack (1/2") directly above tube to header weld; steam-cooled right sidewall panel, arch enclosure.
How discovered:	Operator walkdown
Wash adjacent tube:	no
Root cause:	Results from metallurgical analysis showed that the root cause of the failure was SAC caused by thermal or mechanical cyclic stresses exerted on the tube during operation.
Leak detection:	no
Bed cooling enhance:	no
Last full inspection:	March 2014
Sequence of events:	#5 Recovery was brought back on line at 8:30 pm on March 28th, 2015 following the mill's annual outage. While performing a boiler startup walk down the 2nd Assistant noticed a small amount of moisture escaping from underneath the lagging on the lower right hand steam cooled wall header. This wall is located in the nose arch vestibule area. The 2nd Assistant notified the proper personnel and decision was made to keep boiler on line until the following morning. This decision was based on that no liquor had been fired in the boiler, leak was external to furnace, and from previous leak experience in this location. Boiler was taken off line at 5 am the following day, cooled, and repairs made. Boiler was then hydro'd and brought back on line at 2 pm on March 30, 2015.
Repair procedure:	4 inch tube stub was washed from header and new tube stub was installed. Top of stub was welded to new tube section that was installed the previous year.
Future prevention:	Startup procedures have been modified to include step to remove water from these steam cooled sections by blowing down the headers during startup

UPPER FURNACE

FALL 2015 – 26	
Classification:	**Noncritical**
Location:	**Georgia Pacific, Brunswick, GA**
Unit:	RB5, 1970, B&W, PR-145, 2 drum unit, large econ, sloped floor
Unit Size:	3.9 MM lb ds/day; 540,000 lb/hr steam at 1225 psig, 825°F, 1500 psig design (MAWP)
Incident Date:	August 23, 2015
Downtime hrs, leak/total	43/43 hours
ESP?	**Yes**
Leak/Incident Loc:	Upper furnace wall tube, crack near top of boiler bank hopper
How discovered:	Operator walkdown
Wash adjacent tube:	No
Root cause:	Stress crack at hopper attachment weld
Leak detection:	yes
Bed cooling enhance:	yes
Last full inspection:	August 2015
Sequence of events:	During a walk-down of the unit, the operator noticed that steam was blowing from an external crack in a furnace wall tube at the mud drum elevation. The operator returned to the control room and the decision was made to ESP the unit. The leak was external, but because they could not get close enough to inspect the area, they felt the safest option was to rapid drain in case the tube were to rupture while bringing the unit down. After a 6 hour waiting period, the area was inspected and a 2" vertical crack found in a furnace wall tube adjacent to a boiler hopper casing weld. No other cracking was observed and the tube thickness was OK. The

	crack was ground out and weld repaired. After cooling the bed with sodium bicarbonate, the boiler was hydroed and started back up.
Repair procedure:	Crack was ground out and weld repaired.
Future prevention:	Remove lagging and insulation and inspect for similar cracking.

LOWER FURNACE

Fall 2015 –27	
Classification:	**Critical 852**
Location:	**Green Bay Packaging, Arkansas Kraft Division, Morrilton, AR**
Unit:	RB2, 1974, CE, 20973, 2 Drum, Large Economizer, Decant Floor
Unit Size:	2.0 MM lb ds/day; 346,000 lb/hr steam at 600 psig, 725°F, 725 psig design (MAWP)
Incident Date:	February 28, 2015
Downtime hrs, leak/total	88hrs
ESP?	**Yes**
Leak/Incident Loc:	Front wall, tube #62, 18.5' Above floor
How discovered:	Visual
Wash adjacent tube:	No
Root cause:	Faulty weld. Weld porosity which propagated from the tube interior to the exterior.
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	May, 2014
Sequence of events:	On February 24th at 0709am, Recovery unit was being removed from service for a scheduled down day. Gas starter burners were placed in service and bed was being burned out, as liquor guns were being removed the operator noticed a leak below and to the right of the opposite liquor gun port. Operator informed supervisor and unit was ESP'd. Control room operators and field personnel evacuated to the remote DCS to monitor the balance of the mill. Steam flow was 54KPPH, drum pressure 592PSI and drum level was +1.9". Liquor flow was <100gpm at 12psi, and 280°F. Electromatic vent valve opened at 0724. Boiler at 0 psi at 0848. Water level in boiler was 8' above floor and leak had stopped. Mill all clear was sounded and authorized personnel returned to local control room.
Repair procedure:	88.5" dutchman
Future prevention:	

LOWER FURNACE

FALL 2015 – 28	
Classification:	**Noncritical**
Location:	**WestRock, Panama City, FL**
Unit:	RB2, 1971, CE, 27070, 2 drums, cascade evaporators, decant
Unit Size:	2.97 MM lb ds/day; 398,000 lb/hr steam at 450 psig, 750°F, 570 psig design (MAWP)
Incident Date:	March 28, 2015
Downtime hrs, leak/total	22/26
ESP?	**No**
Leak/Incident Loc:	½" circumferential crack, Tube 107 on left hand side wall at 23 ft elevation external to the furnace
How discovered:	Operator round
Wash adjacent tube:	No
Root cause:	Stress crack
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	March 2015
Sequence of events:	The operator in the area observed water coming out from behind the insulation and lagging on the left wall of No. 2 RB at 3:00 am on 3/28/15. There was no indication of water entering the furnace. The lagging and insulation in this area was removed and a crack was identified on

	the exterior of tube 107 at 4:10 am. The boiler was taken off liquor at 6:35 am and taken down for the repair at 8:35 am.
Repair procedure:	The crack was ground out and pad welded. In the process of the repair, the crack propagated from below the clip to above the clip. The clip was removed and all crack indications were removed and weld repaired.
Future prevention:	Tubes 107 and 106 will be sectioned and replaced in this area in our March 2016 annual mill maintenance outage. Additional inspections will also be made in this area during the next annual outage.

RISER

Fall 2015 –29	
Classification:	**Noncritical**
Location:	**WestRock, West Point, Va.**
Unit:	RB4, 1975, CE, 21975, 2 drum, decanting hearth, DCE Cascade
Unit Size:	2.7 MM lb ds/day; 427,000 lb/hr steam at 1225 psig, 900°F, 1360 psig design
Incident Date:	March 23, 2015
Downtime hrs, leak/total	NA
ESP?	**No**
Leak/Incident Loc:	Riser tube in penthouse
How discovered:	Boiler contractor noticed washed area on tube during scheduled outage
Wash adjacent tube:	no
Root cause:	Under deposit corrosion
Leak detection:	no
Bed cooling enhance:	no
Last full inspection:	March, 2014
Sequence of events:	On March 23, 2015 while scheduled outage work was being performed in the #4 Recovery's penthouse a boiler contractor noticed signs of a leak on a lower riser tube (#15) which fed the steam drum from the right side wall header. This leak appeared to be located on the top of the riser tube directly under a retaining bar. Following this discovery NDT was performed on all 50 riser tubes feeding the drum from the left and right side wall headers and the screen tube mini headers. Readings were taken at three foot intervals on the horizontal sections of these tubes from the drum to the first 90 degree bend. Out of the approximately 500 thickness checks 9 locations were found to be below ASME min wall. Decision was made to replace any section of tube that had a wall thickness less than 0.181", ASME min wall plus 10%. Using this guideline 13 dutchmen of varying lengths were installed. During the end of outage hydro another pin hole leak was located on a lower riser tube (#17) that feeds the steam drum from the right side wall header. The location of this leak was directly under a "1 inch flat bar" retaining strap. Due to the discovery of this leak 52 additional NDE checks were performed directly under all of the retaining straps. This additional NDE work discovered an additional 14 locations on the riser tubes that where below our required thickness of 181 mils. To remove these 14 indications an additional 14 dutchmen of varying lengths had to be installed.
Repair procedure:	Replaced tube sections. All remaining risers were checked with a boroscope for deposits. All remaining risers were hydro-blasted to remove any deposits.
Future prevention:	100% replacement of risers

SH STEAM SUPPLY TUBE

Fall 2015 – 30	
Classification:	**Noncritical**
Location:	**Sappi NA – Somerset, Skowhegan ME**
Unit:	RB1, 1976, CE, 21774, 2-Drum, Large Economizer, Decant
Unit Size:	5.2 MM lb ds/day; 775,000 lb/hr steam at 900 psig, 855°F, 1050 psig design (MAWP)
Incident Date:	March 18, 2015
Downtime hrs, leak/total:	37 hours (additional hours from the economizer leak)
ESP?	**No**
Leak/Incident Loc:	Steam supply tube from the steam drum to the front superheater
How discovered:	Hydro
Wash adjacent tube:	No
Root cause:	Tube wall abrasion from a support rod
Leak detection:	N/A
Bed cooling enhance:	N/A
Last full inspection:	October 2014
Sequence of events:	On March 18 the Recovery Boiler was hydro tested after a repair to a tube leak in the front economizer. During the hydro test, water was discovered in the boiler penthouse. An entry and closer inspection revealed a leak in the bottom of saturated steam supply to the front superheater inlet header tube #12.
Repair procedure:	Grind, prep and filled with weld per code
Future prevention:	100% visual inspection and random NDE during next annual outage

SMELT SPOUT

Fall 2015 – 31	
Classification:	**Critical 853**
Location:	**Domtar, Dryden, Ontario.**
Unit:	RB4, 2004, Kvaerner, 17549, single drum, large economizer, decant
Unit Size:	3.7 MM lb. ds/day; 682,771 lb./hr, 1265 psig, 900°F, 1640 psig (MAWP)
Incident Date:	February 26, 2015
Downtime hrs, leak/total	87.5
ESP?	**Yes**
Leak/Incident Loc:	Spout failure, ¼" hole on inserted end of #4 spout, 7 o'clock position
How discovered:	Walkdown
Wash adjacent tube:	n/a
Root cause:	Most probable cause is a chain of weld porosity
Leak detection:	no
Bed cooling enhance:	no
Last full inspection:	May 2015
Sequence of events:	Recovery Area Supervisor was performing a walk down of the RB4 boiler for the purposes of a workplace inspection. At approximately 11:15 am, he heard abnormal noises which appeared to be coming from the spout area. He proceeded back into the control room to ask the Operator if he had noticed abnormalities around spout operation. The Operator indicated he also heard a noise that from the control room sounded like someone was moving material on the floor above. At that point the Evaporator Operator pointed out evidence of some smelt spitting at the #4 spout location on the smelt spout camera. Area Supervisor asked the Operator to get in touch with the Field Engineer 1 to inspect and determine why some of the smelt was spitting out from that spout. At the same time the Area Supervisor went down to the spout floor and by observing from the railing he could see what appeared to be a smelt/water reaction taking place close to the boiler opening on #4 spout. Area Supervisor proceeded to go to the lobby to give the Superintendent a call to notify him of the situation. During this time, the FE1 and the Shift Engineer went to the spout floor to assess the situation. Both SE and FE1 then met Area Supervisor in the lobby discussing that a boiler ESP may be required. Area Supervisor asked everyone to go to the control room right away for a discussion with the operator. Back at the control room, a quick discussion was held and since there was clear evidence of water/smelt reaction at the smelt bed elevation in the # 4 smelt spout area with the water source unknown thus could not be stopped immediately, the decision was made to activate the ESP. The ESP was activated by the Control Room Engineer 1 (Operator) at 11:25am.
Repair procedure:	Replaced spout
Future prevention:	In regards to the spout failure, our short term corrective action is to install a 1/8" thick 309 L weld overlay over the suspect weld to the new spouts being installed at our upcoming shut down under the advisement of Acuren metallurgist. The new spouts being installed were manufactured in the same period of the failed one and it is our understanding that NDE alone would not be 100% conclusive in regards to the weld quality in that particular location once fabricated. It is also our intent in the near future to have engaged discussions with our spout manufacturer for an agreed upon long term solution in respect to QA/QC.

DISSOLVING TANK EXPLOSION, SUPPLY TUBE LEAK

Fall 2015 – 32	
Classification:	**Dissolving Tank Explosion #35**
Location:	**WestRock, Panama City, FL**
Unit:	RB2, 1971, CE, 27070, 2-Drum, Cascade, Decant
Unit Size:	2.97 MM lb ds/day; 398,000 lb/hr steam at 450 psig, 750°F, 570 psig design (MAWP)
Incident Date:	February 2, 2015
Downtime hrs, leak/total:	222/292
ESP?	**Yes**
Leak/Incident Loc:	Dissolving tank explosion, Partially sheared supply tube at weld to header; 5th supply tube LHSW (counting from FW). Also Found SH tube leaking on hydro.
How discovered:	Control Room Indication: Sudden loss of drum level, vapor observed in building
Wash adjacent tube:	No
Root cause:	Lack of dilution flow to 2B dissolving tank (2 tanks, in series), explosion lifted DT roof / support beam. This beam struck supply tube. Bending it upwards, tearing at header.
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	February 2013
Sequence of events:	Operators were in the process of restarting the mill from a total power failure from Jan 31. RB #2 came on line and liquor was fired the morning of Feb 2, at the 6AM shift change. At 12:24 PM, the recovery control room operator heard a loud bang. Drum level immediately started dropping, and Steam / Feedwater flows began separating. At 12:25 PM, the operator initiated an ESP
Repair procedure:	Repaired DT, supply tube was replaced and SH tube was weld repaired.
Future prevention:	✓ Review High dissolving tank density EOP's and modify as necessary. Should include specific steps to take as increasing density up to MFT. ✓ Add pre-black liquor firing checklist to include weak wash and emergency water valve lineup. ✓ Verify dissolving tank(s) have the required BLRBAC instrumentation and appropriate alarms: o Weak Wash Flow o Dissolving Tank Density o Dissolving Tank Temperature (Class II, but would have helped in this incident) o Agitator amps with high and low alarm ✓ Review this incident in annual Recovery Boiler Emergency Scenario training

DISSOLVING TANK EXPLOSION

Fall 2015-33	
Classification:	**Dissolving Tank Explosion #36**
Location:	**International Paper Orange Mill, Orange, TX**
Unit:	RB2, 1967, B&W, PR-108B, 2 drum, cyclone, sloped floor to front
Unit Size:	2.7 MM lb ds/day; 254,000 lb/hr steam at 850 psig, 835°F, 975 psig design (MAWP)
Incident Date:	July 10, 2015
Downtime hrs, leak/total	180 hours
ESP?	**No**
Leak/Incident Loc:	Dissolving tank explosion
How discovered:	Noise.
Wash adjacent tube:	
Root cause:	Burner reliability, operator skills and knowledge, methods to unplug spouts, continued to sootblow when liquor was out of boiler
Leak detection:	Nalco RBLI system
Bed cooling enhance:	
Last full inspection:	April 2015
Sequence of events:	7 hours after being off liquor the west spout opened up and had a smelt rush. Time line of events: 7:13 pm on 7-9-15 turbine tripped. #2 recovery boiler tripped on low drum level 8:49 pm fired first burner 9:21pm fired second burner 10:10 pm fired third burner and then others 2:30 am fired liquor 5:00 am pulled liquor due to mix tank level issues 5:00 am able to hold 2 gas burners in boiler and hold 69Kft3/hr gas rate 5:23 am lost burner and was able to hold 43K gas rate after restart then quick return to 69K gas rate. Burners 1 and 7 in service (1-rear wall, 7 left wall rear burner) Steam rate was nil. 0-20K 5:30-5:45 am shift change Note: operators reported both spouts flowing at time of shift change and no bed remaining. 7:49 am was able to get additional burners to light, gas rate went to 167 over the next 15 minutes. Burners 1,2,3,4,7 in service 8:10 am Steam rate increased to 77K 9:23 am operator noticed IK system still in service with no liquor being fired and stopped IK's 9:25 steam rate increased to 117K +/- 10:30 am operators reported that the spouts were plugged and went to work on the spouts +/- 11:30 am operators had chased parts around for come along and had tried to pull the rod unsuccessfully and went to eat 11:55 am the spout opened and began to flow freely 11:57 operator cut all fuel – gas was at 170K and steam was at 125K 11:57 operator increased primary air from 92K to 115K#/hr 12:14 operator returned primary air to normal Tank and associated piping was repaired and boiler returned to burning liquor 7-17-2015 at 11:30 pm. No injuries or near miss. Operators were away from the tank at time of incident. Operators sheltered in place in control room once event was underway.
Repair procedure:	Replace damaged components of tank and associated piping
Future prevention:	New employee training, procedure review, improve burner reliability, setting of critical burners for high priority repair, review design of dissolving tank vent capacity, alarming for sootblowing when not on liquor, review agitation of the tank and review of alarms on low amps, review method on how to manage, review of shatter jet mounting system and design

INTERNATIONAL INCIDENTS

ECONOMIZER

FALL 2015 – 1139	
Classification:	
Location:	International Paper, Rajahmundry, AP, India
Unit:	RB4, 2007, Supplied by Andritz , Single drum, Large Economizer, Decant
Unit Size:	1500 Tds/day Liquor firing , 210 TPH steam flow , steam pressure :65 bar, Steam temp.=460 Deg
Incident Date:	March 11, 2015
Downtime hrs, leak/total	30 hours
ESP?	**No**
Leak/Incident Loc:	Economiser-1 panel Bottom large inlet header, supply tube crack at top of weld to inlet header, 11 (row B, 6) tube from Boiler RHS side (CF-6 Boiler side)
How discovered:	Operator walkdown
Wash adjacent tube:	no
Root cause:	May be due to Cyclic stress or localized stress developed due to shop welding.
Leak detection:	No
Bed cooling enhance	No
Last full inspection:	April 2013
Sequence of events:	• At 3 PM on 11/03/2015 the operator reported out to shift in charge that he had an indication of water in Economizer 1 hopper. • At 3:15 PM shift in charge went to field to further investigate. He found that leakage in economizer -1 and he informed to Power boiler manger. • At 3.20 power boiler manger went to field. It was determine that there is leakage at ECO-1. • At 4.30 PM one meeting was held for stopping of recovery boiler. A plan was developed for stopping of recovery boiler and related to other plant. • Boiler was shut down at 8 PM on 11/03/15 when bed was burned out. • After leak repairs boiler was hydrostatic tested and economizer leak was found to be repaired successfully. Oil firing started at 7.15 pm on 12/03/15, Liquor firing at 2.30 PM on 13/03/15. Boiler went online at 3PM 13/03/15.
Repair procedure:	grind out defect, NDT and weld
Future prevention:	extensive NDT of bottom header ,

SUPERHEATER

Fall 2015 –1140	
Classification:	
Location:	**Luiz Antônio Mill; Luiz Antônio; SP; Brazil**
Unit:	#1 RB; 1991, CBC/Andritz; CBC 19463, 2 drums, Large Economizer, Decant
Unit Size:	3.3 MM lb ds/day; 509,109 lb/hr steam at 1109 psig, 842°F, 1123 psig design (MAWP)
Incident Date:	February 2, 2015
Downtime hrs, leak/total	12 / 192
ESP?	**No**
Leak/Incident Loc:	High temperature secondary superheater outlet tubes, 2 leaks
How discovered:	Hydrostatic test during annual outage
Wash adjacent tube:	No
Root cause:	Corrosion in high crown seal box, above roof
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	February 2015(just prior to the leak being detected during the same annual outage)

Sequence of events:	Found during hydrostatic testing
Repair procedure:	Tube section replacement
Future prevention:	Open high crown seals and inspect for corrosion and repair as needed.

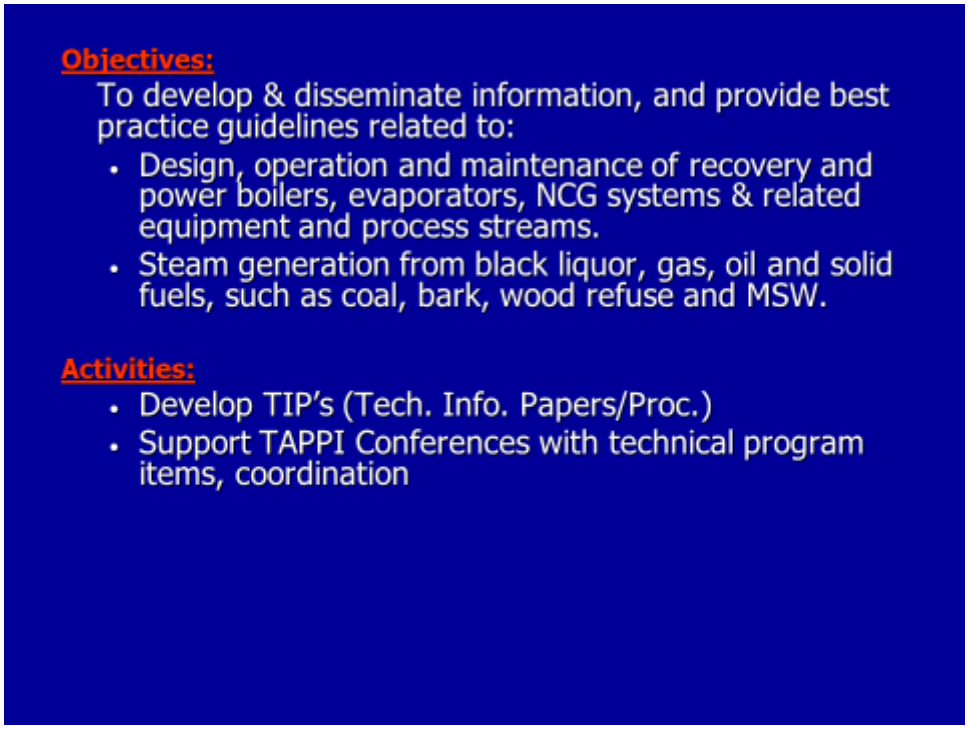
SUPERHEATER

Fall 2015 –1141	
Classification:	
Location:	**Luiz Antônio Mill; Luiz Antônio; SP; Brazil**
Unit:	#1 RB; 1991, CBC/Andritz; CBC 19463, 2 drums, Large Economizer, Decant
Unit Size:	3.3 MM lb ds/day; 509,109 lb/hr steam at 1109 psig, 842°F, 1123 psig design (MAWP)
Incident Date:	August 4, 2015
Downtime hrs, leak/total	0 / 15
ESP?	**No**
Leak/Incident Loc:	High temperature secondary superheater outlet tube, 1 leak
How discovered:	Hydrostatic test during schedule water wash outage
Wash adjacent tube:	No
Root cause:	Corrosion in high crown seal box, above roof
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	February 2015
Sequence of events:	Found during hydrostatic testing
Repair procedure:	Tube section replacement
Future prevention:	Open high crown seals and inspect for corrosion and repair as needed.

UPPER FURNACE

Fall 2015 –1142	
Classification:	
Location:	**Luiz Antônio Mill; Luiz Antônio; SP; Brazil**
Unit:	#1 RB; 1991, CBC/Andritz; CBC 19463, 2 drums, Large Economizer, Decant
Unit Size:	3.3 MM lb ds/day; 509,109 lb/hr steam at 1109 psig, 842°F, 1123 psig design (MAWP)
Incident Date:	August 4, 2015
Downtime hrs, leak/total	15 / 15
ESP?	**No**
Leak/Incident Loc:	7/8” circumferential crack, right wall tube at top, rear of nose arch, last wall tube before boiler bank sidewall, just above bifurcate weld.
How discovered:	Operator inspection before start of water wash.
Wash adjacent tube:	No
Root cause:	Possible thermal fatigue due to condensate contact.
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	February 2015(just prior to the leak being detected during the same annual outage)
Sequence of events:	Found during hydrostatic testing
Repair procedure:	12” tube section replacement
Future prevention:	Perform visual inspection in all outages and walk down inspection in operation

APPENDIX B
TAPPI REPORT



TIP's Published in 2015

- TIP 0416-10; Stripping of Kraft pulping process condensates: regulations, design and operation (L. Paul Johnson)
- TIP 0416-11; Recommended test procedure for black liquor evaporators (Christopher L. Verrill)
- TIP 0416-15; Chloride and potassium measurement and control in the pulping and chemical recovery cycle (Andrew Jones)

TIP's Published in 2015

- TIP 0416-25; Nitrogen oxide emissions control from biomass and Kraft recovery boilers in the pulp and paper industry (John F LaFond)
- TIP 0416-26; Best practice for recovery boiler inspection (optimizing inspection scope) (Chris Jackson)

TIP's Under Review

- TIP 0416-08; Guidelines for replacement of generating bank tubes with expanded joints in two-drum boilers (Michael Lykins)
- TIP 0416-06; Keys to successful chemical cleaning of boilers (James N. Graham)
- TIP 0416-03; Water quality and monitoring requirements for paper mill boilers operating on high purity feedwater (James N. Graham)
- TIP 0416-05; Response to contamination of high purity boiler feedwater (James N. Graham)

TIP's Under Review

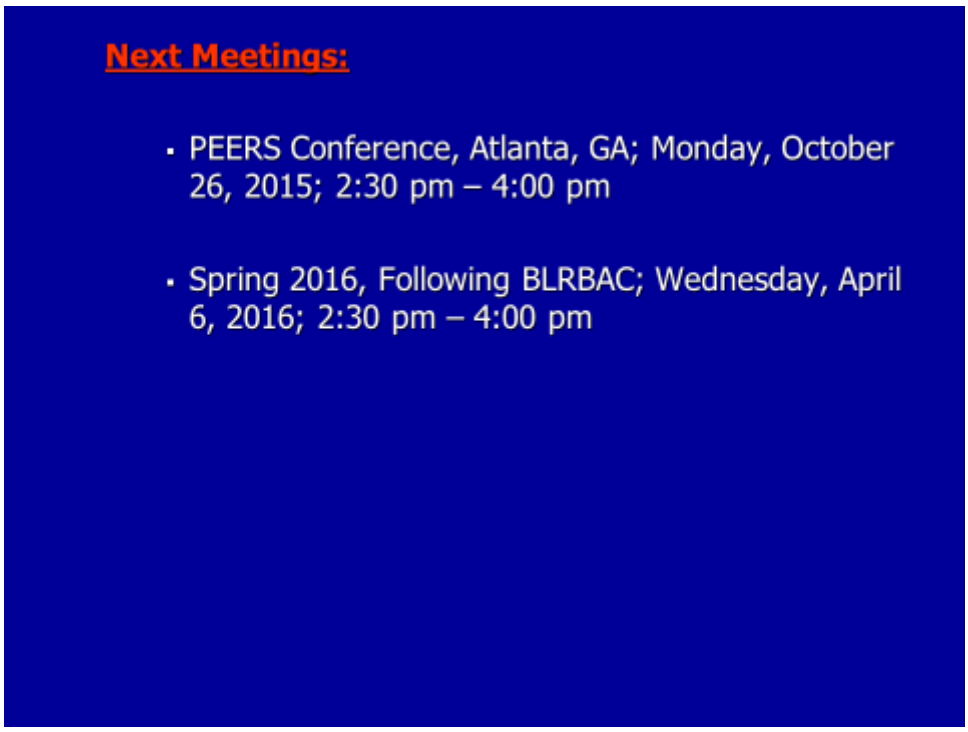
- TIP 0416-14; Water quality and monitoring requirements for paper mill boilers operating with softened makeup water (James N. Graham)
- TIP 0416-02; Definitions of black liquor recovery furnace availability (Len Erickson)
- TIP 0416-04; Design engineer decisions tree: paper mill boiler feedwater (James N. Graham)
- Next TIP up for review in 2017

New TIP's in Development

- TIP 0416-**; Black liquor recovery boiler inspection planning and implementation (Bentley Sherlock)
- TIP 0416-**; Green liquor density measurement (Thanh Trung)

Possible TIP's Proposed

- Steam Blow Procedures
- Wet ESP Considerations
- Recovery Boiler Fouling
- Considerations for extending recovery boiler outage cycles


Next Meetings:
PEERS Conference, Atlanta, GA; Monday, October 26, 2015; 2:30 pm – 4:00 pm
Spring 2016, Following BLRBAC; Wednesday, April 6, 2016; 2:30 pm – 4:00 pm