BLACK LIQUOR RECOVERY BOILER
ADVISORY COMMITTEE

MINUTES OF MEETING
Crowne Plaza Hotel/Atlanta Airport
Atlanta, Georgia
October 6, 7 and 8, 2014

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:	**Scott Moyer** RockTenn 9469-I Eastport Road Jacksonville, FL 32218	Tel: 904-437-7149 **smoyer@rocktenn.com**
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Treasurer:	**Len Olavessen** LENRO, Inc.	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	**March-April**	**30, 31 & 1**	**-*-**	**2015**
Fall	**October**	**5, 6 & 7**	**--**	**2015**
Spring	**April**	**4, 5 & 6**	**--**	**2016**
Fall	**October**	**3, 4 & 5**	**--**	**2016**
Spring	**April**	**3, 4 & 5**	**--**	**2017**
Fall	**October**	**2, 3 & 4**	**--**	**2017**

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

■ Past Chairman Lon Schroeder

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*Changed by Executive Committee Member from previously posted dates due to Easter Holiday.

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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Barbara's Cell Phone: 630-640-1805
fhholich@aol.com

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: October 2012)
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)
Checklist and Classification Guide for Instruments and Control Systems
(Dated: February 2012)
Post ESP Guidelines
(Dated: October 2002)

If you have any questions, contact:

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‡**Tim Hicks** Babcock & Wilcox 20 South Van Buren Avenue PO Box 351 Barberton, Ohio, 44203-0351 Tel: 330-860-2820 Cell: 330-730-7216 **tehicks@babcock.com**	‡**Majed Ja'arah** Verso Paper 6775 Lenox Center Court Suite 400 Memphis, TN 38115 Tel: 901-317-5589 **majed.jaarah@versopaper.com**	‡**Guy Labonte** FM Global 600 de la Guachetiere Ouest, 14th Floor Montreal, Que H3B 4L8 Canada Tel: 514-876-7412 Cell: 514-942-3651 **guy.labonte@fmglobal.com**
‡**Scott Moyer** RockTenn 9469-I Eastport Road Jacksonville, FL 32218 Tel: 904-531-9394 Cell: 386-227-8991 smoyer@rocktenn.com	‡**Doug Murch** MeadWestvaco 501 South 5th Street Richmond VA 23219 Tel: 804-444-5245 Cell: 804-787-0781 douglas.murch@mwv.com	‡**Bob Phelps** Extra Hand, Plant Support Services 5440 Karma Road Chester, VA 23831 Ph. (804) 921-7374 Cell: 804-748-4391 **robert.pheleps1@verison.net**

‡ Denotes attendance at meeting in October 2014

SAFE FIRING OF BLACK LIQUOR SUBCOMMITTEE (Cont.)

Aaron Rose Georgia-Pacific 133 Peachtree St. NE P.O. Box 105605 Atlanta, GA 30348-5605 Tel: 404-652-2968 Cell: 770-596-7704 **aaron.rose@gapac.com**	‡**Mark Sargent** Consultant 857 Tall Trees Drive Cincinnati, OH 45245 Tel: 514-543-0480 msarge@yahoo.com	‡**Alvaro Timotheo** Andritz Pulp & Paper 1115 Northmeadow Parkway Roswell, GA 30076-3857 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**		

‡ Denotes attendance at meeting in October 2014

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** Andritz 10745 Westside Parkway Alpharetta, GA 30004 Tel: 770-640-2571 **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**	‡**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**
Bentley Sherlock Georgia Pacific Corp. Atlanta, GA Tel: 404-652-4608 Cell: 404-884-4872 **bentley.sherlock@gapac.com**	**Michael D. Sides** XL GAPS 1360 Olympia Park Circle Ocoee, FL 34761 Tel: 407-656-4275 Mobile: 407-462-4622 **michael.sides@xlgroup.com**	**John Veltre** Chartis 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**		

‡ Denotes attendance at meeting in October 2014.

WATER TREATMENT SUBCOMMITTEE

Tom Madersky
Power Specialists Assoc., Inc.
531 Main Street, Somers, CT 06071
Tel: 860-763-3241
tom.madersky@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 Performance Fibers, LLC 4470 Savannah Hwy. Jesup, GA 31545 Tel: 912-588-8213 Cell: 912-432-2921 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 meeting in October 2014.

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	‡**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
‡**Tom Przybylski** Boise Inc. 400 Second Street Int'l Falls, MN 56649 -2327 Tel: 218-285-5011 tomprzybylski@boisepaper.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 meeting in October 2014.

Registered for the meeting were:

3S TEAM
Fudge, Joey, Skiatook, OK
Jones, Mickey, Skiatook, OK
Pyszynski, George, Skiatook, OK
Ratclif, Danni, Skiatook, OK

A.H. Lundberg Associates
Patel, Jean-Claude, Naperville, IL
Seefeld, Paul, Jacksonville, FL
Wass, Greg, Bellevue, WA

Acuren
Griffin, Timothy, Quinnesec, MI

AF&PA
Grant, Tom, Yonkers, NY

AirTek Construction
Moore, Ronnie, Troy, AL

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

Andritz
Herod, Chris, Roswell, GA
Ilmonen, Mika, Roswell, GA
Immonen, Janne, Roswell, GA
Miller, Jason, Roswell, GA
Phillips, John, Roswell, GA
Sims,Alison, Roswell, GA
Soderlund, Harri, Roswell, GA
Timotheo, Alvaro, Roswell, GA

Applied Technical Services
Castle, Bill, Marietta, Georgia

Arcole Power, LLC
Krushinski, Jay, Cheyenne, WY

Atlantic Combustion Tech.
Digdon, David, Amherst, NS, Canada

ATS
Thomas, Brad, Marietta, GA

AXA Matrix Risk Consultants
Hayes, Michael, Miamisburg, OH

AZZ/SMS
Power, Stacy, St. Petersburg, SC

AZZ/WSI
Li, Bingtao, Norcross, GA
Nugent, Mike , Norcross, GA

Babcock & Wilcox
Blair, Michael, Houston, TX
Edwards, Tom, Charlotte, NC
Franks, Ralph, Houston, TX
Hansen, Kenneth, Barberton, OH
Hicks, Timothy, Barberton, OH
Holland, Joseph, Copley, OH
Hovinga, Mark, Barberton, OH
Kornaker, Greg, Barberton, OH
Kulig, John, Barberton, OH
LeClair, Amber, Barberton, OH
McDonald, Lawrence , Barberton, OH
Mishou, Derek, Houston, TX
Osborne, Steve, Barberton, OH
Payne, Zach, Houston, TX
Schwartz, Eric, Barberton, OH
Slack, Dave, Barberton, OH

Beecher Carlson
Eaves, Dennis, Berkeley Lake, GA

Boiler Services & Inspection (BSI)
Clay, Dean, Simsboro, LA

Buckman Laboratories
Amsden, Bill, Pollock, LA
Call, Fred, Newry, ME
McKee, Mark , Memphis, TN

Registered for the meeting were:

CB Anthony Ross
Jost, Lance, Hanover, MD
Tandra, Danny, Atlanta, GA

ChemTreat, Graham
Jim, Collierville, TN

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

Cianbro Corporation
Carver, Jeffrey , Pittsfield, ME
Lerch, Jeffrey , Pittsfield, ME

Clearwater Paper
Beck, Justin, Lewiston, ID
Vilgos, Marty, Lewiston, ID

Combustion Components Assoc. (CCA)
Schindler, Nathan, Monroe, CT

CORR Systems
Ruiz de Molina, Eladio, Birmingham, AL

Delta Training
Lewis, Sam, Wilmington, NC

Diamond Power
Phinney, Michael , Lancaster, OH
Youssef, Simon, Lancaster. OH

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

Electron Machine Corp., The
Conrad, Scott, Umatilla, FL
Osborne, Brad, Umatilla, FL
Vossberg, C. A. , IV, Umatilla, FL

Entech Products
Mathis, Steven, Houston, TX

Envirovac
Williams, Kenny, Guyton, GA

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

Flotech
Gorny, Tomm, Jacksonville, FL
Rapoza, Ryan, North Charleston, SC
Verdier, Daniel, Macon, GA

Fluor
Lewis, John, Greenville, SC

FM Global
Barefoot, David, Four Oaks, NC
Cooke, Craig, Oconomowoc, WI
Cooper, Mark, Woodinville, WA
Hoffman, Daryl, Kirkland, WA
Hume, Everett, Norwood, MA
Jackson, Larry, Alpharetta, GA
Labonté, Guy, Montreal, Que.
Lang, David, Plano, TX
Matarrese, Rick, Alpharetta, GA
Moberg, Eric, Plano, TX
Polagye, Mike, Norwood, MA
Ricardo, Sam, Melbourne, Victoria, Australia

Fossil Power Systems
Donahue, Mark, Dartmouth, NS, Canada

Foster Wheeler
Eric, Charlotte, NC

Fuel Tech, Inc.
Chapman, Zack, Warrenville, IL
Saratovsky, Ian, Warrenville, IL

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

Registered for the meeting were:

Georgia-Pacific
Browning, John, Perdue Hill, AL
Daily, Christopher, Atlanta, GA
Flach, Don, Maricopa, AZ
Guerrero, Alexander, Cedar Springs, GA
Johnston, Jennifer, Atlanta, GA
Morency, Karl, Atlanta, GA
Orender, Robert, Atlanta, GA
Rose, Aaron, Atlanta, GA

Glatfelter
Forry, Jeffrey , Spring Grove, PA
Hollar, Leslie, Chillicothe, OH
Plappert, William , Spring Grove, PA
Rose, Willie, Chillicothe, OH
Stevens, Stanley, Chillicothe, OH

Global Risk Consultants
Greenwood, Andrew, W. Byfleet, Surrey, U.K.
Macaulay, Charlie, Snoqualmie, WA
Smith, Andy, Woodstock, GA

GommiTech
Gommi, Julius, Maple Valley, WA

GP Cellulose, LLC
Lane, Terry, Brunswick, GA
Lentz, Gregg, Brunswick, GA
Meadows, Tom, Brunswick, GA
Miller, Keith, Brunswick, GA

Hartford Steam Boiler (HSB)
Blank, Mike, Hartford, CT

Integrated Global Services
Kahan, David, Richmond, VA

International Paper
Adams, Wayne, Clinton, NC
Bedgood Chris, Campti, LA
Blackard, Vernon, Loveland, OH
Childress, Susan, Loveland, OH
Frazier, David, Loveland, OH
Fuhrmann, Dave, Loveland, OH

International Paper
Kiper, Mike, Loveland, OH
Krekeler, Daniel , Loveland, OH
MacIntire, Wayne, Loveland, OH
Navojosky, Frank, Loveland, OH
Whisonant, Nathan, Campti, LA

Jansen Combustion & Boiler Technologies
La Fond, John , Kirkland, WA
Verloop, Arie, Kirkland, WA

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

Kapstone Paper
Graves, Doug, Longview, WA
Putman, Robert, North Charleston, SC
Richards, Meghan, Longview, WA
Waldher, Chris, Longview, WA

KPAQ Industries LLC
Strahan, Van, St. Francisville, LA
Terrell, Carl, St. Francisville, LA

K-Patents
Hamalainen, Arto, Naperville, IL
Pyorala, Keijo, Naperville, IL
Wagner, Phil, Naperville, IL

Len Erickson
Erickson, Leonard, Boise, ID

Lewis B. Bringman, LLC
Bringman, Lewis, Linthicum, MD

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

Marsh
Gobin Nick, Vancouver, Canada

Registered for the meeting were:

MeadWestvaco
Andrews, John, Charleston, SC
Murch, Douglas, Richmond, VA
Sanders, Doug, Phenix City, AL
Shirley, Wade, Phenix City, AL

Metso
Conley, Clar, Lake Wylie, SC
Haag, Darryl, Lansdale, PA
Lampela, Kari, Duluth, GA

Nalco
Morgan, Mitch, Naperville, IL
Olavessen, Len, Humble, TX
Vittum, Michael, Winterport, ME

National Boiler Service
Harville, Steve, Trenton, GA

Nautilus Loss Control
Jackson, Christopher, Fox Island, WA

NORAM Engineering
Bucher, Wayne, Vancouver, BC, Canada

P. W. BolcSpaw
Cholewa, Krzysztof, Ruda Slaska, Poland
Wiecek, Wojciech, Ruda Slaska, Poland

Packaging Corporation of America
Fiala, Brian, Tomahawk, WI
Gaedtke, Jacob, Tomahawk, WI

Power Specialists Assoc. Inc. (PSA)
Bastarache, Kelli, Somers, CT
Henriques, Fabian, Somers, CT
Lukezich, Steve, Somers, CT
Przybylski, Tom, Somers, CT
Zawistowski, Bob, Somers, CT

Poyry Management Consulting
Maasalo, Mikael, Vaanta, Finland

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

Purolite
Destefano, Frank, Bala Cynwyd, PA
Downey, Don, Bala Cynwyd, PA
Hosler, Jeremy, Bala Cynwyd, PA

Rayonier
Dean, Sam, Jesup, GA
Gray, John, Fernandina Beach, FL
Yeomans, Scott, Jesup, GA

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

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

Robins & Morton
Lawton, Roger, Alpharetta, GA

RockTenn
Buzzell, Maurice, La Tuque, Quebec, Canada
Campbell, Robert , West Point, VA
Lanier, Dustin, West Point, VA
Moyer, Scott, Jacksonville, FL
von Oepen, David, Demopolis, AL

Rocky Mountain Industrial Services (RMIS)
Dunn, Steve, Denver, CO
Wigglesworth, Ernie, Denver, CO

SAPPI
Aderman, Craig, Westbrook, ME
Edgcumbe, Chris, Cloquet, MN
Fredrickson, John, Cloquet, MN

Smith Industrial
Kaiser, Michael, Mobile, AL
Smith, Chris, Mobile, AL

Registered for the meeting were:

Smurfit Kappa Carton de Colombia
Franco, Daniel, Cali, Colombia

Solenis
Johnston, Norris, Laceys Spring, AL
Meredeth, Jim, Gulf Breese, FL
Roof, David, Raleigh, NC

SOMPO Japan Nipponkoa Risk Management
Doi, Ryo-ichi, Shinjuku-ku, Tokyo, Japan
Muramatsu, Kenichi, Shinjuku-ku, Tokyo, Japan

Southern Environmental
Brandt, David, Pensacola, FL
Foster, Stephen, Pensacola, FL
Harris, Don, Pensacola, FL

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

Valmet, Inc.
Biddle, Tyler, Charlotte, NC
Bird, Jennings, Charlotte, NC
Burelle, Raymond, Charlotte, NC
Burrows, Tammy, Charlotte, NC
Cross, Tom, Charlotte, NC
Farmer, Robert, Charlotte, NC
Kittel, David, Charlotte, NC
Martin, James, Charlotte, NC

Valmet, Inc. (Cont.)
Morrison, Dan, Charlotte, NC
Nichols, Jody, Charlotte, NC
Rollan, Carlos, Charlotte, NC
Smith, Dan, Charlotte, NC
Swayne, Greg, Charlotte, NC
Ulrich, Jim, Charlotte, NC
Weikmann, John, Charlotte, NC

Verso Paper
Claverie, Alex, Norway, MI
Ja'arah, Majed, Memphis, TN
Knox, Cale, Jay, ME
O'Neill, Vince, Jay, ME

Weyerhaeuser
Bogart, Steven, Longview, WA
Brewer, Kip, Columbus, MS
Brown, Anitra, Oglethorpe, GA
Burnette, Richard, Oglethorpe, GA
Hudson, Brian, Columbus, MS
Jolly, Mike, Columbus, MS
Knowlen, Bruce, Federal Way, WA
Sharpe, Greg, Oglethorpe, GA
Smith, Kevin, Columbus, MS
Thomas, Gary, Columbus, MS
Watt, Graylin, Columbus, MS

XL GAPS
Franks, James, Somerville, TN

****

MAIN COMMITTEE MEETING

INTRODUCTION – Scott Moyer, Chairman. Good morning! Welcome to the fall 2014 BLRBAC. Thank you for sticking around through Wednesday. The Main Committee Meeting. is now open. This meeting, as are all BLRBAC meetings, is held in strict accordance with BLRBAC's Anti-Trust Policy.

OLD BUSINESS

ACCEPTANCE OF THE SPRING 2014 MEETING MINUTES – Scott Moyer

The Meeting Minutes from the Spring 2014 meeting were posted on the BLRBAC WEB site. Does anyone have corrections? Can I get a motion to accept those Minutes? Can I get a second? All in favor? All opposed? Thank you. The spring 2014 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** – Mike Polagye

NEW REGULAR MEMBERSHIP - None Reported

I think for the first time since I've been Secretary I can report that we have had no applications for new memberships to review. That being said, I recommend all Regular Members check the WEB site or check within your company to make sure that you know who your designated Representative is and to make sure that Barbara has the correct contact information. She gets to use that particularly with the registrations when a check comes in from someone's Finance Department without any names on the stub and no Registration Form enclosed. She contacts the Representative or Alternate Representative to ask for assistance in figuring out who the check is for so she can complete the registration. Also, your Reprehensive and Alternate Representative is the person who can vote when we take votes to approve the Recommended Practices or other Guidelines that come up to vote at this meeting and all other meetings as well as to vote for the slate of officers, which occurs every two years with the next election being today in a few minutes.

NEW ASSOCIATE MEMBERSHIPS - None Reported

NEW CORRESPONDING MEMBERSHIPS – None Reported

2. **NEW MEMBERS/REPRESENTTIVE CHANGES REPORT** – (Cont.)

REGULAR REPRESENTATIVE CHANGES

Irving Pulp & Paper
Dan Mott remains the designated Representative
Dennis Mott replaced Blaine Anderson as designated Alternate Representative

Solenis
Norris Johnston replaced Virginia Durham as designated Representative
Jim Meredeth replaced Norris Johnston as designated Alternate Representative

ASSOCIATE REPRESENTATIVE CHANGES

Metso
Clark Conley is the designated Associate Representative
Jeff Butler is the designated Alternate Associate Representative

CORRESPONDING MEMBERSHIP CHANGES - None Reported

MEMBERSHIP COMPANY NAME CHANGE

Solenis
Previously known as Ashland Water Technologies

Valmet Automation
Previously known as Valmet

MEMBERSHIP COMPANY STATUS CHANGE

Metso
Previously a Regular member; but has become an Associate member.

*{**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 –** Scott Moyer

The Executive Committee met Tuesday afternoon in closed session with five members present. The operating budget for 2015 was reviewed and approved. We have finalized the incorporation of the BLRBAC organization after several years of effort. Incorporation documents were filed with the state of Georgia on Tuesday, October 7, 2014. BLRBAC is officially incorporated!

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

Per the BLRBAC bylaws, the following slate of officers has been nominated for a two year term beginning after today's business meeting:

Chairman – John Gray from Rayonier
Vice Chairman – Dave Slagel from Weyerhaeuser
Manufacturer's Representative – John Phillips from Andritz
Insurance Representative – Jimmy Onstead from FM Global
Operating Company Representative – David VonOepen from RockTenn

Will the voting members, those with a red ribbons, please rise. Unless there is an objection, we will vote this slate of officers as one vote. Any objections? All in favor of the recommended slate of officers? Opposed? The slate of officers was approved unanimously by the voting members present.

A recognition plaque is being presented to Jules Gommi as he is retiring from BLRBAC work after many years of dedicated service. Hopefully you will enjoy your retirement. (Applause!)

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

Let me start with the normal accounts:

201 Advance Registrations
35 At Door
17 Paper Companies
8 Insurance Companies
4 Boiler Manufacturers
38 Associate Member Companies
4 Guests of Member Companies

We had a total of six folks from outside of the continental United States; two from Japan, two from Poland, one from Colombia, and one from Great Britain. Welcome to all of you!

That represents an average head count of around 240 per meeting that we've had the last three or four meetings. Using that information, the 2015 budget was put together. If we maintain that level, we anticipate getting about $66, 000 or $67,000 in registration fees next year. That is a conservative estimate based on the attendance from the last three meetings.

Our costs anticipated for next year are expected to be around $68,000 with some reserve funds in there for things like the incorporation and purchasing liability insurance, etc. That will cost us some money. The Crowne Plaza costs have gone up a little bit year after year. We have an increase for the audio-visual. Also slight increases for travel expenses. We have a new on-line accounting services. We are getting big enough and we are handling enough money that I suggested to the Executive Committee that we really need some professional assistance in making sure our books are in order so we don't get into trouble with the IRS down the road and because I'm a chemist and not a bookkeeper. Also, I didn't marry a CPA like Ron Hess.

3. **TREASURER'S REPORT** – (Cont.)

The last item which I'd like to cover with you is beginning with the spring meeting At Door registrations will be able to be paid for with a credit card or a debit card. (Applause.) Its cost is not too much for us on an annual basis, maybe $500 or $600. The biggest cost is purchasing the card reader. One thing I'm going to try to do is get a unit that has a chip and pen capability because the US is getting away from magnetic strip and going to chip and pen. The overseas visitors are all using chip and pen type cards. At any rate, even though I anticipate $66,000/$67,000 income with a $68,100.00 proposed budget which was approved for 2015, I need to tell you that our current cash on hand as of Tuesday was $94,144.94. So, I'm not worried if we are a little short on registration revenue. We have plenty funds in the bank. I anticipate the expenses through the end of the year of around $24,000 or $25,000 which means we should end the year with almost $70,000 cash-on-hand in the bank.

We no longer have a Certificate of Deposit. That has been rolled over into the Checking Account.

As far as the incorporation goes, since I'm low man on the totem pole, I got stuck with going out and getting the liability insurance. We need some other legal paperwork in order to do business as BLRBAC because our official incorporation title is Black Liquor Recovery Boiler Advisory Committee, Inc. So I have to do a d/b/a certification with Fulton County, which I will do. Like I said, get the liability insurance, change the checks, and all that stuff that is important to reflect our new title.

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

First, I want to note there were a couple changes to the Meeting Minutes from 2013 regarding the Incident Summaries. The revised PDF files for the April 2013 and the October 2013 Meeting Minutes are posted on the BLRBAC website. The changes for April 2013 were very minor. However, the Incident List that was included with the Meeting Minutes for the October 2014 meeting was the wrong list. The correct Incidents are now included with the October 2014 meeting minutes. My apologies for any confusion that may have caused

For anybody who is here for the first time; welcome! Assuming you included your e-mail address when you submitted your Registration Form, you will be added, as are all attendees, to the BLRBAC mailing list. You will receive all future communications letting you know when documents are posted for membership review and comments, when the next meeting registration materials are available, when meeting minutes are posted, etc. It all gets sent out by e-mail and you will be on that list. So it is important that you keep your e-mail address up-to-date if you want to continue receiving these communications.

With that being said, I will be retiring from FM Global at the end of this year. So I will be asking Barbara to put my personal e-mail address (mpolagye@gmail.com) in the meeting minutes so that through the transition to the new Secretary of BLRBAC I will be able to continue to receive all the e-mails. Please be sure to check the contact information that will be updated and posted on the BLRBAC website, as well as these Minutes for my correct e-mail address.

4. **SECRETARY'S REPORT** – (Cont.)

CHAIRMAN - Mike kind of sprung this on us. He has been hinting at this for years, but had we known, we would have prepared some recognition for him as well. Mike has been on the Executive Committee as Secretary for about 12 years maybe. For those of you who don't know, that is probably the position at BLRBAC that requires the most amount of work. Between managing the secretarial services and dealing with the subcommittee chairs, it can take up quite a few hours over and above what the average person in this room is required to put in. So in addition to that, as Chairman, he has been a tremendous help to me. He is a very organized guy who helps keep track of what's going on, what we decide and what we did, and where we're going. So he has been an invaluable help to me and I'm sure to the past Chairman. He has also been a good friend! So we will miss you, Mike. I do have a chalice for you. Thank you again, Mike for all your work. I appreciate it. (Applause.)

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.

SECRETARY'S REPORT – (Cont.)

All Advance Registration attendees are recorded, given a registration number and sent a verification e-mail 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. There are no exceptions when paying after the cut-off date, your organization will be required to pay the higher At Door fee.

5. SUBCOMMITTEE REPORTS

5.1 AUXILIARY FUEL REPORT – Bruce Knowlen

The Safe Firing of Auxiliary Fuel Subcommittee meeting opened at 1:10 pm on Oct 6, 2014 with the BLRBAC Anti-Trust Policy. The minutes from the last meeting were read and acknowledged by all present.

Introductions were made around the room. There were 3 of 9 members present and 15 visitors. It was noted that the subcommittee was short of a quorum to continue with the business planned. However, with the participation of the guests, we proceeded to discuss the topics of the agenda and collect the perspective of those attending.

Three guests indicated interest in joining the subcommittee. These will be contacted to gather details to submit to the members at the next opportunity.

The Chair asked if there were any items of concern from the guests that SFAF SC could help them with. No new items were brought forward and attention turned immediately to the three planned topics.

The first item was to continue work on improving the SFAF position on Furnace Purge and Precipitator operation relative to those of NFPA 85. Task team effort since the last meeting was presented. A revised paragraph to outline the extent of furnace purge was read to replace a sentence in the SFAF section 4.1. Also considered was whether to remove power from an electrostatic precipitator in specific situations following an MFT.

The next agenda topic for this meeting was the use of the term *Managed System*. It appears in the SFAF document without an accompanying definition. In seeking to re-use a definition from SFBL, some changes to it were outlined to clarify understanding.

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

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

The last agenda topic was the plan to include a recommendation on "Superheater Clearing at Start-up". The group present strongly supported including this in our subcommittee document; emphasizing the importance of doing this on aux fuel if possible before attempting to fire black liquor.

Many good suggestions and ideas were provided in this meeting from our guests. These will be conveyed to the subcommittee members by email since so few members were present. We appreciated our guests' interest in helping and noted their commitment to support an attitude of boiler safety.

The subcommittee members will be contacted to make a decision whether to have a meeting at the Spring 2015 BLRBAC event.

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

SFBL Subcommittee Meetings – October 6, 2014 at 8:30 AM (CLOSED) and 01:00 PM (OPEN). Sub Chair meeting on 4 pm October 6th. Main meeting report out October 8th at 8 am.

REPORT OUT:

- Opened the meetings. 14 members (both meetings) and approximately 25 guests in open meeting.
- Reviewed BLRBAC Anti Trust statement. Both closed and open meeting.
- Introduced members and guests.
- Review and approved the Spring 2014 meeting minutes.
- Reviewed the submitted document changes that were approved from the executive committee on Spring 2014 meeting.
    - Document revisions were submitted for the Fall 2014 meeting and approved after vote during the main committee meeting.
- Reviewed any open items brought up to the subcommittee before the Fall 2014 Meeting.
    - Additional information on Andritz emulsified liquor guns was reviewed. Reviewed with possible changes to document being considered by Tim Alvaro, Len Erickson and Mark Sargent for more discussion next meeting (Chapter 12 & 13). Improved liquor gun life using this emulsion; and need to continue discussions on ways to mitigate water source hazard from using these guns in our document.

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

- SFBL definition changes and status. Will continue to work with other committees for common definitions. Managed systems, stable liquor firing, major maintenance outage.

- Clarifications reviewed as I&C subcommittee changes related to Chapter 5 valve position on liquor divert valve. Do not want to move flow meter; would rather just monitor divert valve position. Will add alarms and first outs for next document revision submitted. Will continue discussions next meeting with David Boudreau of Sappi.

- Reviewed wording for large tube leak indication and action. Confirmed that actual leak history used to establish 45 second time max interval for closing feedwater valve after low drum level trip with high furnace pressure.

➢ Open item discussion from members and guests. Discussed open spout with no smelt flow having runoff issue with Cliff Barreca of Weyco. One suggestion was to plug this spout if not needed. Also to use laser level to set all spout openings' lower elevation equally during outage.

➢ Reviewed items to consider related to AF&PA DT survey and BLRBAC DT explosion reports after reviewing Tom Grace Power Point presentation from Feb 2014. Also short presentation on DT vent issues by Vernon. We will continue activities on this topic. Vernon will generate document work areas to consider for next meeting and we will discuss and add to it during that meeting. Also requesting assistance from AF&PA who is also working on dissolving tank operation and proper design. Mark Sargent will assist with the AF&PA related efforts.

CHAIRMAN: The proposed changes to the Safe Firing Document have been posted on the WEB site. Did you review them yesterday?

VERNON BLACKARD: No.

CHAIRMAN: Okay. Would voting members please rise. Can I get a motion to approve the changes as posted? Seconded? All in favor? All opposed. No changes were made to what was posted. Approved unanimously.

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

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

The ESP Subcommittee met in closed session on Monday October 6th, 2014 with 10 of 13 members represented and one guest. Everett Hume of FM Global sat in for Scott Crysel. Dean Clay attended both meetings as the incoming ESP Subcommittee Secretary to replace Jules Gommi who will be retiring after this meeting. The Subcommittee met in open session on Tuesday morning October 7th, 2014 with 10 members represented and about 170 guests. .

During the open session, the Subcommittee reviewed 42 incident reports from North America and no International Incidents. Of the 42 incidents, there were no Smelt Water Explosions reported, which is good. There was a close call where a large leak literally washed out the bed but no smelt water reaction was reported. Sixteen (16) of the reported leaks were classified as critical incidents and 25 were non-critical incidents. One report was for an ESP that was conducted but no leak was found. An Emergency Shutdown Procedure (ESP) was performed in 11 of the incidents including 9 of the critical incidents representing 69% of the critical incidents that should have been ESP'd. There were two leaks classified as critical that were found on a hydrostatic test so an ESP was not necessary in those two cases.

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

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

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

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.

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

Incident Locations

The general locations of the leaks for boilers in North America are shown in Figure 1, which displays a typical boiler, not representing any particular style or model. The yellow marks are the non-critical incidents and the red marks indicate the location of the critical incidents. The blue dot is for the ESP with no leak. The general location for those represents an estimate of where the suspected leak was located.

The leaks locations are summarized as follows:

- 19 – Economizer
- 6 – Superheater
- 0 – Screen
- 4 – Upper Furnace
- 7 – Boiler Bank
- 5 – Lower Furnace
- 1 – ESP with no leak found

Leaks by Boiler Type

The leaks by the number of drums and the back end arrangement were reviewed. There were 6 incidents reported in a single drum unit and 36 incidents reported in two drum units.

Two of the reported incidents were in boilers with Cascade Evaporators and 9 of the units had Cyclone Evaporators. Thirty one of the incidents involved units with extended economizers. This represents a smaller percentage of DCE units than prior meetings.

Root Cause

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

- 10 – Thermal or Mechanical Fatigue
- 4 - Weld Failure
- 13 - Erosion or Corrosion Thinning
- 2 - Mechanical Damage
- 9 - Stress Assisted Corrosion or Corrosion Fatigue
- 2 - Overheat
- 2 –Unknown

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

How Discovered

Operator observations during boiler walkdowns continue to be the prevalent method of detecting leaks and accounted for identification of 28 of the leaks (67%) and shows that operators are continuing to be diligent in looking for leaks. Five of the leaks (12%) were identified by the control room and 6 leaks (14%) were initially indicated by the leak detection system installed. Three leaks (7%) were found during a hydrostatic test during an outage.

Leak detection systems were reported to be installed on units in 25 of the incidents (60%). The leak detection systems were credited with providing the initial indication of 6 leaks and confirmed 3 additional leaks, including one in the economizer. .

One of the things the committee has been looking at is 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 3:45 hours. The median time to initiate the ESP was about 35 minutes which is a little faster than recent history.

Incident Review

Figure 2 shows the critical incidents reported each year. We had a few more than usual due clearing up a backlog of reports that were submitted for this meeting. Figure 3 shows the history of Recovery Boiler Explosions showing the smelt water explosion reported last meeting and the one from 2012.

Figure 4 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 indicating two explosions in a five year period. Hopefully in another few years we can get back down to zero!

Figure 5 shows the history of reported dissolving tank explosions showing that we may be making some progress in reducing the incidents. 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 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 leveled off at 0.49 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 all need to continue to get those trends going back down.

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

Learnings

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

- Make sure to remove alignment brackets when installing tongue and groove ties in superheater
  - Buy groove ties that have pre- cut alignment bracket or make cut before installation
  - Consider using weld material for attaching superheater links that will fail at the link rather than pulling out base tube metal (7018 weld rod)
  - Make sure start/stop of weld is on tie rather than on tube
  - Model or mock-up of proper installation may be helpful to make sure contractors understand the proper method of installation.
- Several incidents showed the value and need for the Large Leak Logic the closes feedwater valve on trip w/ high furnace pressure and low drum level.
- It is OK to turn on evacuation alarm while investigating potential leak but once decision has been made to ESP don't wait for evacuation before the rapid drain is initiated.
- Watch for weak wash leaks onto tubes and headers behind spout hoods, especially the extended hoods. Consider stainless steel split pipe to cover lower water wall headers under the spouts for additional protection against weak wash leaks.
- Inspect large seal plates at sootblower openings for cracks. Consider replacing seal plates with refractory seals to minimize potential for cracks in the seal plate going into the tube.
- Consider using a fixed orifice for sootblower condensate drains rather than traps due to reliability concerns with traps. Need to get the condensate out!
- Squared off membrane terminations between tubes can be source of cracking. Consider cutting the end of the membrane to a V notch to minimize the stress riser.
- For economizers with oxygen pitting and deposits consider including in chemical cleaning

ESP Guideline Changes Under Consideration

The Subcommittee is working to combine the Post ESP Guidelines that cover 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.

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

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.

List of Operating Boilers

We have a list of operating boilers in the US and Canada on the BLRBAC Web site. Dean Clay, as the new Secretary will continue to maintain the list. He could use some help keeping up with the boiler details or if there have been any significant changes to the boiler. I urge you that if you have a chance, look at your units, see if they are up to date, and if there are any corrections that need to be made, get those to Dean.

Incident Questionnaires

The Incident questionnaires are key to the operation of the ESP Subcommittee. We appreciate the good job that the mills have done in filling them out for their incidents. The current questionnaire has been updated with the contact information to send the file to Dean Clay at dclay@fuse.net. Anytime you have an incident that needs to be reported, I know it is very tempting to just go back in the file and pull out the report from a couple of years ago and just fill in the new information, but we really urge you to go and get the most recent version of that off the website 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 further reminder that especially when you're copying and pasting pictures into a Word document, it can very quickly get to a massive file size, so when you prepare a report, look at the file size and if it is above 10 meg., cut it down into separate files. The best thing would be to send in the pictures separately as .JPG files.

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 Dean to see if there is a problem.

Finally I would like to thank Jules again for his 25 years of dedicated service to the ESP Subcommittee

Are there any questions or comments?

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

DAVE FUHRMANN: You might want to correct your dates on your meeting **slide**. It says still April.

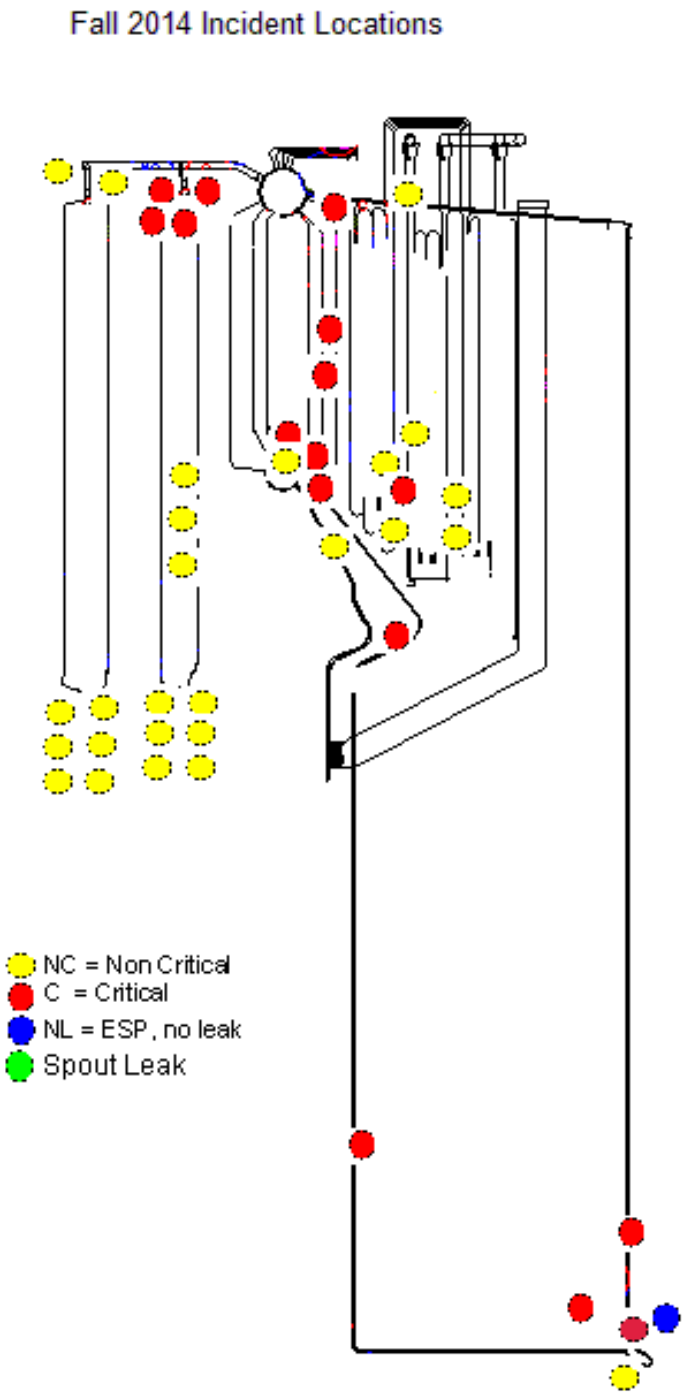
JOHN ANDREWS: Yes, well, it was late last night! (Laughing)

DAVE FUHRMANN: I understand. The other thing is that you said "all motor interlocks should be bypassed". Do you mean just for the rapid drain valves or do you mean even the feed water block valve?

JOHN ANDREWS: I think we specified the rapid drain valves. Again that only applies to the open circuit for initiating the ESP. Not for the test circuit. It is not a good idea to keep that into the test circuit. You don't want to burn up the motor on the test or in the closing circuit. You can keep those interlocks in as well.

CHAIRMAN: Alright. Thank you, John. Again I echo the thanks to Jules and a welcome to Dean. I would personally like to emphasize the large leak logic. It is very easy to install. It's in the DCS. You don't need an outage. Don't need a big review of the changes with FM or whoever. Check your mill if you've got it. Get it done. All you need is a couple hours time for your controls guy to make it happen. It is a lot of protection for not much work. No more soap box!

Figure 1


Fall 2014 Incident Locations
NC = Non Critical
C = Critical
NL = ESP, no leak
Spout Leak

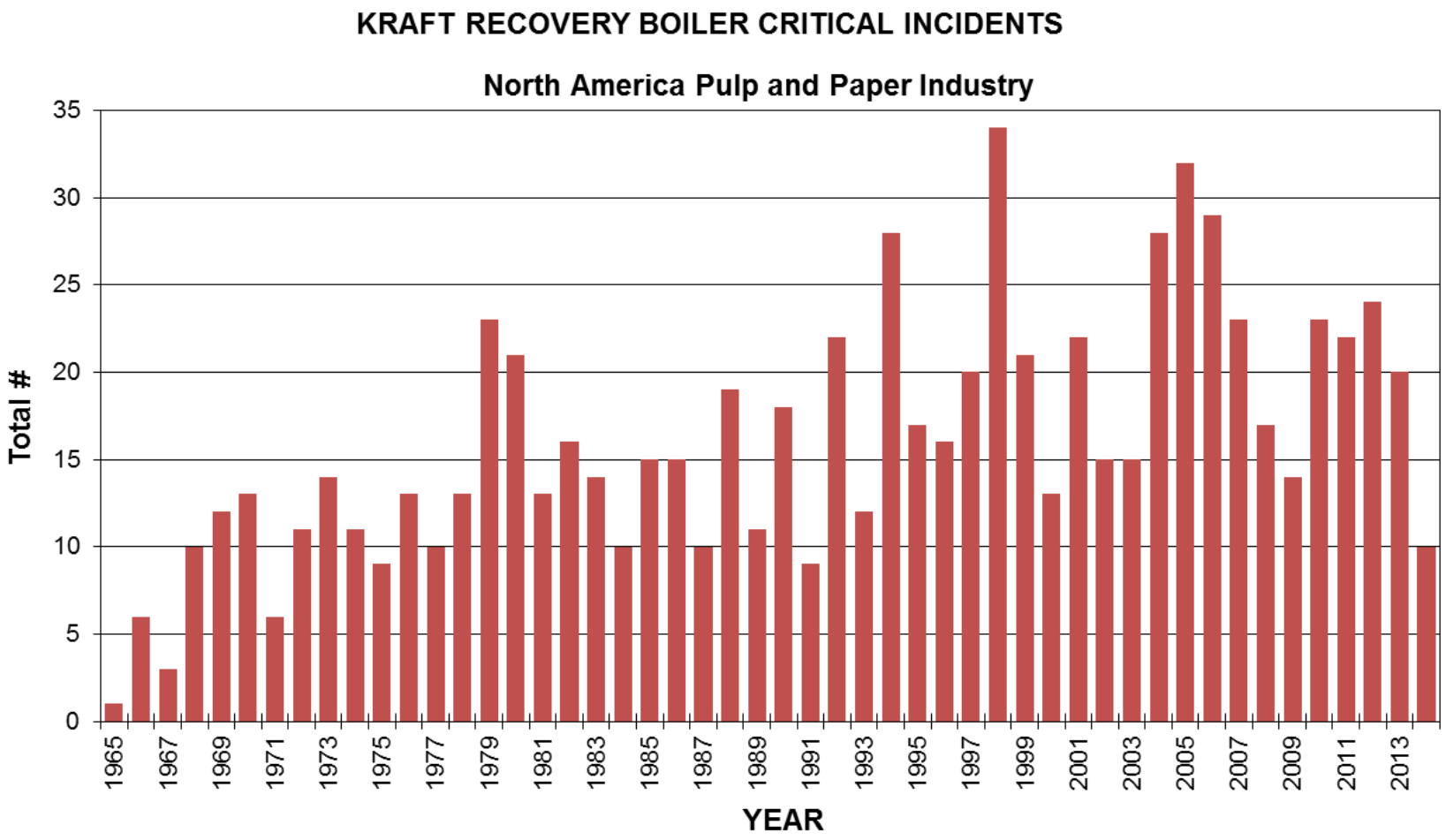
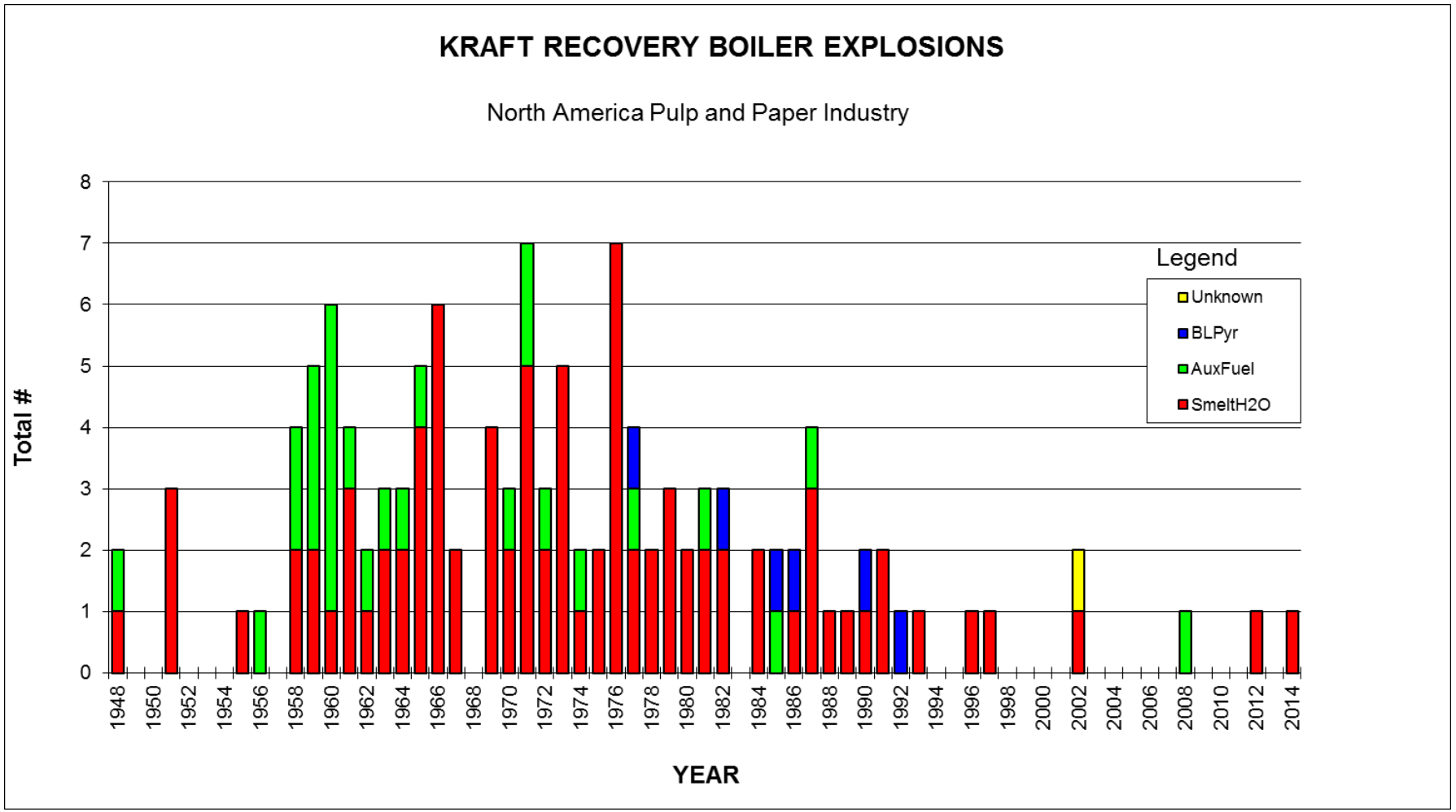


Figure 2

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


KRAFT RECOVERY BOILER EXPLOSIONS
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BLPyr
AuxFuel
SmeltH2O
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2
3
4
5
6
7
8
1948
1950
1952
1954
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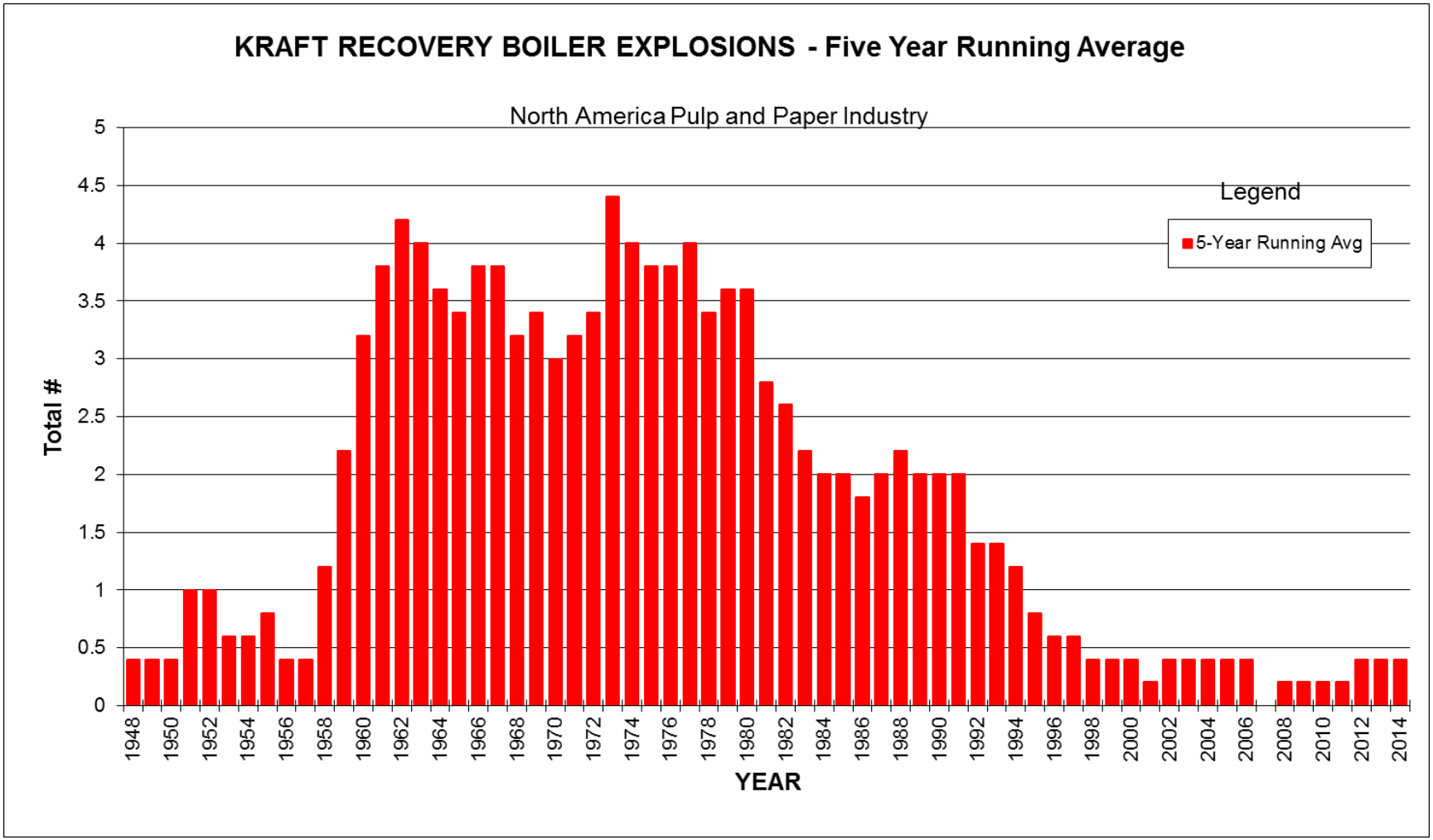
2012
2014

Figure 3


KRAFT RECOVERY BOILER EXPLOSIONS - Five Year Running Average
North America Pulp and Paper Industry
Legend
5-Year Running Avg
Total #
YEAR
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
1948
1950
1952
1954
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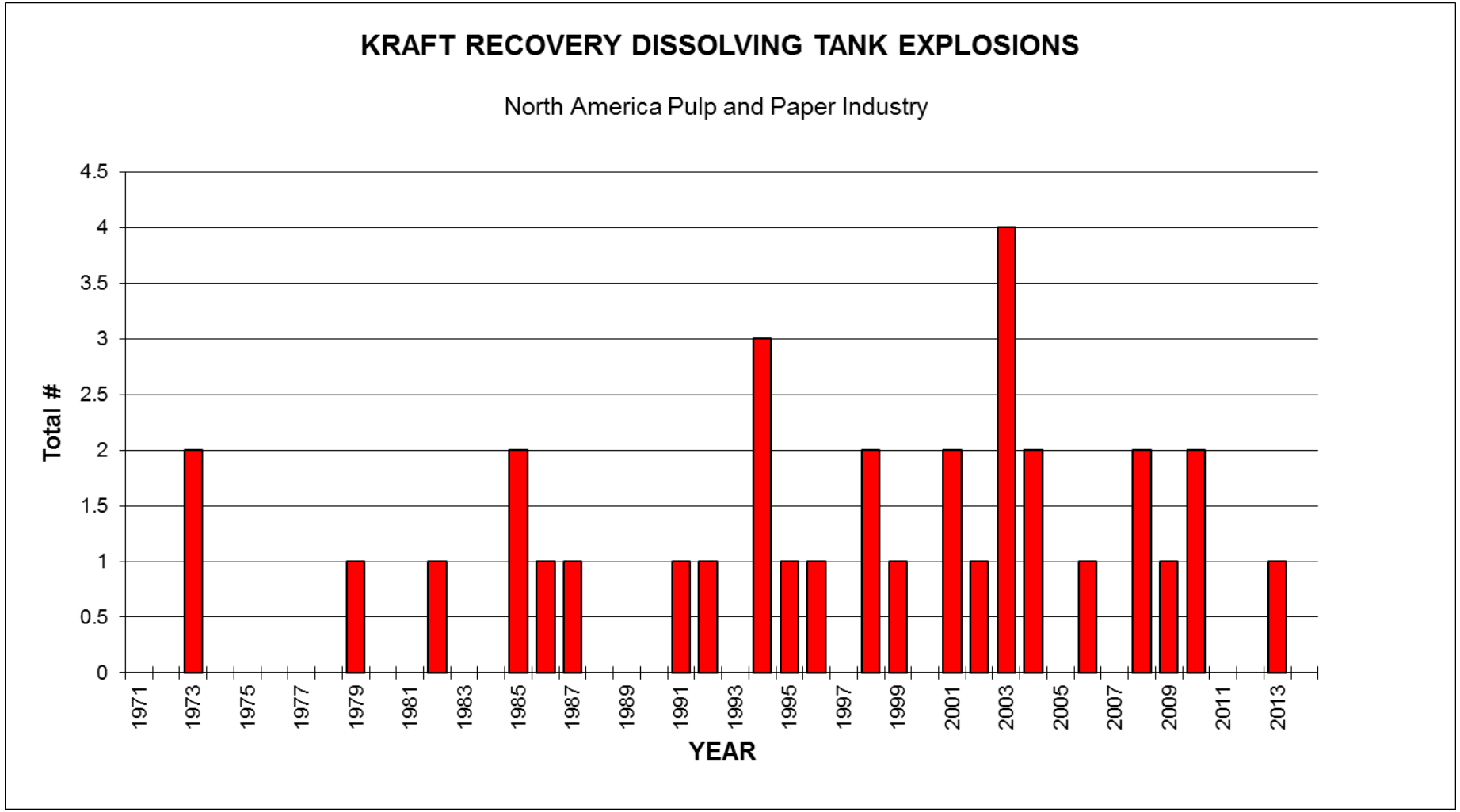
2014

Figure 4


KRAFT RECOVERY DISSOLVING TANK EXPLOSIONS
North America Pulp and Paper Industry
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3.5
3
2.5
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1.5
1
0.5
0
1971
1973
1975
1977
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2013
YEAR

Figure 5

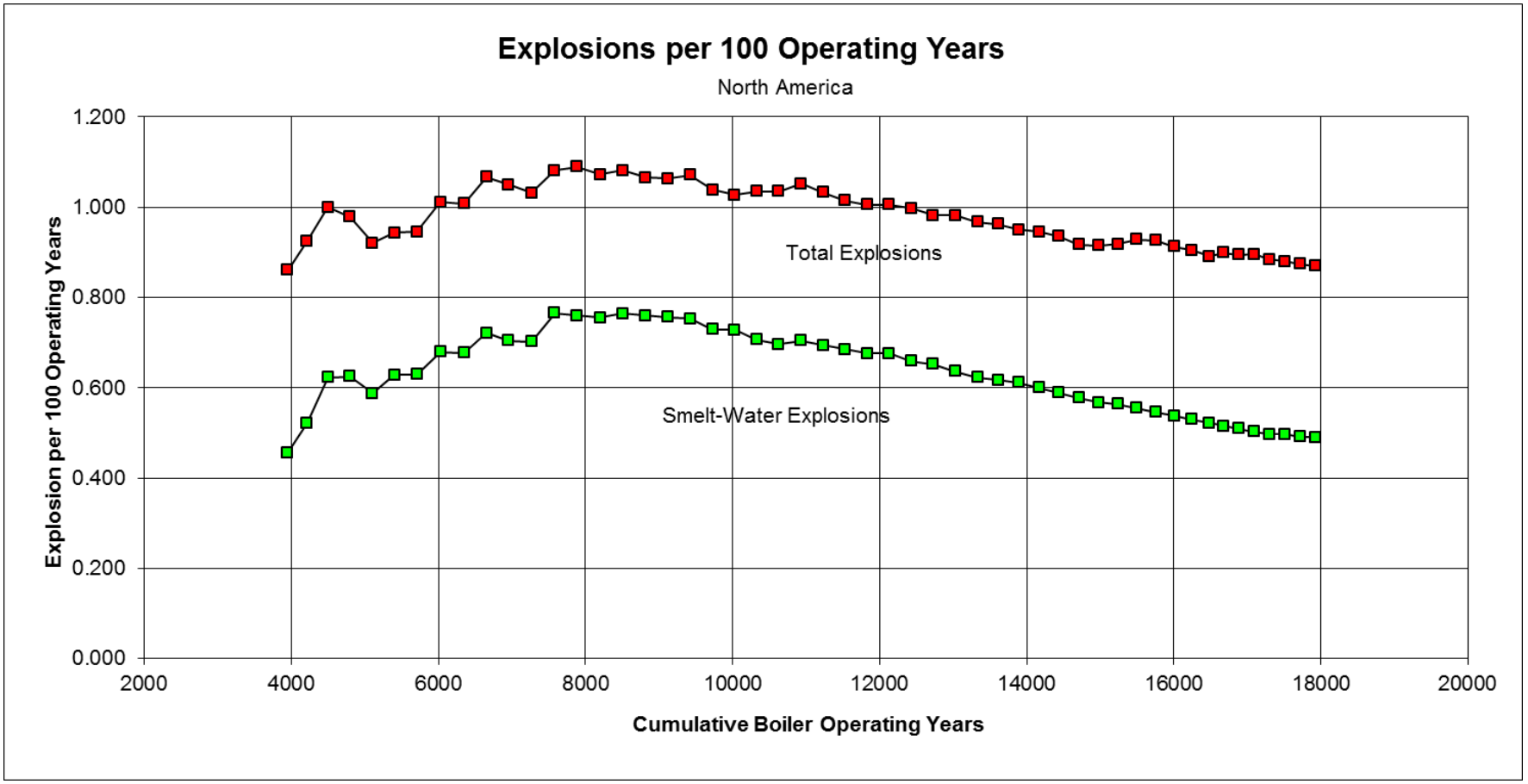
Explosions per 100 Operating Years
North America
Explosion per 100 Operating Years
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Total Explosions
Smelt-Water Explosions
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Cumulative Boiler Operating Years

Figure 6

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

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

No report given at this meeting.

5.5 **INSTRUMENTATION REPORT** – Dave Avery

The instrumentation subcommittee met in open session on Monday morning with 14 members and seven guests. Our session began with reading the antitrust statement continuing with membership review along with introductions of members and guest.
Comments/Requests that were received as a result of our submittal of a proposed new daft of our document (INSTRUMENTATION CHECKLIST AND CLASSIFICATION GUIDE FOR INSTRUMENTS AND CONTROL SYSTEMS USED IN THE OPERATION OF BLACK LIQUOR RECOVERY BOILERS Chapters 1 thru 4) to the Executive committee were reviewed and the following actions taken based on comments from the membership.

- **In 3.13 we changed the word "year" to "planned operational period" as applicable to testing**.

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

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

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

5. **SUBCOMMITTEE REPORTS** - (Cont.)
   5.5 **INSTRUMENTATION REPORT** – (Cont.)

Note: Provided that a complete test through a common output (e.g. MFT) is performed, a test of the remaining individual trip conditions, to just that common output only is acceptable.
While boiler start-up, following a shutdown, provides the most feasible time for these tests, it is perfectly acceptable to conduct such tests throughout the ***planned operating interval*****,** when possible. This would be applicable for auxiliary fuel and waste stream systems and possibly others depending on operating arrangements of the unit. Any unscheduled trips occurring during boiler start-up or operation may be applied toward meeting the intent of testing for that particular trip or permissive, provided the event is properly documented and the a first out system is provided that verifies the source of the trip.

- **In 3.12 we added a need for regular calibration based on a request, and then the question was posed "Do ranges need to be checked as well?" Do we need a range and alarm/trip set point verification comment"? After some discussion, "including engineering units and set points (alarm, trip points)" was added to the bullet point called current design parameters.**

3.12 Preventive Maintenance (Posted Text)
Field Devices
A preventive maintenance program should be established for all control system components associated with the recovery boiler. A program should identify inspection***/calibration*** tasks, inspection */calibration* frequency, and reporting procedures necessary to schedule, track, and document individual devices.

Documentation shall include the following information as a minimum:
· date of inspection***/calibration***,
· name of the person who performed the test or inspection,
· serial number or other unique identifier of equipment,
· current design parameters (baseline calibration specifications ***including end user engineering units and set points (alarm, trip points))***
· results of inspection/test (design, "as-found" and "as-left" conditions) and
· Inspector comments on overall integrity of inspected system.
· A procedure should be used for maintaining, testing and repairing a system.

These changes were reviewed by the Executive Committee to make sure that these changes did not require an additional review period before voting on the document. These changes were reviewed with the general membership after the Tuesday operating session.

CHAIRMAN: Alright, would the voting members please rise. First off, are there any objections to the changes that were made since the document was posted? The Executive Committee reviewed this and felt they were minor editorial type changes. I'll entertain a motion to approve the changes as written? Seconded? All in favor? All opposed? The motion has passed unanimously. Thank you.

5. **SUBCOMMITTEE REPORTS** - (Cont.)
   5.5 **INSTRUMENTATION REPORT** – (Cont.)

DAVE AVERY: Our work continued with a presentation from our committee members C.A.Vossberg and Gordie Vandenberg on specific wording to clarify SFBL section 4.10 Refractometer Calibration - the difference between an "on-line" standardization and an "off-line" calibration. Subcommittee evaluation found their proposal sound and approved it to be submitted to Safe Firing of Black Liquor for their consideration.

Current Wording:

4.10 Refractometer Calibration

All refractometers shall be calibrated against a reliable periodic test. (See Chapter 6 – Off-Line Black Liquor Solids Measurement)

The refractometer shall be calibrated:

1. On initial installation or reinstallation.
2. At any time it is felt or known that the refractometers may be deviating from the known black liquor solids content.
3. Any time there is a 2% difference between refractometers.

The reading of the refractometers shall be checked against the off-line moisture analyzer at two hour intervals (8 hour intervals if firing above 70% solids), and the off-line moisture analyzer shall be checked by the TAPPI method weekly.

All refractometer calibration changes shall be entered in the recovery boiler "log book."

If the continuous solids monitor differs from the field measurement by more than 2% on an absolute basis, the off-line test results must be confirmed and then if required the continuous monitor should be recalibrated.

4.10 Refractometer ~~Calibration~~ Standardization (Zero Offset) to Off-Line Test (Proposed wording)

A Refractometer Standardization ("zero shifting" or "bias adjustment") is an adjustment of the refractometer calibration curve to an off-line test to account for un-dissolved solids and/or changes in the black liquor chemistry. This is normally performed while the instrument is actively measuring black liquor solids.

All refractometers shall be verified against a reliable periodic off-line test. (See Chapter 6 – Off-Line Black Liquor Solids Measurement)

The refractometers shall be standardized:

1. On initial start-up of the recovery boiler.
2. At any time it is felt or known that one of the refractometers may be deviating from the known black liquor solids content.

5. **SUBCOMMITTEE REPORTS** - (Cont.)
5.5 **INSTRUMENTATION REPORT** – (Cont.)

3. Any time there is a 2% difference between refractometers:
The reading of the refractometers shall be checked against the moisture analyzer or microwave analyzer at two hour intervals (8 hour intervals if firing above 70% solids), and the moisture analyzer or microwave analyzer shall be checked by the TAPPI Standard Method, T650-om-05, weekly.

All refractometer standardization changes shall be entered in the recovery boiler "log book."

4.11 Refractometer Calibration
A Refractometer Calibration involves placing two or more "samples" onto the sensor to generate a refractive index vs. dissolved solids curve. This is typically performed utilizing calibration oils or electronically (depending on supplier) in a controlled environment, while the sensing head is off of the process line.

Calibration procedures shall be done in a manner that does not affect the system's ability to automatically perform a black liquor diversion utilizing the remaining (active) in-service refractometer. Improper procedures, or those that defeat the monitoring system described in Chapter 4, can result in the system failing in an unsafe condition. Refer to the manufacturer's appropriate procedures

If the ~~continuous solids monitor~~ ***refractometer*** differs from the off-line test field measurement by more than 2% on an absolute basis, the off-line test results must be confirmed and then if required the ~~continuous monitor~~ ***refractometer*** should be ***standardized and/or*** recalibrated ***according to the manufacturer's recommended procedures. Repeated errors may indicate a failure of a refractometer component. Refer to the manufacturer's recommendations for repair or replacement.***

These proposed changes to Safe Firing of Black Liquor document is being forwarded to the SFBL subcommittee for their review and consideration.

The focus shifted to maintenance of our document for the future. The subcommittee feels that dividing our document into two separate documents is the best way to maintain and simplify the documents and their use.

We will keep the frontend of our document chapters 1-4 as ***Recommended Good Practice for Instruments and Control Systems Used in the Operation of Black Liquor Recover Boilers (Chapters 1-4).***

The ***Installation Checklist and Classification Guide for Instruments and Controls Used in the Operation of Black Liquor Recovery Boilers*** *(Spreadsheets)* will be maintained separate from the frontend. The individual spreadsheets will have their own revision and date to allow updates per sheet. This will allow for easier alignment updates with the Good Practices.

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

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

The afternoon session had 10 members and 6 guests in attendance.
We began with a discussion on how we can develop a concordance for our documents to make it easier to look up questions that the end user may have. John Browning has agreed work on the development of this idea.

The checklist is our continuing task with each member assigned to a section. I would like to have sections ready for review in the spring. The group also discussed what a qualified I&E technician is and what is a calibration. These items will be further explored over the next few meeting to help define this as it pertains to Recovery Boilers.

The selection of a vice chair is still in progress hopefully the spring will bring resolution to this issue.

I want welcome three new members to our group Chris Daily (GP), Bob Putman (Kapstone) and Mikko Antikainen (Andritz).

Finally, our Instrumentation Subcommittee Meetings open collaborative events "*Working together in a joint intellectual effort" always produces a better product!*

5.6 **MATERIALS & WELDING REPORT** – Dave Fuhrmann

Review BLRBAC Anti Trust Statement

"This meeting, as are all BLRBAC meetings, is being held in accordance with BLRBAC Anti-Trust Guidelines"

Attendance

- The morning meeting of the Materials and Welding Subcommittee met on October 6, 2014 in open session with 12 of 24 members represented and 18 guests.

Old Business

- Minutes of last meeting reviewed and approved.
- Changes posted for member review.
  a. No document changes are posted to reflect changes for approval this session.

New Business:

- New members:
  a. No new candidates presented for membership.

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

5.6 **MATERIALS & WELDING REPORT** – (Cont.)

- Communications:
  - **a.** Dave Fuhrmann (International Paper) solicited input on zipper corner standards. Recent BLRBAC discussions have not been known to provide a conclusion to address a standard. Alstom provided them 1966 until 1997. B&W doesn't provide them unless specified by the customer.

- Document development was continued and completed on a Technical Bulletin **1.6 PLUGGING TUBES IN DRUMS AND HEADERS**

- Document development continued on a procedure **2.5 PLUGGING TUBES IN DRUMS AND HEADERS**

Afternoon Session:

The open afternoon session met in an open meeting with 14 members present and **21** guests.

- Call to order and review of the BLRBAC Anti Trust statement.
- Review of Morning Meeting Activities
- There was no presentation provided this session.
- Continued development of the Procedure **2.5 PLUGGING TUBES IN DRUMS AND HEADERS**

Plans for the next meeting may include:
- Continued development of the procedure for **PLUGGING TUBES IN DRUMS AND HEADERS**
- Alignment of the presentation on weld overlay with respect to our document.
- Solicit an experience presentation.
- Solicit AF&PA permission on using figures from their document.
- Membership listing review (3 members not participating); Chairman to make final communication attempt to these members.

5.7 **PERSONNEL SAFETY REPORT** – Robert Zawistowski

The Personnel Safety Sub-committee met in an "open" session on Monday, October 6, 2014. There were 11 members (out of 18) plus 27 guests in attendance during the meeting.

Representation at our meeting by regular members and guests included original equipment manufacturer Babcock & Wilcox. Representation from insurance and insurance service companies included FM-Global and Sompo Japan Nipponkoa Risk Management. Operating company representation was present at this meeting with representatives from, CLW Clearwater Paper, Georgia-Pacific, Glatfelter, International Paper, Kapstone, MeadWestvaco, Packaging Corporation of America, Rayonier AM, Rock-Tenn, Verso Paper and Weyerhaeuser. Contractor representation included 3S Team. Consultant representation included George H. Bodman, Power Specialists Assoc., Inc. and RSI.

5. **SUBCOMMITTEE REPORTS** - (Cont.)
   5.7 **PERSONNEL SAFETY REPORT** – (Cont.)

The BLRBAC anti-trust statement was read.

The minutes of the last meeting were read and accepted.

Changes recommended for the main Personnel Safety document by the Executive Committee at the April 2014 meeting were reviewed and edited in the Subcommittee Meeting on Monday morning with the members and guests. The edited document was forwarded to the Executive Committee for review, and if acceptable, posting for Membership vote during the April 2015 Meeting.

No action was taken on the development of the Common Practices section during this meeting. We did receive one photo permission slip signed off by a Mill Manager from Mondi. A number of members of the Subcommittee have volunteered to assist in obtaining permission from Mill Managers. We expect we will be able to continue review of the Common Practices section during the April 2015 meeting.

We discussed safety around hopper inspection and clearing. There was enough member interest to suggest we need a section dedicated to this important topic. We will start developing language over the winter for review and editing by the Subcommittee during the April 2015 meeting.

We had a request for additional information regarding assembling "chain mail" for spout splash protection. Information was solicited from the membership during the meeting. Sam Dean – Rayonier AM (and Personnel Safety Subcommittee Member) volunteered to obtain the information we are looking for.

Between the April 2014 and October 2014 meetings there were no requests for clarification/interpretation of information in the Personnel Safety document.

Toward the end of the meeting there was a discussion about "Unsafe Acts." We played the 12 minute video "The Cost of Accidents" for the meeting attendees.

We had one member resign from the Subcommittee, Randy Lombardi of Babcock & Wilcox who recently retired from B&W. We wish to thank him for his participation in the Subcommittee. We had two members join the Subcommittee, Eric Schwartz of Babcock & Wilcox and Sam Dean of Rayonier AM. We wish to welcome them aboard.

We are actively looking for a volunteer for the position of Vice-Chair for the Personnel Safety Subcommittee. I have had one person express interest assuming his job responsibilities allow. He will advise me shortly if he is available.

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

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

5.8 **PUBLICITY & NEWS REPORT** – Everett Hume
No report.

5.9 **WASTE STREAMS REPORT** – Paul Seefeld

On October 6, 2014 the Waste Streams Subcommittee met in a closed session at 9:00 AM with five members, two alternates, and one user invitee present. There were six excused absences and one resignation (Wendy Coyle). With a lack of quorum, no voting could be performed.

At the start of both the morning and afternoon sessions the BLRBAC antitrust statement was reviewed. The April 2014 meeting's minutes were reviewed and unanimously accepted.

Document Updates
The meeting was opened with discussion of resuming the editing of chapters 4 and 5. The continued editing had been put on hold until the previous changes were approved and released. In chapter 4, there are some minor corrections needed that do not change the message of the document. However, in chapter 5 there are several editing requirements of a more substantial nature. They are as follows:

Page 37, 5.1.2.2: Elimination of the comment about removing methanol from SOG.

Pages 38-39: Defining which equipment "should" be inside or outside of the boiler.

Page 39 and 42: Reference to seal pots. In 5.2.1.2, this is something we are considering removing and in 5.2.3, this may need to be relocated or clarified with a stronger "if" statement. The seal pot technology is something that may have safety risks associated with water supply and is counter to the overall theme of recovery boiler equipment in our section.

Pages 47-48: The explanation of vents and drains needs to be reworded to disassociate them from each other. This needs to follow the modification to figures 5 and 6.

There are numerous small corrections to be made as well as modifying the document to remove "switches" as a primary descriptor.

Information Needed:
The Subcommittee is going to query users who route liquid methanol within the heavy liquor to the refractometers to determine if there is a measurable effect.

The list of locations routing waste streams to the recovery boiler needs to be updated.

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

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

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

Continuous Igniter usage:
A new paragraph is to be developed to give the option to use a camera integrated with the CNCG/SOG burner. The purpose of this is to verify blockage of the port only.

An additional paragraph will be developed as a response to a request in the open session (see below).

New DTVG Section:
Based upon the incident at Skoghall, Sweden, the subcommittee examined the dissolving tank vent gas section and found it inadequate to address the new direct contact design. Therefore, we are going to develop an outline before the next meeting and begin building a new chapter section dedicated to the direct contact and indirect contact designs for dissolving tank vent gas handing. Members from Andritz, Lundberg and B&W are requested to look at their practices and bring back findings to the next meeting.

Co-subcommittee language:
Definitions for "stable firing", "annual outages", and "managed system" were discussed. Stable firing is actually defined within figure 1 on page 30 of the Safe Firing document as 30% solids and 30% MCR on steam. Waste Streams currently allows that each mill may model their boiler to determine if that meets the safe firing criteria from the boiler OEM. Otherwise, the boiler will have to achieve 50% MCR to initiate CNCG burning. The subcommittee will scan the documents to find references of "annual outages" and "managed systems" in order to be consistent with other subcommittees.

In the afternoon (open) session, there were five members, and eight guests present. We discussed the proposed updates to the document and the development of the chapter section dedicated to the dissolving tank vent gas collection.

There was a request that we add alternative guidance to the document related to the disengagement of the continuous igniter during normal operation. Specifically, that there be a permissive to the igniter disengagement related to the relative pressure between the igniter box and the secondary air duct. We agreed that we would develop language for review by the executive committee.

5.10 **WATER TREATMENT REPORT** – Tom Przybylski reporting for Tom Madersky

The water treatment subcommittee met Monday morning and Monday afternoon in open sessions.

Seventeen (17) subcommittee members and twelve (12) guests attended both sessions of the meeting. The subcommittee membership profile for those in attendance was as follows:

- Four (4) OEMs
- Four (4) mill representatives
- Nine (9) BLRBAC Associate Members (four of the nine in attendance represented water treatment companies).

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

5.10 **WATER TREATMENT REPORT** – (Cont.)

The fall meeting activities were as follows:

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

- The subcommittee spent the morning reviewing 23 specific comments on the four sections of the guidelines posted for review as well as the drum, tube, and header circuitry document which was submitted to the executive committee for review, but has not been posted on the BLRBAC website for review:

  - 16 of the comments resulted in minor changes to the documents. Seven (7) revisions will be submitted on the documents posted for comment on the BLRBAC website at a future date.

  - The remaining revisions based on the comments were applied to the drum tube and header circuitry.

  - The subcommittee revisited the recommendation for a continuous pH meter in the feedwater. Based upon mill experiences and water treatment supplier experiences with contaminants that have entered boilers without detection of conductivity, the subcommittee favored making continuous feedwater monitoring a requirement. This device is covered by the instrumentation subcommittee guidelines; the water treatment subcommittee decided to take up classification of continuous pH monitoring with the instrumentation subcommittee.

  - The subcommittee started developing the next section of the water treatment document which covers condensate.

  - Condensate system boundaries were established. Typical condensate equipment was agreed upon. Primary concerns about contaminants were discussed. Discussion about conductivity instrumentation in evaporator condensate, paper machine condensate, and pulp mill condensate was debated, as well as particulate detection for iron from paper machines. Preliminary guidelines for these instruments were established.

  - The four documents posted for comment are up for vote by the membership at the general meeting.

- We adjourned at 2:40 p.m.
- Water subcommittee presented an overview of the documents for review to the general BLRBAC membership following the Tuesday operating problems session

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

In closing, we would strongly encourage the membership to download the revised document once posted and take the opportunity to review and, if possible, work with the draft checklist in related system reviews.

We would, again, like to thank all of the subcommittee members and guests for their participation and valued contributions.

CHAIRMAN: Are you ready to vote on your document now? Alright. Would the voting members please rise. The proposed new document, four sections, have been posted on the BLRBAC WEB site as Tom mentioned. I'll entertain a motion to approve this document? Seconded? All in favor? Opposed? It has passed unanimously. Madersky missed one meeting and you get his document approved!

TOM PRZBYLSKI: Yes, I'd get someone with the same first name, I think, to replace him. That's the only requirement. (Laughing)

CRAIG ADERMAN: I'm a member of the subcommittee. Tom has done a great job in filling in for Mr. Madersky. I really want to thank the membership for the comments that they made on those draft documents which we've put out. That is the highest level of input we've had at any time.

WAYNE MACINTIRE: Just one question. Is there any part of the document that talks about starch contamination or recommendations on condensates from jet and batch cooking because starches, as we all know, pretty much is undetectable going in and drops the pH when it gets there. So is that somewhere in that document?

TOM PRZBYLSKI: At this point, no. We did cover it some in the condensate section that we started. So that will be part of the discussions for spring 2015.

WAYNE MACINTIRE: Traditional conductivity meters won't catch it.

TOM PRZBYLSKI: Yes, we didn't have any silver bullets for that one yet, but it will be on the agenda for spring.

6. **AMERICAN FOREST & PAPER ASSOCIATION RECOVERY BOILER REPORT** – Tom Grant

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

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

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

We held two Operational Safety Seminars in Atlanta – one on April 29 – 30th and the second on May 13 – 14th. Due to a few upsets at a couple of mills which caused a number of cancellations, attendance was down from the past few years. We had 35 people attend the April seminar and 52 at the May seminar - a total of 87 people from 14 companies and 23 mills. We continue to receive excellent reviews from the attendees who get valuable information from the dialogue among the attendees (operators, supervisors and maintenance people) and the monitors of the seminars. Two seminars will be held in Atlanta next year and we hope that the mills will seriously consider sending people to each seminar, especially sending new and lesser experienced operators and supervisors.

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.

A copy of the information that Dr. Grace reported from the initial survey was submitted to the Chairman of the BLRBAC Safe Firing Subcommittee since it is looking into similar issues. The R & D Subcommittee will also be reviewing a proposal from the University of Toronto involving additional research in smelt spouts and dissolving tanks

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

The O & M Subcommittee is working 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 June 30, 2015. The final draft will be reviewed by members of the Subcommittee

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

Proposal for Research of Protective Clothing and Equipment

The R & D Subcommittee is reviewing a proposal to launch a critical review of the materials that are available for use for personnel protection around black liquor recovery boilers. The BLRBAC Personnel Safety Subcommittee was contacted for suggestions for this proposal. The R & D Subcommittee discussed possible materials testing groups that might take on the study, but without success. Other groups are being contacted for this study.

Other Research Projects Under Review

The Committee discussed possible new research projects related to recovery boiler safety including: shatter jet design improvements; the use of infrared (IR) scanners for monitoring superheater inlet gas temperature during recovery boiler start-ups; methanol burning; energizing precipitator prior to starting fans up; ash hopper pluggage/level indication; exclusion areas around liquor guns; tube clearing; developing procedures for investigation of steam leaks; and boiler inspection protocols looking for SAC and FAC.

New AF&PA Recovery Boiler Program Explosion Monitor

After serving as the AF&PA Recovery Boiler Program Explosion Monitor since 2007, Jules Gommi has submitted his resignation as of December 31, 2014. We wish to thank him for his time and efforts in this position. Jules did an outstanding job in covering these matters as well as an excellent job as one of the monitors at the Operational Safety Seminars. We wish Jules all the best in his retirement. He will be missed by all for both his professionalism and friendship.

Dean Clay has agreed to replace Jules as the Explosion Monitor and a monitor for the Operational Safety Seminars. Dean, as most of us know, has many years of experience in the industry including 23 years with International Paper and 16 years with Babcock & Wilcox. He also has served many years on BLRBAC Committees, including as Chairman of the Executive Committee. Dean also served on AF&PA Recovery Boiler Program committees since 1999. He is currently employed by Boiler Services & Inspection (BSI).

Annual Meetings and Conference

AF&PA's annual Recovery Boiler meetings and Conference is scheduled to be held in Atlanta on February 3rd and 4th. 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 RECOVERY BOILER SUBCOMMITTEE OF STEAM & POWER REPORT** - Chris Jackson

The TAPPI Steam & Power/Energy Management Committee met at the TAPPI PEERS Conference in Tacoma last month. At the Steering Committee Meeting which preceded the Main Meeting, the Executive Committee for the Engineering Division kind of brought the hammer down on us for not having a good officer rotation procedure process in place. Before we left that meeting, we came to the decision, confirmed later in the Main Committee Meeting, that we would have a chair, a vice-chair/secretary, we would combine those positions, and a Technical Program Chair responsible for developing the steam and power and energy management tracks during the PEERS Conference. Then we would have three subcommittee chairs. The three slots, chair, vice-chair and Technical Program chair, would have two year terms and would succeed each other, vice-chair moving up to chair, and Technical Program chair moving into the vice-chair slot.

There is a membership chair, Steve Wilson, and for the moment, he is still maintaining that position. I was nominated Chair of the Main Committee. Dr. Danny Tandra of Clyde-Bergemann was the Technical Program chair for the PEERS Conference. He has agreed to step into the Vice-chair/Secretary position. Pasi Miikkulainen from Andritz will be our Technical Program chair for the fall PEERS Conference.

This committee has two functions. First and foremost, to provide a track of presentations helpful to the industry at the PEERS Conference. Second is to develop technical information papers to solve problems in the industry. We have three subcommittees presently: Water Treatment lead by Jim Graham; Energy Management lead by Chris Dietel; and the Recovery & Power Boiler Subcommittee lead by Bentley Sherlock.

For those of you who don't know how the TIP program works, once a TIP is established, they often have to go through a periodic review for five or ten years. The committee is responsible to make sure they get reviewed. If they do not get reviewed, they get withdrawn. So for lack of volunteers there has been the sad occasion when some useful information has left the canon of data.

We have 12 TIPS currently that are being reviewed or are coming up for review. That information is available on the TAPPI website. One of my goals for my term as chair is to make TAPPI information more accessible. You may find yourself asked to assist on such efforts and I hope you'll step up and give us some of your time and the benefit of your experience and knowledge so that this information is improved and renewed.

Aside from updating old ones we create new ones. Recently we published a TIP on leak indications. It's a TIP that guides new operators and experienced operators into the kinds of things that might indicate a leak and why. An example would be speeding up of the ID fan. Another example would be separation of steam and water. There are truly about a dozen of these things and they were all captured in one TIP. We offer it to you as a training tool.

7. **TAPPI RECOVERY BOILER SUBCOMMITTEE OF STEAM & POWER REPORT** - (Cont.)

At the Committee Meeting we discussed some new projects, some of which have been in the works for a while and other ideas were generated at the meeting. These include a green liquor density measurement TIP. We have a working group chair for that and we are working on the abstract now to get a work item number from TAPPI. NO_x control in power boilers. Again we had a volunteer take the working group chair position and we will get a work item number for them.

One of the older subjects was steam blow procedures. That one has flagged. We hope to get it reactivated between now and the next meeting in April. Another on the subject of Boiler Inspection appeared also to have been neglected. On this subject, we are now planning to have two TIPS. One will describe the proper cost effective useful scope of an inspection of the recovery boiler water and fire side; and the second will focus on the implementation and execution of the outage and the inspection process. I'm very excited about these two. We've got working group chairs and we are starting to build teams around them.

The Corrosion Materials Committee invited us to participate with them on a TIP on water side cracking and stress assisted corrosion. We're pulling together a team on that. Max Moskal and Ron Lansing of M&M are working group chairs for that. If you hear anything that sparks your interest, please do not hesitate to contact me (chris.jackson44@comcast.net) and I'll put you in touch with the people who will benefit from your assistance.

Our next meeting is April 1st. I hope there is no significance to that date. In 2015 it will be after BLRBAC is done. Last year in April we had a very successful meeting with what we call "Lunch & Learn". Attendance had flagged and somebody came up with the bright idea of providing food. Food seems to draw people. So we are going to do it again. We are going to come up with a presentation that we think you will find interesting and useful. It will be coupled with a box lunch. I've suggested that we limit the number of lunches available, so first come, first served, to encourage people to show up on time.

Before I go to questions, I want to acknowledge that the previous Chair, John Andrews, took over three and a half years ago what was supposed to be a two year term. He held that position in spite of a number of volunteers who disappeared for good personal reasons, but they were no longer there to provide officer rotation. We are very grateful that he stuck it out as long as he did. We will be recognizing him going forward. We very much hope he will continue to participate. We don't want to lose that knowledge and experience which he brought to the committee.

Are there any questions or comments?

WAYNE MACINTIRE: Here's a question, it's more of a general questions, but is there anything that the TAPPI group that you are leading can do to drive more core research in our end of the industry because certainly as you know Tom Grace left IPST and now IPST is RBI and everybody is chasing the cellulosic ethanol and Georgia Tech in their infinite wisdom tore down the high solids pilot equipment. Now if we want to do any kind of high solids evaporation work, we have to go off-shore to like Chalmers University. You know we have Honghi Tran retiring from the University of Toronto. You know that succession is not exactly clear yet. But I think it is our core business, paper and forest products, and I see a lot of the evaporation and retirement of a lot of the core research in our industry. So how can you help drive that?

7. **TAPPI RECOVERY BOILER SUBCOMMITTEE OF STEAM & POWER REPORT** - (Cont.)

CHRIS JACKSON: I said our purpose was to write TIPS. You don't write TIPS for the sake of TIPS. You write TIPS to solve problems. It's my goal in the next two years to identify some of those problems that are in the industry and to try to focus the academic and the industrial knowledge that still exists on those problems and to try to codify the information we get into a TIP. I've had some people suggest that in the case of the boiler inspection TIP, we poll the sites to see what they are doing now and see if we are really solving a problem that needs solving.

But in the spirit of your question, Wayne, I would love to identify those problems that TAPPI could begin working on through the Steam & Power Committee. I've been here less than a month, but I do want to come up with some mechanism to gather those problems, the things we might work on, and if I can, I will be burning up the phone lines with people like Doug Singbiel and Dave Bennett and whoever else I can find who might bring some energy, some research to bare. I think of the AF&PA Committee as being the source of research, so I expect I would work some with Tom on that.

But by all means if there are problems to solve and they are not getting addressed somewhere else, I would love to tackle them.

Any other comments and/or questions? Thank you for your time.

8. **WESTERN CANADA BLRBAC REPORT** – Raymond Burelle

The Spring meeting of Western Canada BLRBAC was held in Vancouver on April 1 & 2, 2014 in Vancouver, just ahead of the BLRBAC Spring meeting.

Nine of the 14 member mills were in attendance. Several mills had shutdown in April / May, which is why the meeting was moved to an earlier date than usual.

The only incident discussed was the Canfor Northwood #5 recovery boiler water wall leak, incident 40 that was discussed here yesterday. The details were limited as this incident happened shortly before the meeting. All other Western Canada incidents discussed yesterday took place after the Spring meeting.

The minutes of the meeting are available at WCBLRBAC.org

The Fall meeting will take place in Vancouver on October 28 & 29, 2014.

Shawn Casey, long time representative of Western Canada BLRBAC at this meeting and member of the ESP subcommittee, left Howe Sound Pulp & Paper to take a position outside of the Pulp & Paper Industry last Spring. The current Chairman of Western Canada BLRBAC is Tim Thygesen from Skookumchuck Pulp.

CHRIS JACKSON: Are you saying that the meeting on the first day is now open to all comers as observers or is it still restricted only to owner/users?

8. **WESTERN CANADA BLRBAC REPORT** – (Cont.)

RAY BURELLE: It is still restricted to owner/users. I should have mentioned that. Thank you. However, it was discussed that they wanted to, and Shawn was the instigator of that, make it just a couple of hours closed session for them only. Then that would be followed by the regular discussion and Problem Operating Session. So this may change in the near future, but as far as I know right now it is still a closed meeting on the first day.

CHRIS JACKSON: I would encourage you to think hard about that. You could increase attendance if you let a wider audience into that first meeting.

9. **ACTIVITIES OUTSIDE NORTH AMERICA REPORTS**

No reports given at this meeting.

10. **OPERATING PROBLEMS SESSION REPORT** – John Gray

The Operating Problems Session was conducted during the afternoon of Tuesday, October 7th. We had good attendance. A total of 15 individual problems and issues were submitted for discussion and exploration during the first half of the meeting.

Major discussion topics varied, but included:

Dissolving tank density control options
Trouble shooting spout splatter and scale build-up
Black liquor port cleaning options
Spout cleaner technology
Oil to natural gas conversions
Options for minimizing floor tube damage during clinker falls
Green liquor system controls to better react to heavy smelt lines
Shop inspection methodologies and recommended protocols
Potential chromized tube applications in a recovery boiler
Soap separation methodologies
Potential challenges with going longer than 12 months between major outages.

During the second half of the meeting we allotted some time for presentations by subcommittee chairs. Those presentations were, as we have said before, designed to educate membership on some of the proposed changes that are coming up for vote. Some of the things we voted on here this morning were actually discussed in detail yesterday during that part of the Operating Problems Session.

Dave Avery from Instrumentation and Tom Przybylski from Water Treatment gave presentations.

That concludes the Operating Problems Solving Session Report, but before we move to close the Main Committee Meeting here, I have a couple of announcements. We will have two Technical Presentations immediately following this meeting. Kari Lampela from Metso will present "***Using Magnetic Resonance to Measure Solids***" and that is assuming Kari has made it in from Thunder Bay this morning. Is he here? Okay!

10. **OPERATING PROBLEMS SESSION REPORT** – (Cont.)

That was a tight one there. Then the last presentation of the morning will be from Mikael Maasalo from Poyry. He is going to present "***Stabilization of Recovery Boiler Steam Pressures***". So we have a couple of pretty interesting technical presentations coming up. We encourage all of you to stick around for that and not hit the doors as soon as we close this meeting.

Our next BLRBAC meeting is slated for March 30-31 and April 1 and will be held right here at the Crowne Plaza Hotel.

CHAIRMAN: That concludes our Main Committee Meeting. I guess I'd like to say for a while as I'm stepping down as Chair effective now.

JOHN GRAY: We need to thank Scott for his service over the last two years. He got a lot accomplished! (Applause)

CHAIRMAN: Thank you all for your attendance and your time away from home. I'll entertain a motion to close the meeting. Motion made and seconded. All in favor?

NEXT MEETING – March 30, 31 and April 1, 2015, Crowne Plaza Hotel, Atlanta, GA.

Appendix A – Incident List

ESP ONLY - NO LEAK

FALL 2014 - 001	
Classification:	**ESP Only – No Leak**
Location:	**International Paper, Bogalusa, LA**
Unit:	20RU, PR-66 (PR-202 1980 rebuild), 1964, B&W, 2 drum, front-sloped hearth, DCE cyclone
Unit Size:	2.8 MM lb ds/day; 388,000 lb/hr steam at 850 psig, 825°F, 1050 psig design
Incident Date:	April 27, 2012
Downtime hrs, leak/total:	60
ESP?	YES
Leak/Incident Loc:	Suspected smelt spout
How discovered:	Walk down
Wash adjacent tube:	n/a
Root cause:	n/a
Leak detection:	No
Bed cooling enhanc	Yes. Southland NaHCO3/N2
Last full inspection:	March 2012
Sequence of events:	**26Apr**: Previous shift had problems controlling bed on spout wall. **27Apr**: 03:00 North spout opened. Fired liquor. By shift change, covered spouts with unburned liquor. Blacked out primary air ports. Draft issues on unit. Sootblower sequence had to be modified. Suspect additional ash dropped on front wall spouts. South spout had been smelting but was now thick with char and gooey liquor. Found opposite wall spray partially plugged. Changed it to get good spray pattern back. Worked on clearing air ports fighting the gummy liquor that covered wall. South spout plugged with gummy liquor. Added manpower to spout deck to help with air ports and plugged spout. With a flashlight, saw steam escaping from top of spout opening above liquor plug – a strange look of steam puffing out of spout. Decided to **ESP** unit since could be from leak in area. ESP initiated, post ESP checklist completed, Lockout/tag out, confined space entry procedure, 4 hour wait time prior to entering recovery building.: Accelerated bed cooling used – Southland NaHCO3/N2. **28Apr** 04:00 Unit cooled. 16:00 Water wash complete. 23:00 Hydro blasting of buildup done. **29Apr**: 02:00 Hydro tested. No leak was found. 12:00 Ready to fire. 20:45 Liquor in unit.
Repair procedure:	n/a
Future prevention:	Continue to train on ESP procedures and general best practices for controlling bed.

ECONOMIZER **HAND HOLE CAP**

FALL 2014 - 002	
Classification:	**Non Critical**
Location:	**International Paper, Texarkana, TX**
Unit:	#1 RU, 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:	October 29, 2013
Downtime hrs, leak/total:	28.67 off line/36.17 off liquor
ESP?	No
Leak/Incident Loc:	Porosity hole in lower (cold) economizer upper header hand hole cap weld external leak of center module
How discovered:	Walk down. Saw water in econ hopper.
Wash adjacent tube:	No
Root cause:	Porosity in weld metal
Leak detection:	Yes. IP design
Bed cooling enhanc	No
Last full inspection:	Sept 2012
Sequence of events:	During walk down, saw water in upper (hot) econ hopper. Inspection found hand hole cap leak.
Repair procedure:	Localized porosity and hole ground out, PT'd, welded with 300 degree preheat using SMAW with 7018 rod, with a root, and final PT
Future prevention:	Inspect other hand hole welds in the next annual outage. 6 hand hole cap leaks since 2006. 4 upper header cap leaks; 2 were lower header cap leaks.

Appendix A – Incident List (Cont'd)

ECONOMIZER **INSPECTION STUB**

FALL 2014 - 003	
Classification:	**Non Critical**
Location:	**International Paper, Texarkana, TX**
Unit:	#1 RU, 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:	October 29, 2013
Downtime hrs, leak/total:	28.67 / 36.17
ESP?	No
Leak/Incident Loc:	Hole in fillet weld at an inspection stub-to-header weld, at interface between two pass cap weld beads at 6 o'clock position of stub, on center module of primary (upper) economizer lower front header, LHSW stub.
How discovered:	Walk down. Saw water in econ hopper.
Wash adjacent tube:	No
Root cause:	Weld defect (fish eye) at start-stop point.
Leak detection:	Yes. IP design
Bed cooling enhanc	No
Last full inspection:	Sept 2012
Sequence of events:	During walk down, saw water in upper (hot) econ hopper. No water in boiler hopper. Pulled IK's for inspection.
Repair procedure:	Defect ground out. Dye pen. Repaired with 300 degree preheat using SMAW 7018 rod. Final dye pen OK.
Future prevention:	Inspect all stub welds in the next annual outage.

Appendix A – Incident List (Cont'd)

ECONOMIZER **INSPECTION STUB**

FALL 2014 - 004	
Classification:	**Non Critical**
Location:	**International Paper, Texarkana, TX**
Unit:	#2 RU, 1976 B&W PR-186, 2-drum, rear-slope hearth, 2005 large econ
Unit Size:	4.55 MM lb ds/day; 763,000 lb/hr steam at 1050 psig, 825°F, 1200 psig design
Incident Date:	Nov 16, 2013
Downtime hrs, leak/total:	53.75 hrs off line / 60.33 hrs off liquor
ESP?	No
Leak/Incident Loc:	Hole in weld of inspection stub, primary Upper economizer, rear lower header LHSW module, LHSW
How discovered:	Walk down. Saw water primary econ hopper conveyor
Wash adjacent tube:	No
Root cause:	Crack propagated from imperfection in weld. Several spots of porosity in weld around hole
Leak detection:	Yes. IP design
Bed cooling enhanc	No
Last full inspection:	Oct 2013
Sequence of events:	**16Nov**: Around 10 PM saw water in primary economizer conveyor. Pulled Liquor back and inspected unit. No evidence of water was observed from any other door in economizer or in generating bank hoppers. Unit taken down, cleaned and repairs made
Repair procedure:	Indication excavated; crack ground out to pipe and header interface. Dye penetrant to ensure all cracking removed prior to repairs. Header pre-heated to 300 degrees and welding done using GTAW process. Initial repair root pass was dry magnetic particle tested to ensure no cracking had developed. The final cap weld PT'd after cooled. The hemispherical cap cut off prior to repairs and an internal inspection of header found it to appear normal with no internal corrosion present that would have caused any cracks to develop. Accuren attempted unsuccessfully to UT the internal pipe to identify any cracking or holes in weld. Nipple prepped and new cap installed following header repairs. Root pass of cap butt weld was dry mag tested prior to completing filler and cap welds. Final cap weld PT'd and radiograph tested with no issues.
Future prevention:	Prior failure on #1 RU. Working with technology on a permanent solution. Plan development in progress.

Appendix A – Incident List (Cont'd)

ECONOMIZER HAND HOLE CAP

FALL 2014 - 005	
Classification:	**Non Critical**
Location:	**International Paper, Texarkana, TX**
Unit:	#1 RU, 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:	January 25, 2014
Downtime hrs, leak/total:	30.33 / 39.83
ESP?	No
Leak/Incident Loc:	Crack in weld of hand hole cap, primary, upper, hot economizer, LHSW module, lower front header, RHSW inspection nipple.
How discovered:	Walk down. Saw water in econ hopper. Heard leak when opened hopper door
Wash adjacent tube:	No
Root cause:	Poor weld quality. ID originating with large visual clusters of porosity subsurface. Lack of fusion weld defects in root pass
Leak detection:	Yes. IP design
Bed cooling enhanc	No
Last full inspection:	Sept 2012
Sequence of events:	During walk down, **saw water in** upper (hot) **primary economizer. Pulled IK's. Closed several hand valves.** Inspection. O**nly water found was primary hopper. Boiler hoppers remained dry. Eeasily heard at primary hopper door.**
Repair procedure:	Localized porosity and hole ground out, PT'd, welded with 300 degree preheat, with a root, and final PT
Future prevention:	**3rd inspection nipple leak between two recovery boilers. All on primary economizer lower headers.** Inspect other hand hole welds with PT. Will cut out and replace all inspection nipples in the next annual outage. 6 hand hole cap leaks since 2006. 4 upper header cap leaks; 2 were lower header cap leaks.

Appendix A – Incident List (Cont'd)

ECONOMIZER

FALL 2014 - 006	
Classification:	**Non Critical**
Location:	**International Paper, Courtland, AL**
Unit:	#2 RU, 1979 B&W, PR-180, 2 Drum, front-sloped hearth, DCE Cyclone
Unit Size:	4.2 MM lb ds/day; 500,000 lb/hr steam at 450 psig, 550°F, 550 psig design
Incident Date:	April 3, 2013
Downtime hrs, leak/total:	53.3 / 53.3
ESP?	No
Leak/Incident Loc:	¾" split, at bottom header of cold (rear) econ middle module 5, tube #70 from LHSW, 11th row from hot side Leak on hydro: Pinhole at bottom header of cold (rear) econ middle module 5, tube #70 from LHSW, 12th row from hot side
How discovered:	Walk down. Saw water leaking down outside of economizer outlet vertical ductwork on floor beneath bottom of economizer.
Wash adjacent tube:	No
Root cause:	Cold side corrosion thinning and internal pitting
Leak detection:	Yes. DCS mass balance, mill design. Were trying to correct ongoing reliability issues with leak detector for some time. The mass balance leak detect calculation had been slightly over threshold for giving an alarm for several weeks. Looking back on data after leak, several step changes were seen in mass balance calculation on day prior probably due to leak starting or worsening.
Bed cooling enhanc	No
Last full inspection:	Oct 2012
Sequence of events:	3Apr: 03:00 During walk down, saw small amount of water leaking from under insulation on economizer outlet duct. No signs of gen bank leak were detected (boiler water conductivity and cbd valve position were normal, no water was observed in gen bank hopper or unusual noise noted coming from gen section). Opened several economizer and ductwork doors to check for any sign of water or unusual noise but none was detected. 07:00: Initial day shift walk down saw increase in water leaking out of duct. Liquor was pulled. 10:00 Economizer doors again opened. Leak found at outlet (bottom) of economizer. Did orderly shut down and burned out bed. Did repair. Did hydro. Found pinhole leak. Did repair. 5Apr: start up.
Repair procedure:	Cut upper section of failed tube and capped near upper header. Completely removed bottom section of failed tube from header and another capped stub was welded into header. Remnants of failed tube were removed from unit.
Future prevention:	Economizer is scheduled to be replaced in 2014. Economizer is original from 1979. There have been numerous economizer tube failures near bottom header due to internal pitting, external pitting and general external corrosion. There are 6 modules, 3 wide by 2 deep. No. 1 module was replaced by a new module of the same design in 2002 due to chronic tube leaks. The other 5 modules are original, from 1979. Since the start of 2000, there have been 22 recorded tube leak incidents in the economizer. Since the start of 2009, there have been 12 recorded tube leak incidents. Tube leak outages result in No. 2 Recovery Boiler downtime ranging from 48 to 60 hours. Lab analysis on a number of tubes from all modules shows extensive waterside pitting, some of which has caused leaks. Stress assisted corrosion, cold side external corrosion; sootblower erosion and vibration bar mechanical rubbing have also caused leaks. In February, 2011, modules #2 and 3 were bypassed due to chronic tube leaks. Subsequently, **MILL HAS BEEN SHUT DOWN**.

Appendix A – Incident List (Cont'd)

ECONOMIZER

FALL 2014 - 007	
Classification:	**Non Critical**
Location:	RockTenn, Hodge, LA
Unit:	#2 RU 1971 CE 20370, 2-drum decanting hearth, 1982 large econ
Unit Size:	3.7 MM lb ds/day; 658,000 lb/hr steam at 1250 psig, 900°F, 1475 psig design
Incident Date:	June 29, 2014
Downtime hrs, leak/total:	42.3
ESP?	No
Leak/Incident Loc:	Three pin hole leaks at bottom inlet header of cold (rear) economizer. Row 23 tube 2 & 3 and row 24 tube 3 about 3 inches from header weld. (1st pinhole washed 2 others.)
How discovered:	Walk down. Heard audible leak noise.
Wash adjacent tube:	Yes. 2nd two leaks. Also, row 22 tube 2 and row 24 tube 2 had flat spots from water washing caused from leaks above.
Root cause:	highly localized internal wall loss from under-deposit corrosion.
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	Nov 2013
Sequence of events:	28Jun: West economizer sluice hopper was running a little high. 29Jun: 00:30 Walk down all OK. 02:30 Inspected hopper. Heard unusual noise. Thought it was IK. Contacted area operator. 02:35 Stopped IKs. Heard noise at economizer bottom. At 4th floor, noise audible but faint. 03:00 Opened economizer bottom doors. Saw water. 05:15 off liquor. 05:38 pulled gas, began boiler cool down. 12:00 Three leaks seen from economizer side access plate. 20:00 Began weld repairs. 30Jun: 07:25 Hydro OK. Delay getting unit on line due to unrelated issue 1Jul: 14:45 Unit on line. 20:20 On liquor.
Repair procedure:	Re-welded with SMA welding IAW Alstom welding procedure. Flat spots from water washing were pad welded
Future prevention:	Performed detailed NDT inspection of this area. No issued found

Appendix A – Incident List (Cont'd)

ECONOMIZER

FALL 2014 - 008	
Classification:	**Non Critical**
Location:	RockTenn, Hodge, LA
Unit:	#2 RU 1971 CE 20370, 2-drum decanting hearth, 1982 large econ
Unit Size:	3.7 MM lb ds/day; 658,000 lb/hr steam at 1250 psig, 900°F, 1475 psig design
Incident Date:	July 30, 2014
Downtime hrs, leak/total:	72.6
ESP?	No
Leak/Incident Loc:	Three pin hole leaks at bottom inlet header of cold (rear) economizer. Row 29 tube 3 about 3 inches from header weld. Row 24 tube 3 inches from header just above pad weld of 6/29/14 leak). Row 79 tube 1 25inches above header weld.
How discovered:	Walk down. Saw sluice tank running full, then saw water at econ.
Wash adjacent tube:	Row 24 tube 2 has flat spot from water washing caused from leak above.
Root cause:	Highly localized internal wall loss from under-deposit corrosion. Row 79 leak Dutchman analysis. Dutchman X-ray and NDT found nothing, Corrosion product analysis found significant amount of sulfer (as much as 1.9% wt) and chlorine (as much as 2.4% wt) that could have promoted the under-deposit corrosion.
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	Nov 2013
Sequence of events:	30Jul: Walk down. Saw sluice tank running full. 04:00 Saw water at econ hopper. Saw water raining down in hopper. Delayed shut down due to issue with other RU. 8:00 Off liquor 17:00 Pulled gas, fire out of unit, commenced cool down. 19:00 Saw more than one leak during cool down. 31Jul: 09:30 Begin repairs 14:30 Repairs done on 2 north tubes. 15:00 Hydro fill to locate south tube leak. 16:00 Began Dutchman repairs to south tube. 23:00 Repairs done. Hydro fill. 1Aug: 02:02 Hydro OK. 01:47 Fire in unit, delayed due to wet fan motor. 2Aug: 05:35 Unit on line. 06:35 Unit on liquor.
Repair procedure:	Re-welded with SMA welding IAW Alstom welding procedure. All leaks and flat spot were pad welded except for leak on tube 79. Removed Dutchman sample for analysis. Pad welded 5 inches on tube 24 since 2nd leak was on same tube and area of a previous leak. BLRBAC guidelines were not referenced.
Future prevention:	Had 3 pinhole leaks Jun 29, 2014. Performed detailed NDT inspection of this area. No issues found. Tube sample taken for failure analysis.

Appendix A – Incident List (Cont'd)

ECONOMIZER

FALL 2014 - 009	
Classification:	**Non Critical**
Location:	RockTenn, Hodge, LA
Unit:	#2 RU 1971 CE 20370, 2-drum decanting hearth, 1982 large econ
Unit Size:	3.7 MM lb ds/day; 658,000 lb/hr steam at 1250 psig, 900°F, 1475 psig design
Incident Date:	August 11, 2014
Downtime hrs, leak/total:	0/ 72.6
ESP?	No
Leak/Incident Loc:	Three 1/8" pin hole leaks at bottom inlet header of cold (rear) economizer. Row 3 tube 3, Row 7 tube 3 and row 21 tube 3, on bottom side of tubes
How discovered:	Walk down. Saw water running out of economizer. Sluice tank running full
Wash adjacent tube:	Yes.
Root cause:	Highly localized internal wall loss from under-deposit corrosion
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	Nov 2013
Sequence of events:	**11Aug**: Walk down. Saw sluice tank running full. 08:40 Saw water at econ hopper. Saw water raining down in hopper. 9:50Off liquor 09:55 Unit off line. 12:18 Fire out of unit, commenced cool down. **12Aug**: 06:00 Begin repairs Plugged leaking tubes. 14:45 Repairs done. 15:32 Hydro fill showed another leak. 18:45 Repairs done. 19:03 Hydro fill. **13Aug**: 01:30 Hydro OK. 01:50 Fire in unit. 15:07 Liquor in unit. 15:17 On line.
Repair procedure:	Leaking tubes were cut and plugged
Future prevention:	Had pinhole leaks Jun 29 aand July 30, 2014. Performed detailed NDT inspection of this area. No issues found. Row 21 tube sample sent off to NALCO for failure analysis

ECONOMIZER

FALL 2014 - 010	
Classification:	**Non Critical**
Location:	**RockTenn La Tuque, Quebec, Canada**
Unit:	**#4, 1966, Combustion Engineering SL, 2 drum, Decanting Hearth, DCE Cascade**
Unit Size:	**1.16 MM lb ds/day; 178,000 lb/hr steam at 320 psig, 850°F, 725 psig design**
Incident Date:	**May 20, 2014**
Downtime hrs, leak/total:	**219**
ESP?	**Yes**
Leak/Incident Loc:	**1/8" x ¼" hole in tube #26 in middle of lower header on front of hot side economizer bank. Adjacent tube 25 damaged by erosive action.**
How discovered:	**Control Panel. Liquor solids decreasing.**
Wash adjacent tube:	**Yes adjacent tube was washed but did not leak until a pinhole occurred.**
Root cause:	**ID stress assisted corrosion cracking of tube at weld to header (age-related)**
Leak detection:	**No**
Bed cooling enhanc	**No**
Last full inspection:	**November 2013**
Sequence of events:	19May**: 21:30 Saw liquor guns solids decreasing over time, likely due to #1 evaporator set experiencing start-up operation issues and causing low solids production. Continued to monitor solids. 22:00 Walk down. No water or other dilution sources entering cascade. Nothing found.** 20May**: 05:00. Evaporators still experiencing problems. 07:30 Lower solids stable. 11:30 Liquor guns solids decreasing slightly even though evaporator solids slightly higher. 11:45 Walk down. Sees water dripping from flue gas duct at entrance to cascade. See dark area in economizer outlet and up one level. Solids reached 60% alarm, divert imminent. Decide to ESP the boiler since leak may be higher in economizer or generating bank. 12:06 ESP'd unit.**
Repair procedure:	**Both Lower bends cut out and replaced. Welding process**
Future prevention:	**Feb 2014 Leak at the top of the economizer. Economizer will be replaced**

Appendix A – Incident List (Cont'd)

ECONOMIZER

FALL 2014 - 011	
Classification:	**Non Critical**
Location:	**International Paper, Riegelwood, NC**
Unit:	#5 RU, 1981 CE 20980, 2-drum, decanting hearth, large economizer
Unit Size:	7.32 MM lb ds/day; 1,030,000 lb/hr steam at 850 psig, 825°F, 1130 psig design
Incident Date:	June 25, 2013
Downtime hrs, leak/total:	47.1 / 51.1
ESP?	No
Leak/Incident Loc:	2" crack at start/ stop place in weld from hanger lug scallop bar attachment to bottle header No. 21 (left to right) at top of rear economizer.
How discovered:	Control panel. Saw gas outlet temperatures dropping on one side of unit.
Wash adjacent tube:	No. Leak sprayed against upper casing.
Root cause:	Poor weld; Joint at 85% full load efficiency. Hanger rod limiting design
Leak detection:	Yes. IP design
Bed cooling enhanc	No
Last full inspection:	May 2013
Sequence of events:	25Jun: 0 8:00 Saw gas outlet temperatures dropping on one side of unit. Walk down then Discovered leak. Saw water dripping from expansion joint on economizer outlet. Through economizer hopper conveyor inspection door, saw water in conveyor. Kept running. 20:20 Began orderly shut down. Slowdown unit. Burn bed out. 21:30 Oil fire in. 26Jun: 00:23 Unit off line. Repaired leak in header No. 21 counting left to right. During hydro, found second smaller leak in header 73. Repaired second leak. Hydro OK. 27Jun: 23:27 Unit on line on oil. 28Jun: 01:05 Liquor in unit.
Repair procedure:	Ground out crack. PT verify. Weld repair.
Future prevention:	Installation of a new hanger design. Design is very marginal. In May 2014 annual outage, replacing back hangers with 2 new hanger lugs so load goes to same collector beam. Similar leak in Oct 2010, thought to be poor welds.

ECONOMIZER

FALL 2014 - 012	
Classification:	**CRITICAL INCIDENT #813**
Location:	**International Paper, Texarkana, TX**
Unit:	#1 RU, 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:	April 11, 2013
Downtime hrs, leak/total:	27.75 / 27.75
ESP?	No
Leak/Incident Loc:	Porosity pinhole in tube-to- header weld at start-stop point, upper (hot) economizer, 2nd module upper header; Washed split in tube across, about 6" below upper header.
How discovered:	Panel, then Walk down. Saw water in hot econ hopper. Heard leak at upper header. None in boiler hopper.
Wash adjacent tube:	Yes
Root cause:	Porosity in header weld metal at start-stop point.
Leak detection:	Yes. IP design
Bed cooling enhanc	No
Last full inspection:	Sept 2012
Sequence of events:	On panel, saw dip in liquor burning solids. Did walk down, saw water in upper (hot) econ hopper. Heard leak at upper rear header. Saw leak through manway door just below header. Did orderly shut down. Did repairs.
Repair procedure:	Pinhole ground out and re- welded. Split tube and a tube removed for access were plugged at headers.
Future prevention:	Inspect header welds in next annual outage.

Appendix A – Incident List (Cont'd)

ECONOMIZER

FALL 2014 - 013	
Classification:	**CRITICAL INCIDENT #814**
Location:	**International Paper, Texarkana, TX**
Unit:	#2 RU, 1976 B&W PR-186, 2-drum, rear-slope hearth, 2005 large econ
Unit Size:	4.55 MM lb ds/day; 763,000 lb/hr steam at 1050 psig, 825°F, 1200 psig design
Incident Date:	July 4, 2013
Downtime hrs, leak/total:	54
ESP?	No
Leak/Incident Loc:	Crack in toe of header fillet weld on tube side upper header on primary economizer.
How discovered:	Walk down. Saw water at primary econ hopper door
Wash adjacent tube:	No
Root cause:	Likely manufacturing weld defect
Leak detection:	Yes. IP design
Bed cooling enhanc	No
Last full inspection:	Oct 2012
Sequence of events:	**4Jul** Saw water leaking out from edges of north primary (upper) economizer hopper door. Found crack in toe of header fillet weld.
Repair procedure:	Crack ground out and PT'd. Welded up using WPS GTSM-P1. PT'd.
Future prevention:	x

ECONOMIZER

FALL 2014 - 014	
Classification:	**CRITICAL INCIDENT #815**
Location:	**International Paper, Texarkana, TX**
Unit:	#2 RU, 1976 B&W PR-186, 2-drum, rear-slope hearth, 2005 large econ
Unit Size:	4.55 MM lb ds/day; 763,000 lb/hr steam at 1050 psig, 825°F, 1200 psig design
Incident Date:	November 20, 2013
Downtime hrs, leak/total:	0 / 0
ESP?	No
Leak/Incident Loc:	Crack in toe of header fillet weld on tube side of #18 tube from the LHSW, row 3 on rear upper header on primary economizer.
How discovered:	Hydro. Water found during hydro after lower header stub repair.
Wash adjacent tube:	No
Root cause:	Likely stresses from shop weld not being properly profiled. Leak directly under outlet nozzle on top of header. Within 3 feet of hanger.
Leak detection:	Yes. IP design
Bed cooling enhanc	No
Last full inspection:	Oct 2013
Sequence of events:	Unit being hydro'd after repair of lower header stub. Watching through doors as pressure being raised. At 400 psig, saw leak at upper rear primary economizer header. Finished hydro. Unit drained and locked back out for repair. Made repair. Re-hydro'd. [NOTE: Area inspected after fire removed and unit coming down. Also inspected secondary economizer stubs earlier when boiler brought to 700 psig after area cleaned for inspection. No leaks were found either time.]
Repair procedure:	Crack ground out and PT'd to ensure all cracking removed. Tube preheated and repaired with GTAW process. Final weld cap PT'd.
Future prevention:	Economizer hanger rods have since been balanced. Will do thorough inspection next annual outage.

Appendix A – Incident List (Cont'd)

ECONOMIZER (& SUPERHEATER)

FALL 2014 - 015	
Classification:	**Non Critical (2 LEAKS,BOTH NON-CRITICAL)**
Location:	**Verso Paper, Androscoggin, Jay ME**
Unit:	#1 RU, 1965 CE DE 0193 2-drum, front-slope hearth, 1984 CE or Tampella extended large econ
Unit Size:	2.35 MM lb ds/day; 296,000 lb/hr steam at 900 psig 810°F, 1000 psig design
Incident Date:	January 20, 2014
Downtime hrs, leak/total:	72.5/72.5
ESP?	No
Leak/Incident Loc:	Extended econ-two 1/16 " pin holes ½ inch above bottom header, tube 1 row 7; Primary SH- three pin hole leaks in cracks at attachment weld at top of tube clip between tubes
How discovered:	Walk down. Clearing plugged econ hopper. (SH leaks found during hydro)
Wash adjacent tube:	No
Root cause:	Econ: Dissolved oxygen pitting; SH: Metal fatigue of attachment weld
Leak detection:	No
Bed cooling enhanc	n/a
Last full inspection:	April 2013
Sequence of events:	**20Jan**: 15:00 walk down washing saltcake- plugged hopper under new extended econ. 15:30 saw water entering hopper 15:45 ID'd from tube at lower header. 15:50 Began orderly shutdown. 19:08 ready for entry. **20Jan-**22Jan: Did repairs. **22Jan**: 05:25 **SECOND LEAK**: During hydro found 2 SH leaks. Staged & did repairs. **23Jan:** 05:30 During hydro found 1 SH leak. Staged & did repairs. 19:40 Hydro OK.
Repair procedure:	Econ: Tubes cut off & plugged at top & bottom headers. Welds dye penetrant tested & unit hydro'd
Future prevention:	Improved dissolved oxygen control. Replace Economizer Similar leaks in 2003, & 2008 (at previous repair)

ECONOMIZER

FALL 2014 - 016	
Classification:	**Non Critical**
Location:	**Verso Paper, Androscoggin, Jay ME**
Unit:	#1 RU,1965 CE DE 0193 2-drum, front-slope hearth, 1984 CE or Tampella extended large econ
Unit Size:	2.35 MM lb ds/day; 296,000 lb/hr steam at 900 psig 810°F, 1000 psig design
Incident Date:	March 28, 2014
Downtime hrs, leak/total:	26.6
ESP?	No
Leak/Incident Loc:	Extended econ- 1/8 " pin hole outside of first bend above bottom header, tube 21 row 9;
How discovered:	Leak detection indicated.
Wash adjacent tube:	No
Root cause:	Dissolved oxygen pitting
Leak detection:	Yes. Buckman Recovery Boiler Advisor New Jan 2014. Gave initial detection.
Bed cooling enhanc	no
Last full inspection:	April 2013
Sequence of events:	**28Mar:** Leak detection indicated. Did walk down inspection 20:00 Saw water in new economizer hopper. Began to burn the Bed out. 23:35 Fire out. Orderly shut down**.** 29Mar**:** Repairs complete Hydro OK. 20:30 Fire in unit.
Repair procedure:	Tube cut off & plugged at top & bottom headers. Welds dye penetrant tested & unit hydro'd
Future prevention:	Detailed UT inspection planned for October 2014 annual outage to identify specific areas of thinning/pitting. Similar leaks in 2003, 2008 (at previous repair) and Jan 2014

Appendix A – Incident List (Cont'd)

ECONOMIZER

FALL 2014 - 017	
Classification:	**CRITICAL INCIDENT #816**
Location:	**Verso Paper, Quinnesec, MI**
Unit:	#1 RB,1985 B&W PR-203, 2-drum, rear-slope hearth, large economizer
Unit Size:	4.20 MM lb ds/day; 620,000 lb/hr steam at 600 psig, 752°F, 800 psig design
Incident Date:	January 23, 2014
Downtime hrs, leak/total:	34.1
ESP?	**No**
Leak/Incident Loc:	½ in radial crack approximately ¾" from upper header; 2nd module of hot bank, 1st tube by wall.
How discovered:	Acoustic detected change; and walk down
Wash adjacent tube:	No
Root cause:	Fatigue cracking just below weld; SAC
Leak detection:	Yes Triple 5 Acoustic
Bed cooling enhanc	No
Last full inspection:	Oct 2012
Sequence of events:	23Jan: Leak detection alarm during operation. Walk down, no soot blowers. No water in hoppers. 24Jan: Continue vigilance. 12:30 Moisture at door. 12:51Suspect econ leak. 13:27 Confirm small leak at upper header, 2nd module of hot bank, 1st tube from wall. 13:40-18:00 Orderly cut-back, pulled liquor, burned bed out. **25Jan**: 05:09 Unit tripped 13:38-15:33 Did repair. 17:00 Hydro OK. 19:32 1st fire-gas. **26Jan**: 02:45 On line. 03:04 Fired liquor.
Repair procedure:	Ground out; weld repaired
Future prevention:	Additional NTD, Check lower header for binding and economizer hangers for looseness

ECONOMIZER

FALL 2014 - 018	
Classification:	**Non Critical**
Location:	**Domtar, Hawesville, KY**
Unit:	#4 RU, 1997, Ahlstrom, #59072, 1 drum, decanting hearth, large econ.
Unit Size:	2.7 MM lb ds/day; 415,880 lb/hr steam at 1250 psig, 860°F, 1550 psig design
Incident Date:	April 1, 2014
Downtime hrs, leak/total:	32.85 / 32.85
ESP?	No
Leak/Incident Loc:	¼ " circumferential crack in toe of weld, 9th feeder tube, lower inlet header, cold (rear) economizer
How discovered:	Walk down
Wash adjacent tube:	No
Root cause:	Vibration caused fatigue
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	August 2013
Sequence of events:	**1Apr**: Saw water in east side of north economizer ash collection conveyor. **2Apr**: 11:15 liquor out. Repairs made. **4Apr**: 08:06 on liquor.
Repair procedure:	Leak ground out and re-welded.
Future prevention:	Eighth similar leak in a weld in #1 economizer since March 2009. Put module vibration brackets on this leak. Removed old style casing seals. Shear waved tested all feeder tubes. Made additional repair. Planning shear wave test next outage in September. Weld reinforced all feed tube-to-header welds.

Appendix A – Incident List (Cont'd)

ECONOMIZER

FALL 2014 - 019	
Classification:	**Non Critical**
Location:	**Domtar, Hawesville, KY**
Unit:	#3 RU, 1987, Ahlstrom, #39445, 2 drum, decanting hearth, large econ.
Unit Size:	2.1 MM lb ds/day; 360,000 lb/hr steam at 1250 psig, 860°F, 1550 psig design
Incident Date:	April 5, 2014
Downtime hrs, leak/total:	21.75 / 21.75
ESP?	No
Leak/Incident Loc:	Pinhole leak in 4th from right wall Feeder tube bend, bottom of lower inlet header #1 (cold) economizer
How discovered:	Walk down. Saw
Wash adjacent tube:	No
Root cause:	Feeder tube bend wear from past sootblower issues (condensate)
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	August 2013
Sequence of events:	**5Apr**: 13:45 Saw water in economizer ash conveyor. **7Apr**: 22:58 liquor out. Repairs made. **8Apr**: 20:42 on liquor.
Repair procedure:	Pinhole leak ground out and re-welded.
Future prevention:	Four leaks in last 18 years. Looking into sootblower condensate reduction

ECONOMIZER

FALL 2014 - 020	
Classification:	**Non Critical**
Location:	**Domtar, Hawesville, KY**
Unit:	#4 RU, 1997, Ahlstrom, #59072, 1 drum, decanting hearth, large econ.
Unit Size:	2.7 MM lb ds/day; 415,880 lb/hr steam at 1250 psig, 860°F, 1550 psig design
Incident Date:	July 30, 2014
Downtime hrs, leak/total:	25 / 25
ESP?	No
Leak/Incident Loc:	¼" circumferential crack in toe of weld, 12th feeder tube, lower inlet header, cold (rear) economizer
How discovered:	Walk down
Wash adjacent tube:	No
Root cause:	Vibration caused fatigue
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	August 2013
Sequence of events:	**30 Jul**: During walk down, saw water in east side of north economizer ash collection conveyor. **31Jul**: 21:45 liquor out. Repairs made. **1Aug**: 22:45 on liquor.
Repair procedure:	Leak ground out and re-welded.
Future prevention:	Tenth similar leak in a weld in #1 economizer since March 2009. Previously removed old style casing seals. Shear waved tested all feeder tubes. Made additional repair. More shear wave testing September outage. Weld reinforced all feed tube-to-header welds. Put on module vibration brackets on both #1 and #2 economizer. Future plan: replace inlet header next year's outage. Put module vibration brackets on this leak.. Shear waved tested all feeder tubes. Made additional repair. Planning shear wave test next outage in September. Weld reinforced all feed tube-to-header welds.

Appendix A – Incident List (Cont'd)

SUPERHEATER

FALL 2014 - 021	
Classification:	**Non Critical**
Location:	**International Paper, Texarkana, TX**
Unit:	#2 RU, 1976 B&W PR-186, 2-drum, rear-slope hearth, 2005 large econ
Unit Size:	4.55 MM lb ds/day; 763,000 lb/hr steam at 1050 psig, 825°F, 1200 psig design
Incident Date:	July 10, 2013
Downtime hrs, leak/total:	54 / 54
ESP?	No
Leak/Incident Loc:	Secondary superheater. Weld failure in toe of weld at a T&G, 2nd pendant from the RHSW, 6th tube toward rear.
How discovered:	Walk down. Inspection prior to water washing for an economizer leak repair.
Wash adjacent tube:	No
Root cause:	Crack failure in toe of T&G weld.
Leak detection:	Yes. IP design
Bed cooling enhanc	No
Last full inspection:	Oct 2012
Sequence of events:	Unit down to make repairs to an upper economizer leak, about to be water washed. Saw leak when inspecting the furnace prior to water washing.
Repair procedure:	Indication was ground out. PT performed. Indication welded up and PT'd. WPS used GTSM-P1. New T&G installed 12" above repair area. WPS used GTSM-1-297-70.
Future prevention:	x

SUPERHEATER

FALL 2014 - 022	
Classification:	**Non Critical**
Location:	**International Paper, Orange, TX**
Unit:	#1 RU 1967 B&W PR-108A , 2 drum, Front-sloped hearth, 1988 SH, DCE cyclone
Unit Size:	2.7 MM lb ds/day 254,000 lb/hr steam at 850 psig, 835°F, 975 psig design
Incident Date:	September 8, 2013
Downtime hrs, leak/total:	33
ESP?	No
Leak/Incident Loc:	2.5" crack in thin spot Tube 1, platen 10 rubbed by #5 IK. secondary superheater cold side of lane
How discovered:	Leak Detection Alarm (Mass balance)
Wash adjacent tube:	No
Root cause:	IK rubbing tube thin causing crack. Superheater platens distorted and bow into IK lane is distinct. Tubes are 26 yrs old, some are plugged. Heat causing creep.
Leak detection:	Yes. DCS mass balance & Nalco RBLI Trasar
Bed cooling enhanc	No
Last full inspection:	September 2012
Sequence of events:	Unit at steady state. 16:38 Received DCS mass balance alarm. 1st walk down nothing found, no RBLI confirmation. 18:15 2nd walk down, IK's off. Heard leak, confirmed in superheater where saw tube interference with IK. 18:51 Pulled liquor, 19:16 Unit tripped due to corroded hole in furnace low pressure draft tap. Restarted unit, burned bed down, 22:50 Off line. Began scheduled annual inspection outage 33 hours early. Made repair.
Repair procedure:	Dutchman
Future prevention:	Will monitor IK's on water wash. Repair properly during outage; Replace superheater 2014

Appendix A – Incident List (Cont'd)

SUPERHEATER

FALL 2014 - 023	
Classification:	**Non Critical**
Location:	**International Paper, Orange, TX**
Unit:	#2 RU 1967 B&W PR-108B , 2 drum, Front-sloped hearth, 1987 SH, DCE cyclone
Unit Size:	2.7 MM lb ds/day 254,000 lb/hr steam at 850 psig, 835°F, 975 psig design
Incident Date:	September 21, 2013
Downtime hrs, leak/total:	/86.5
ESP?	No
Leak/Incident Loc:	Dime-size hole in tube, platen 13 rubbed by #6 IK. secondary SH hot side of lane (7th floor)
How discovered:	Leak Detection Alarm (Mass balance)
Wash adjacent tube:	No
Root cause:	IK rubbing tube thin causing dime-size hole. **Superheater platens distorted on cold side of IK lane, platen 10 bowed & pushed IK #6 into platen 13 on hot side of lane. Tubes are 26 yrs old.**
Leak detection:	Yes. DCS mass balance & Nalco RBLI Trasar
Bed cooling enhanc	No
Last full inspection:	Feb 2013
Sequence of events:	**21Sep**: Unit at steady state. 19:30 Received DCS mass balance alarm. During walk down, heard leak. Pulled liquor. Shut IK steam. Confirmed no water leak. Determined in superheater. Did orderly shut down. Burned bed down. 22Sep: 00:05 Fire out
Repair procedure:	Dutchman
Future prevention:	Will monitor IK's on water wash. Repair properly during outage; Replace superheater 2014

SUPERHEATER

FALL 2014 - 024	
Classification:	**Non Critical**
Location:	**International Paper, Orange, TX**
Unit:	#2 RU 1967 B&W PR-108B , 2 drum, Front-sloped hearth, 1987 SH, DCE cyclone
Unit Size:	2.7 MM lb ds/day 254,000 lb/hr steam at 850 psig, 835°F, 975 psig design
Incident Date:	February 13, 2014
Downtime hrs, leak/total:	48.4
ESP?	No
Leak/Incident Loc:	Rupture in thin wastage spot, inner hairpin loop tube 42, platen 21, loop row 2, primary superheater
How discovered:	Walk down. Heard while putting liquor gun in service
Wash adjacent tube:	No
Root cause:	Short term overheat from uncleared SH start-up, at tube thin from wastage due to chronic boiler pluggage and gas channeling.
Leak detection:	Yes. DCS mass balance & Nalco RBLI Trasar
Bed cooling enhanc	No
Last full inspection:	Feb 2013
Sequence of events:	Unit starting up from water wash. Brought on line after all SH tubes were thought to have been cleared. Liquor was just being put in unit. Heard leak, all fuels removed. Analysis of data led to superheater leak. Visual inspection confirmed. Unit shut down for repairs.
Repair procedure:	20' Dutchman. Additional repairs made. Lower loop on this tube also replaced. Frontal tube (tube 1 from IK pass) replaced with 8 ft tube Dutchman for similar wastage and thinning.
Future prevention:	Enforcement of tube clearing procedures during startup. Repair properly during outage. 2015 superheater replacement. which will include additional thermocouples. (Currently, every other tube)

Appendix A – Incident List (Cont'd)

SUPERHEATER

FALL 2014 - 025	
Classification:	**Non Critical**
Location:	**MeadWestvaco, Mahrt, AL**
Unit:	RU 1, 1966 B&W PR-97, 2-drum, front-sloped hearth, 1996 large econ
Unit Size:	2.8 MM lb ds/day; 440,000 lb/hr steam at 890 psig, 825°F, 1000 psig design
Incident Date:	July 14, 2014
Downtime hrs, leak/total:	55.4
ESP?	No
Leak/Incident Loc:	fish mouth leak in secondary superheater section, between 6 and 7th floor South side of boiler. (Adjacent tube thinned.)
How discovered:	Walk down. Heard hissing sound coming from gun port
Wash adjacent tube:	Yes Adjacent tube thinned
Root cause:	--
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	Spring 2013
Sequence of events:	**14Jul**: During walk down, heard hissing sound coming from liquor gun port. Inspected. Put sootblowers on hold. Valved out aspirators on unit. Stopped liquor firing and went on auxiliary fuel before going up to walk unit down. At 7th floor still heard hissing sound even louder on south side of unit. Opened some doors to inspect. Apparent leak in superheater section. Saw clouds of salt blow by it as it fell. Checked all steam and feedwater trends to identify any issues. No separation in feedwater/steam flow. Put liquor back in unit, burned bed out. Did orderly shutdown. Did LO-TO and washed. ID'd tubes 15 & 16 for replacement.. Made repairs.
Repair procedure:	Replaced 2 - 9ft sections of tubes 15 & 16. X-rayed. All was good.
Future prevention:	2 Tubes sent for analysis. Previous leaks December 2013: 2-superheater tubes in same section, opposite side of unit, found on hydro.

Appendix A – Incident List (Cont'd)

SUPERHEATER

FALL 2014 - 026	
Classification:	**Non Critical**
Location:	**ALPAC, Alberta Pacific Forest Industries, Boyle, AB CAN**
Unit:	1992 B&W C-7634 1-drum, rear-slope hearth, large economizer
Unit Size:	7.3 MM lb ds/day; 1,029,268 lb/hr steam at 900 psig, 850°F, 1150 psig design
Incident Date:	April 4, 2014
Downtime hrs, leak/total:	61
ESP?	No
Leak/Incident Loc:	Secondary superheater, hanger tube on Platen #6 sheared off inside seal box at roof penthouse, below the seal box weld to tube location. 170ft above the floor. Tube is connector tube between sections of secondary superheater that are separated by soot blower lane and penetrate through roof, supported by hanger rods attached to structural sections in penthouse.
How discovered:	Leak detection alarm Buckman Recovery Boiler Advisory
Wash adjacent tube:	No
Root cause:	Platen swinging caused fatigue cracking at seal weld between tube and crown seal of seal box.
Leak detection:	Yes. Buckman Recovery Boiler Advisory-RBA (Dynamic water balance) Compares actual operating conditions versus theoretical levels to determine whether an imbalance is present, then interprets potential causes and reports. RBA continuously monitors for classic signs of lower furnace leak using operating parameters such as ID fan speed, opacity, draft, etc.
Bed cooling enhanc	No
Last full inspection:	May 2013
Sequence of events:	4Apr: Leak detection alarm; suspected on secondary superheater. Steam Chief confirmed leak on hanger tube section, rear section of secondary superheater at roof penetration, inside seal box, inside penthouse. Orderly shutdown and made ready for entry. When cool enough, confirmed that hanger tube on Platen #6 had sheared off inside seal box, below seal box weld to tube location. This tube is the connector tube between the sections of secondary superheater that are separated by the soot blower lane and penetrate through the roof, supported by hanger rods attached to structural sections in the penthouse. Repairs made. Hydro-tested at 1560 PSIG. Unit inspected. No leaks. Unit returned to service.
Repair procedure:	Removed the defective section of the tube, one cut inside the penthouse above the seal box, and the other in the boiler cavity above the superheater. When welding completed welds inspected with RT (radiographic) inspection.
Future prevention:	Increase inspections in the area during the next major outage.

Appendix A – Incident List (Cont'd)

GEN SIDE WALL, 1-Drum

FALL 2014 - 027	
Classification:	**Non Critical**
Location:	**International Paper, Valliant, OK**
Unit:	#2 RU, 2006 Andritz 400084, 1-drum, decanting hearth, large econ
Unit Size:	6.3 MM lb ds/day; 943,000 lb/hr steam at 1250 psig, 900°F, 1500 psig design
Incident Date:	December 24, 2013
Downtime hrs, leak/total:	34.5 / 34.5
ESP?	No
Leak/Incident Loc:	1/2" circumferential crack gen bank west sidewall tube, external to unit, below soot blower opening #G-28
How discovered:	Walk down. Found water leaking through boiler insulation
Wash adjacent tube:	No
Root cause:	One of some fatigue cracks in membrane propagated to wall tube.
Leak detection:	Yes. IP design + Hercules BPS
Bed cooling enhanc	No
Last full inspection:	March 2013
Sequence of events:	24Dec: During walk down, found water leaking from gen bank insulation at the leak. Soot blower was isolated. Leak did not change. No signs of water entering firebox or gas path. Lagging and insulation removed around soot blower. No wall box exists in this boiler design around generator bank soot blowers. Once insulation was removed, found very small leak external to unit. Leak close to soot blower sleeve lower support brace. Monitored leak 26Dec: At first opportunity unit was taken off liquor, cooled down and locked out. Made repairs.
Repair procedure:	Ground out indication and pad welding (GTAW and SMAW
Future prevention:	Membrane below other gen bank soot blowers will be visually examined on the run. PT examination will be made during next annual outage. Inspection / evaluation planned. One wall tube leak in March 2013 found during hydro after annual outage

GEN SIDE WALL, 1-Drum

FALL 2014 - 028	
Classification:	**Non Critical**
Location:	**International Paper, Valliant, OK**
Unit:	#2 RU, 2006 Andritz 400084, 1-drum, decanting hearth, large econ
Unit Size:	6.3 MM lb ds/day; 943,000 lb/hr steam at 1250 psig, 900°F, 1500 psig design
Incident Date:	January 24, 2013
Downtime hrs, leak/total:	32.5 / 32.5
ESP?	No
Leak/Incident Loc:	1/2" circumferential crack gen bank west sidewall tube, external to unit, below soot blower opening #G-33
How discovered:	Walk down. Found steam wisping out of tube (insulation previously removed for observations)
Wash adjacent tube:	No
Root cause:	Fatigue crack in membrane propagated to wall tube.
Leak detection:	Yes. IP design + Hercules BPS
Bed cooling enhanc	No
Last full inspection:	March 2013
Sequence of events:	During walk down, found steam wisping out of gen bank tube (insulation previously removed for observations). Did orderly shut down
Repair procedure:	Ground out indication and pad welding (GTAW and SMAW. Visual and PT examinations were made during this outage and will be repeated during next annual outage. 16 sootblowers total are in this extended side wall boiler bank area. To date 3 have been modified with a wall box (March 2013 annual outage). During this tube leak outage membrane cracking was found below 10 of 16 openings. Cracking extending to tube was found in 6 including leaking tube.
Future prevention:	Membrane below other gen bank soot blowers examined. Several indications ground out and repaired. Wall tube leaks in March 2013 and December 2013.

Appendix A – Incident List (Cont'd)

BOILER

FALL 2014 - 029	
Classification:	**CRITICAL INCIDENT # 817**
Location:	**International Paper, Orange, TX**
Unit:	#2 RU 1967 B&W PR-108B , 2 drum, Front-sloped hearth, 2007 Boiler, DCE cyclone
Unit Size:	2.7 MM lb ds/day 254,000 lb/hr steam at 850 psig, 835°F, 975 psig design
Incident Date:	April 2, 2013
Downtime hrs, leak/total:	54.65
ESP?	**YES**
Leak/Incident Loc:	Pinhole leak in rolled tube seat, tube 21, row 51, at mud drum. This leak washed adjacent tube 22, row 50 to rupture.
How discovered:	Unit tripped
Wash adjacent tube:	YES
Root cause:	Bad roll procedure when 2007 boiler was retubed.
Leak detection:	Yes. DCS mass balance & Nalco RBLI Trasar
Bed cooling enhanc	Yes. Southland Fire & Safety. Argon propellant with Bicarbonate of soda NaHCO3
Last full inspection:	Feb 2013
Sequence of events:	Unit at steady state. **2Apr**: 07:21 Unit tripped on high furnace pressure. Suspected superheater tube leak. Saw steam and thought was SH leak. Began orderly shut down. Further assessment gave water leak result. 07:49 ESP'd unit. 4-hour wait. Found gen bank leak. Cooled bed with NaHCO3. Clean unit Did repairs. Hydro OK. Started up.
Repair procedure:	Plugged 4 tubes.
Future prevention:	This zone has history of bad roll leaks. Plan to retube zone.

BOILER

FALL 2014 - 030	
Classification:	**CRITICAL INCIDENT # 818**
Location:	**International Paper, Bogalusa, LA**
Unit:	20RU, (PR-66, 1966) PR-202 1980 rebuild), B&W, 2010 Metso Boiler, 2 drum, front-sloped hearth, DCE cyclone
Unit Size:	2.8 MM lb ds/day; 388,000 lb/hr steam at 850 psig, 825°F, 1050 psig design
Incident Date:	June 17, 2013
Downtime hrs, leak/total:	142 / 142
ESP?	YES
Leak/Incident Loc:	Tube rupture. 4 Leaks in 2" swages, mud drum, generating bank. (row 3, tube 19; row 4 tube 11; row 5 tubes 8 & 9. Pin hole leak?
How discovered:	Unit tripped due to low drum level and high furnace pressure when generating tube ruptured
Wash adjacent tube:	No
Root cause:	Thin wall Rolling defect tube failures just above tube swages
Leak detection:	No
Bed cooling enhanc	Yes. Southland NaHCO3/N2
Last full inspection:	March 2013
Sequence of events:	#20 RB operating normally. **17Jun**: 11:40 Unit tripped off line from high furnace pressure & low drum level. ESP done at same time. Post ESP checklist completed, Lockout/tag out, confined space entry procedure. 4 hour wait period. 18:00 Southland on site to cool bed **18Jun**: 01:00 Bed cooled. 03:15 Start waterwash in economizer. Found 4 generating bank tube leaks on first hydro. Did repairs. Needed several hydro test and repairs. **22Jun**: 18:30 Dry hydro OK. 23:00 Fire in unit. **23Jun**: 09:45 On liquor.
Repair procedure:	Plugged gen section tubes. Seal welding tubes to drum. Used PT and wet fluorescent mag, x-ray, near drum inspection (Genisys).
Future prevention:	2nd tube failures since generating bank replacement of June 2010. Performed near drum NDE for all generating bank tubes. Identified several additional tubes that were thinned. Captured events to use in scenario training with operations. Tubes mapped and outage taken on August 2013 to replace these plugged tubes on south side of drum.

Appendix A – Incident List (Cont'd)

BOILER

FALL 2014 - 031	
Classification:	**CRITICAL INCIDENT # 819**
Location:	**Alberta Pacific Forest Industries, Boyle, Alberta, Canada**
Unit:	1993 B&W C-7634 1-drum, rear-sloped hearth, large economizer
Unit Size:	7.3 MM lb ds/day; 1,029,268 lb/hr steam at 900 psig, 850°F, 1150 psig design
Incident Date:	April 13, 2014
Downtime hrs, leak/total:	104 / 104
ESP?	YES
Leak/Incident Loc:	18" long rupture, at toe of fin-to-tube fillet weld, separated along right side of leading fin, 8" above sootblower centre line, leading tube of generator bank element # 19.
How discovered:	Buckman RBA and walk down. Saw water coming out of ash conveyors.
Wash adjacent tube:	No
Root cause:	Stress assisted cracking SAC initiated in heat affected zone (HAZ) of fin-to-tube fillet weld, then at relatively shallow depth, diverged from HAZ, grew radially into tube under influence of circumferential stress. No general corrosion or significant pitting. Likely high stress from rapid, high magnitude, metal temperature fluctuations experienced during previous operating conditions before circulation upgrade to generating bank. High magnitude temperature fluctuations no longer occur but much lower temperature excursions (i.e.- thermal stress) would be required to grow an existing sharp tipped corrosion/cracking front at a slow rate and thus cause tube ruptures.
Leak detection:	Yes. Buckman Recovery Boiler Advisory-RBA. Dynamic water balance
Bed cooling enhanc	No
Last full inspection:	May 2013
Sequence of events:	**13April**: 12:45:04 -Upper furnace pressure alarm rang @15mmwc. 12:45:05-Furnace pressure switches alarm in, 75mmwc with a 2 sec delay. 12:45:07-First out furnace pressure hi delay. Total fuel trip. 12:45:08-Primary, secondary and tertiary force draft fans tripped out due to high furnace pressure. 12:45:39-Steam drum level alarms in low level @ -3 inches. Started removing liquor guns. 12:45-12:50 Power load shed procedure initiated, shedding power throughout mill. 12:50-First steam turbine tripped on low header pressure. Checked spouts condition - all were clear with good smelt flow. 12:55-Power boiler tripped on low drum level Second steam turbine tripped on low header pressure. 13:00-Monitored power boiler blowdowns. Nothing abnormal in recovery area. 13:05-Tie line breaker opened, therefore mill went black. Black start procedure initiated. 13:30-Power to mill restored with tie line. 13:52-15:00-All auxiliary equipment started. Tried starting power boiler ID fan with no success. RU walk down Began pre start-up procedure. 15:00-16:00-After a few attempts to start power boiler ID fan, decided to start RB first. During walk down saw water coming out of ash conveyors. Added about 180,000 kg/hr to steam drum for 45 minute for start-up. 16:00-Checked ash conveyors water. Checked top of generating bank/economizer to look for leak. **16:30**-Saw large volume of water spraying into furnace. Also saw water coming out of three of the five spouts. No smelt flow from any spout. Contacted control room. **ESP'd unit**. 20:00 access allowed. **14 – 17Apr:** Generating bank repairs made. **17Apr**: 08:00 1575 psi hydro OK.
Repair procedure:	10 foot section of finned tube SA 178A 0.180 MW was removed and replaced with SA210 A1 0.203 bare tube. Old section of tube removed and section of new tube was installed by 2 – 2" butt welds, 100% RT inspection
Future prevention:	Increase inspections in this area

Appendix A – Incident List (Cont'd)

BOILER

FALL 2014 - 032	
Classification:	**CRITICAL INCIDENT # 820**
Location:	**ALPAC, Alberta Pacific Forest Industries, Boyle, AB CAN**
Unit:	1993 B&W C-7634 1-drum, sloped-to-rear hearth, large economizer
Unit Size:	7.3 MM lb ds/day; 1,029,268 lb/hr steam at 900 psig, 850°F, 1150 psig design
Incident Date:	May 25, 2014
Downtime hrs, leak/total:	142/142
ESP?	YES
Leak/Incident Loc:	8" long rupture on left side at toe of leading fin-to-tube fillet weld of leading tube of generator bank element # 65; centred 5" below centerline of sootblower in boiler bank, 155 ft above the floor.
How discovered:	Boiler tripped on high furnace pressure, operator noticed that drum level was dropping faster than previous trip. Leak detection concurrently gave indication.
Wash adjacent tube:	No
Root cause:	Stress assisted cracking starting in heat affected zone of fin-to-tube fillet weld and then diverged from heat affected zone and progressed into tube. No general corrosion or significant pitting.
Leak detection:	Yes. **Buckman Recovery Boiler Advisory-RBA** (Dynamic water balance) Compares actual operating conditions versus theoretical levels to determine whether an imbalance is present, then interprets potential causes and reports. RBA continuously monitors for classic signs of lower furnace leak using operating parameters such as ID fan speed, opacity, draft, etc.
Bed cooling enhanc	No
Last full inspection:	May 2013
Sequence of events:	**25 May** 02:30-Furnace pressure switches alarm in and out a couple of times, 75 mmwc with a 2 sec delay. 02:34-First out furnace pressure hi delay. Total fuel trip. Primary, secondary and tertiary force draft fans tripped out due to high furnace pressure. Shift engineer turned on ESP lights and horns to evacuate power house. Steam drum level alarms in low level @ -3 inches. Power load shed procedure initiated, shedding power throughout mill. 02:38- Shift Engineer ESP'd unit 17:23-Access allowed into power house. **26-30 May**–Repairs /inspections completed on unit. **30 May** boiler passed hydro @1562psi
Repair procedure:	Old section of finned tube SA 178A 0.180 MW was removed. Replaced with two sections of new SA210 A1 0.203 bare tube section with 3– 2" butt welds, 100% RT inspection.
Future prevention:	Increase inspections in that area. Similar failure 18" long rupture in leading tube of # 19 centered 8" above sootblower centerline. Tube had separated along right side of leading fin at weld toe of the fin-to-tube fillet weld.

Appendix A – Incident List (Cont'd)

BOILER

FALL 2014 - 033	
Classification:	**CRITICAL INCIDENT # 821 (Due to Arch Leak) (Two leaks – Boiler leak non-critical))**
Location:	**Georgia-Pacific, Brewton AL**
Unit:	#1 RU, 1957 B&W PR-31, 2005 2-drum Blr, front sloped hearth, DCE Cascade.
Unit Size:	1.2 MM lb ds/day; 184,000 lb/hr steam at 860 psig, 830°F, 975 psig design
Incident Date:	May 14, 2014
Downtime hrs, leak/total:	58 / 58
ESP?	YES
Leak/Incident Loc:	¼" crack in generating tube at mud drum
How discovered:	Walk down
Wash adjacent tube:	No
Root cause:	¼" fatigue crack from vibration by sootblowing in thin tube area over-rolled during installed
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	Nov 2013
Sequence of events:	Unit at steady state. **14May**: 02:05 During walk down, saw wet spot on back wall of boiler north hopper. Then saw small amount of water coming down wall of hopper. 02:20 Fired oil. Steam-water differential = 10,000 lb/hr. Then saw pencil size stream of water on hopper back wall. 02:40 ESP'd unit. Cleared area. 8 hour waiting period. 11:30 Lock out. Small bed with hot spot on right side. Opened doors and increased ID fan speed to help cooling. Saw no water above mud drum. Saw 12" wide wash out area on the mud drum. 15:00 Contractor on site. 18:00 Unit cool. Found crack in generating tube at mud drum, 6 rows in and 5 feet off right wall. Steam drum too hot to proceed. Added fans to cool drum interiors. **15May**: 05:00 Began repair. 11:00 Tube plugged. 13:00 Bed cool; TC's at 120-140F. 15:00 Filled for hydro. **SECOND LEAK: CRITICAL**: At 400 psig, saw water at furnace side wall under nose. Drained unit. Locked out. Refractory removed from back of wall tubes in dead air space. Crack found on back side of flat stud-to-tube weld. Did weld repairs. 20:30 Repair done. Filled for hydro. **16May**: 00:00 Hydro OK. 01:30 Done adding back refractory. Filled unit. 04:00 Fired unit. 11:00 On line. 13:00 On liquor.
Repair procedure:	Plugged tube in steam and mud drums
Future prevention:	Being studied. Unit scheduled for retirement 2016

Appendix A – Incident List (Cont'd)

ROOF

FALL 2014 - 034	
Classification:	**CRITICAL INCIDENT # 822**
Location:	**MeadWestvaco, Mahrt, AL**
Unit:	RU 1, 1966 B&W PR-97, 2-drum, front-sloped hearth, 1996 large econ
Unit Size:	2.8 MM lb ds/day; 440,000 lb/hr steam at 890 psig, 825°F, 1000 psig design
Incident Date:	May 1, 2014
Downtime hrs, leak/total:	132
ESP?	**YES**
Leak/Incident Loc:	2 Roof tubes cracked several inches from steam drum wall
How discovered:	Walk down.
Wash adjacent tube:	no
Root cause:	1. Reduced wall thickeness (a result of near drum corrosion and ID bore machining.) 2. Waterside corrosion fatigue cracking.
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	Spring 2013
Sequence of events:	1May: #1 RU running at 240 gpm of liquor. 08:14 FD fans tripped due to low ID fan turbine speed. Unit tripped. Saw ID fan coupling stripped; turbine still running, 08:30 Called control room to manually trip the fan. Decided to wash fan blades. 10:20 Walk down. Saw small stream of water running in east economizer and generating bank. Investigate. Saw lot s of vapor escaping around duct work at 8th floor penthouse. Opened several inspection doors. While looking in top of door down to steam drum saw water filling up in penthouse. 11:20 ESP'd unit. 8 hour wait period. Re-entered. Investigated. Found 2 roof tubes were cracked approximately 2-3 inches from drum wall.
Repair procedure:	Installed Dutchmen on both tubes.
Future prevention:	--

UPPER FURNACE

FALL 2014 - 035	
Classification:	**CRITICAL INCIDENT # 823**
Location:	**International Paper, Texarkana, TX**
Unit:	#2 RU, 1976 B&W PR-186, 2-drum, rear-slope hearth, 2005 large econ
Unit Size:	4.55 MM lb ds/day; 763,000 lb/hr steam at 1050 psig, 825°F, 1200 psig design
Incident Date:	Oct 23, 2012
Downtime hrs, leak/total:	0 – already down for annual outage
ESP?	No
Leak/Incident Loc:	Crack in bent tube at No. 53 IK opening at seal plate attachment, upper furnace.
How discovered:	Hydro following annual outage
Wash adjacent tube:	No
Root cause:	Crack in seal plate propagated into adjacent tube.
Leak detection:	Yes. IP design
Bed cooling enhanc	No
Last full inspection:	Oct 2012
Sequence of events:	Boiler was unlocked and filled for hydro after the annual outage inspection and repair and the leak at No. 53 IK opening was found.
Repair procedure:	Installed a bent tube Dutchman.
Future prevention:	Inspect all furnace IK openings in next annual outage.

Appendix A – Incident List (Cont'd)

UPPER FURNACE

FALL 2014 - 036	
Classification:	**CRITICAL INCIDENT # 824**
Location:	**International Paper, Orange, TX**
Unit:	#1 RU 1967 B&W PR-108A , 2 drum, Front-sloped hearth, 2005 UprFurn, DCE cyclone
Unit Size:	2.7 MM lb ds/day 254,000 lb/hr steam at 850 psig, 835°F, 975 psig design
Incident Date:	April 9, 2013
Downtime hrs, leak/total:	84.25
ESP?	YES
Leak/Incident Loc:	Rupture of Rear wall loose screen tube just above nose arch
How discovered:	Unit tripped
Wash adjacent tube:	No
Root cause:	Tube thinning due to extreme erosion/corrosion, accelerated by high heat conditions from plugged boiler.
Leak detection:	Yes. DCS mass balance & Nalco RBLI Trasar
Bed cooling enhanc	Yes. Nitrogen propellant with Bicarbonate of soda by Southland Fire & Safety
Last full inspection:	September 2012
Sequence of events:	Unit at steady state. Furnace pressure suddenly went high causing high furnace pressure trip and a main fuel trip MFT. Saw drum level dropping below level where transmitter could read and feedwater make-up going wide open. Suspected large waterside leak. Did ESP within approx 1-2 minutes of tube rupture. Did 4 hour required wait time for entry. Did inspection. Identified rear wall screen tube rupture, 5th platen in from right wall (14th tube from rt wall), app. 2 ft above top of nose arch. All ESP devices were field verified. Boiler water level checked. Assessed bed condition. Sent notice to allow authorized personnel entry. Inspection after unit cleaned revealed 3 additional tubes in very similar condition. A total of 4 Dutchmen were installed.
Repair procedure:	4 Dutchman installed in thinned and leaking tubes
Future prevention:	More detailed inspection. Boiler pluggage reduction effort will be accelerated. Sister boiler will also be inspected as soon as first opportunity arises.

UPPER FURNACE

FALL 2014 - 037	
Classification:	**Non Critical**
Location:	**Georgia Pacific, Crossett, AR**
Unit:	#8 RU, 1981 CE 30719, 2-drum, decanting hearth, large econ
Unit Size:	6.2 MM lb ds/day; 925,000 lb/hr steam at 850 psig, 825°F, 1130 psig design
Incident Date:	Oct 30, 2013
Downtime hrs, leak/total:	32
ESP?	No
Leak/Incident Loc:	Transverse crack in wall tube outside of nose arch on left side, 6th tube in, 113' above furnace floor.
How discovered:	Walk down.
Wash adjacent tube:	No
Root cause:	Stress assisted fatigue due to separation in membrane where bifurcated tubes begin.
Leak detection:	Yes, Nalco 3D TRASAR - RBLI No indication due to small size of leak
Bed cooling enhanc	n/a
Last full inspection:	May 2013
Sequence of events:	One of two feedwater pumps shut down due to Provox issue. Unit tripped on low drum level. Off line for 3 hours. During walk down, discovered leak outside furnace. Did controlled shutdown.
Repair procedure:	Grind out crack, PT'd, then weld repair using WPS 100 (6010 root, 7018 cover) PT'd root an cover welds.
Future prevention:	Alter membrane to relieve stress May 2014. Similar leak 3 years ago.

Appendix A – Incident List (Cont'd)

LOWER FURNACE

FALL 2014 - 038	
Classification:	**CRITICAL INCIDENT # 825 (Due to Water IN duct)**
Location:	**International Paper, Bogalusa, LA**
Unit:	20RU, PR-66 (PR-202 1980 rebuild), 1964, B&W, 2 drum, front-sloped hearth, DCE cyclone
Unit Size:	2.8 MM lb ds/day; 388,000 lb/hr steam at 850 psig, 825°F, 1050 psig design
Incident Date:	April 30, 2013
Downtime hrs, leak/total:	77.1
ESP?	YES
Leak/Incident Loc:	1/8" pinhole at attachment weld on cold side of left hand tube of left hand smelt spout opening –at floor level – cold side of unit.
How discovered:	Walk down. While cleaning primary airports, saw water in primary wind box above left hand spout.
Wash adjacent tube:	No
Root cause:	Stress from repeated start up/ shutdown cycles
Leak detection:	No
Bed cooling enhanc	Yes. Southland NaHCO3/N2
Last full inspection:	March 2013
Sequence of events:	#20 RB operating normally. 30Apr: 20:45 While cleaning primary and secondary airports, saw water in primary wind box above north spout. Water did not appear to be entering furnace but could not confirm Radioed control room. 20:53 Initiated ESP when personnel clear of unit. Post ESP checklist completed, Lockout/tagout, confined space entry procedure, 4 hour wait time prior to entering boiler building. Accelerated bed cooling used: Southland Fire cooled smelt bed using sodium bicarbonate / compressed nitrogen. 1May: 09:00 Bed cooling complete. Bed T/Cs all below 500 F.21:15 furnace water wash completed. 23:50 Did hydro. Located leak. Removed external casing. Repaired leak. 2May: 23:40 Hydro OK. Unit ready to fire.
Repair procedure:	Pad welded tube
Future prevention:	Attachments should not be welded to tube face. Plan to replace during scheduled Acid Wash August 2013

LOWER FURNACE

FALL 2014 - 039	
Classification:	**Non Critical**
Location:	**International Paper, Franklin VA**
Unit:	#6 RU, 1977 B&W PR-185 2-drum, rear-slope hearth, large econ
Unit Size:	5.0 MM lb ds/day; 655,000 lb/hr steam at 1700 psig, 900°F, 1500 psig design
Incident Date:	July 23, 2013
Downtime hrs, leak/total:	17/17
ESP?	**No**
Leak/Incident Loc:	3/8" weld crack between rear wall tube #38 and lower header weld, two feet below floor, lower vestibule
How discovered:	Walk down. Heard and saw leak during post-hydro inspection.
Wash adjacent tube:	No
Root cause:	Possible undercut and porosity from original installation or previous repair, accelerated by the acid cleaning.
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	July 2013
Sequence of events:	10Jul: 22:00 Unit down for annual inspection. 18Jul: 23:45 Hydro OK . Unit acid cleaned (SH & econ filled with pad water) and rinsed. 23Jul: 17:35 Unit hydro. Heard and saw leak during post-hydro inspection walk down. .
Repair procedure:	Weld was ground out and re-welded
Future prevention:	Perform periodic inspection on external lower rear wall headers where possible if dissolving tank skirting is damaged.

Appendix A – Incident List (Cont'd)

LOWER FURNACE

FALL 2014 -040	
Classification:	**CRITICAL INCIDENT # 826**
Location:	**Canfor Pulp Ltd (Northwood Pulp), Prince George, BC CAN**
Unit:	**#5 RU,1982, C E S Ltd, CA-79120, 2 Drums, decanting hearth, cross-flow large economizer, steam coil air heater, falling film concentrator**
Unit Size:	**3.60 MM lb ds/day; 480,000 lb/hr steam at 652 psig, 752°F, 800 psig design**
Incident Date:	March 12, 2014
Downtime hrs, leak/total:	108
ESP?	**No**
Leak/Incident Loc:	**Transverse crack across crown of tube ~ ½" long, Lower left sidewall, 30.5' above floor**
How discovered:	Leak detection + Tracer
Wash adjacent tube:	No
Root cause:	Unknown pending laboratory examination
Leak detection:	Yes
Bed cooling enhanc	No
Last full inspection:	June 2013
Sequence of events:	**11Mar** 10:43 Leak detection alarm triggered; did phosphate test on econ hopper salt cake sol'n = 1.5 ppm tracer testing; Suspect econ leak. Will do close inspection next day during planned thermal shed. **12Mar** 05:07 Off liquor. No leak in econ. During warm-up, saw leak in lower wall. Shut down, water wash, lockout. Did repairs and inspection. **16MAR** 15:38 unit on liquor
Repair procedure:	Remove damaged tube and install a tube pup
Future prevention:	Pending exam.

LOWER FURNACE

FALL 2014 - 041	
Classification:	**CRITICAL INCIDENT # 827**
Location:	**Canfor Pulp Ltd – Northwood, Prince George, BC**
Unit:	**#1 RU, 1966 Combustion Engineering SL, Contr# CA-64127, 2-drum, decanting hearth, large economizer,**
Unit Size:	**4.00 MM lb ds/day; 658,000 lb/hr steam at 656 psig, 752°F, 750 psig design**
Incident Date:	**May 22, 2014**
Downtime hrs, leak/total:	**87**
ESP?	**No**
Leak/Incident Loc:	**¾" in Axial crack at localized area of thinning near tube tangent. Front waterwall tube approximately tube#120 15' above floor**
How discovered:	**Walk down. Saw water coming out of cladding above primary airports. Testing confirmed boiler water chemicals**
Wash adjacent tube:	**No**
Root cause:	**Preparations for tangent tube seal welding, years ago, may have left localized thin area.**
Leak detection:	**No**
Bed cooling enhanc	**No**
Last full inspection:	**June 2013**
Sequence of events:	**Unit was down for area outage. During boiler warm-up on natural gas, saw water coming out from under cladding just above front wall primary airports. Water sample taken to lab for testing. Confirmed presence of boiler feedwater chemicals. Unit shutdown and locked out for investigation.**
Repair procedure:	**A coldside window opening was made in tube to allow temporary repair by application of waterside weldmetal buildup.**
Future prevention:	**pending further examination**

Appendix A – Incident List (Cont'd)

LOWER FURNACE

FALL 2014 - 042	
Classification:	**CRITICAL INCIDENT # 828**
Location:	**Canfor Pulp Ltd – Northwood, Prince George, BC**
Unit:	**#1 RU, 1966 Combustion Engineering SL, Contr# CA-64127, 2-drum, decanting hearth, large economizer,**
Unit Size:	**4.00 MM lb ds/day; 658,000 lb/hr steam at 656 psig, 752°F, 750 psig design**
Incident Date:	**July 1, 2014**
Downtime hrs, leak/total:	**120 / 141**
ESP?	**Yes**
Leak/Incident Loc:	**Two ½" linear cracks adjacent to attachment weld between wall tube and Primary Airport lower corner of nozzle. Left waterwall tube 10 and 26 3'-6" above the floor.**
How discovered:	**Walk down. Bed stability issues led to inspection through primary airport inspection doors.**
Wash adjacent tube:	**No**
Root cause:	**--**
Leak detection:	**No**
Bed cooling enhanc	**No**
Last full inspection:	**June 2013**
Sequence of events:	**Fighting blackout conditions in front left corner. Boiler water residuals dropping. Inspection found weak black liquor bubbling at windbox #12 on left wall. Port rod inserted found liquid to be very thin and watery. ESP was initiated at 00:58.**
Repair procedure:	**Removed primary windbox, nozzles and crotch plates. Excavated each indication until indication removed. Thickness tested area. Temporary weld repairs made from furnace side and dye penetrant tested.**
Future prevention:	**Routine dye penetrant inspections of all Primary Airports. Tubes will be removed in Fall and made available for laboratory analysis.**