BLACK LIQUOR RECOVERY BOILER
ADVISORY COMMITTEE

2017 MINUTES OF FALL MEETING
Crowne Plaza Hotel/Atlanta Airport
October 2, 3 & 4, 2017

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:	**Dave Slagel -- NEW** International Paper 238 Mays Bridge Road Rome, GA 30165	Tel: 706-233-4265 Cell: 912-414-2706 david.slagel@ipaper.com
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Treasurer:	**Len Olavessen** LENRO, Inc. 1851 N. Virginia Avenue Bartow, FL 33830	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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FUTURE BLRBAC MEETINGS

Spring	**April**	***9, 10 & 11**	**--**	**2018**
Fall	**October**	***22, 23 & 24**	**--**	**2018**
Spring	**April**	**8, 9 & 10**	**--**	**2019**
Fall	**October**	**15, 16 & 17**	**--**	**2019**

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

■ Past Chairman Lon Schroeder

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

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

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

BLRBAC MEETING NOTICE

COVER LETTER — General Information

REGISTRATION FORM — Print and mail to Said & Done with appropriate fees before the posted cut-off date.

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

SCHEDULE — List of subcommittee activities on Monday and Tuesday

AGENDA — Reports given to Joint BLRBAC Meeting on Wednesday

OPERATING PROBLEMS QUESTIONNAIRE — Mail/e-mail completed questionnaires to Barbara Holich. These will be given to the Vice Chairman and he will see that your concerns are brought up and discussed during the Operating Problems session at the next meeting.

Mrs. Barbara Holich
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These are available at the **BLRBAC INTERNET ADDRESS**: **www.blrbac.org**

BLRBAC Guidelines & Recommended Practices

LEGAL NOTICE

Emergency Shutdown Procedure (Dated: October 2012)

Safe Firing of Black Liquor in Black Liquor Recovery Boilers (Dated: April 2016)

Materials & Welding Guidelines (Dated: April 2013)

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

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

Personnel Safety & Training (Dated: February 2012)

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

Post ESP Water Level (Dated: January 2005)

Post ESP Guidelines (Dated: October 2002)

Boiler Water Management Guidelines for Black Liquor Recovery Boilers (Dated: April 2016**)**

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

Thermal Oxidation of Waste Streams in Black Liquor Recovery Boilers (Dated: April 2016)

If you have any questions, contact:

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‡**John Lewis** Fluor 100 Fluor Daniel Drive Greenville, SC 29607-2762 Tel: 864 517-1683 **john.lewis@fluor.com**	‡**Pasi Miikkulainen** Andritz 5405 Windward Parkway Alpharetta, GA 30004 Tel: 770-640-2414 Cell: 678-230-1525 **pasi.miikkulainen@andritz.com**	‡**Steven L. Osborne** Babcock & Wilcox 20 S. Van Buren Avenue Barberton, OH 44203 Tel: 330-860-1686 **slosborne@babcock.com**
‡**Michael D. Sides** XL Catlin 1360 Olympia Park Circle Ocoee, FL 34761 Tel: 203-964-5333 Mobile: 407-462-4622 **michael.sides@xlcatlin.com**	‡**Greg Wass** Lundberg LLC 13201 Bel-Red Road Bellevue, Wa 98005 Office: 425-283-5070 Cell: 425-503-2747 **greg.wass@lundbergllc.com**	

‡**Denotes attendance at the meeting in October of 2017.**

WATER TREATMENT SUBCOMMITTEE

‡Tom Przybylski
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tom.przybylski@psaengineering.com

Kelli Bastarache Power Specialists Assoc., Inc. 531 Main Street Somers, CT 06071 Tel: 860-763-3241 kelli.bastarache@psaengineering.com	**‡Michael Bayse** George H. Bodman, Inc. bbayse@aol.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	**‡Ray Cassel** RMIS 8571 Rosemary St # B, Commerce City, CO 80022 Tel: 303-789-9307 rlcassel@rmis.biz	**‡Susan Childress** IP Technology Power Mfg. Solutions 5870 Anderson Road Grovetown, GA 30813 Tel: 706-339-1631 susan.childress@ipaper.com
Frank DeStefano 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
‡Jeff Fox Nalco Company 1601 W. Diehl Road Naperville, IL 60563-1198 jfox@nalco.com, jfox@ecolab.com	**James Graham** ChemTreat jimg@chemtreat.com	**‡Ken Hansen** B&W Consultant Barberton, OH 44203 Tel: 330-256-5955 kenhansen0728@gmail.com hansenknute@aol.

‡Denotes attendance at the meeting in October of 2017.

WATER TREATMENT SUBCOMMITTEE – (Cont.)

‡**Scott Holloway** Solenis **sholloway@solenis.com**	‡**Norris Johnston** Water Wizard Consulting 37 Hough Road Lacey's Spring, AL 35754 Tel: 256-650-0049, Cell: 256-520-1011 **nnjohnston@ashland.com** **h2odocnnj@gmail.com**	**Sam Lewis** Delta Training Partners, Inc. 4020 Oleander Drive Wilmington, NC 28403 Tel: 910-790-1988 **slewis@deltatraining.com**
Tom Madersky Power Specialists Assoc., Inc. 531 Main Street Somers, CT 06071 Tel: 860-763-3241 **tom.madersky@psaengineering.com**	‡**John McGraw** Shepard T. Powell **jwm@stpa.com**	‡**Jason Miller** Andritz Inc. 1115 Northmeadow Parkway Roswell, GA 30076-3857 Tel: 770-640-2528 Cell: 770-335-8529 **jason.miller@andritz.com**
Rick Morgan FM Global 5700 Granite Pkwy. Plano, TX 75024 Tel: 972-731-1869 **rick.morgan@fmglobal.com**	**Kurt Parks** Packaging Corporation of America 5495 Lake Park-Clyattville Road Valdosta, GA 31601 Tel: 229-559-2257 Cell: 229-415-8557 **kparks@packagingcorp.com**	**Jim Robinson** GE (Infra, Water) 4636 Somerton Rd. Trevose, PA 19053 Tel: 215-942-3381 **james.robinson@ge.com**

‡Denotes attendance at the meeting in October of 2017.

Registered for the meeting were:

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

A.H. Lundberg
Seefeld, Paul, Jacksonville, FL

Acuren
Strand, Jeff, Raleigh, NC
Harley, Todd, Trussville, AL
Spires, Lawrence, Augusta, GA
Taylor, Kenneth, Trussville, AL

American Insurance Group (AIG)
DeBeer, Thomas, Woodstock, GA
Smith, Andy, Atlanta, GA

AirTek Construction
Baines, Troy, Troy, AL
Breland, Stevan, Troy, AL
Shanahan, Dennis, Troy, AL

American Forest & Paper Assn. (AF&PA)
Grilliot, Wayne, Springboro, OH

Andritz
Bunner, Ben, Alpharetta, GA
Davis, Joe, Alpharetta, GA
Heinola, Ari, Varkaus, Finland
Herod, Chris, Alpharetta, GA
Imig, Greg, Alpharetta, GA
Kuittinen,Tuomo, Alpharetta, GA
Latvakoski, Mika, Alpharetta, GA
LeBel, Mark, Alpharetta, GA
Lehtinen, Markku, Varkaus, Finland
Miikkulainen, Pasi, Alpharetta, GA
Miller, Jason, Alpharetta, GA
Payne, Zack, Alpharetta, GA
Phillips, John, Alpharetta, GA
Pulkka, Antti, Varkaus, Finland
Rose, Aaron, Alpharetta, GA
Schull, Alec, Alpharetta, GA
Soderlund, Harri, Alpharetta, GA
Johnson, David, Alpharetta, GA
Morgan, Preston, Alpharetta, GA
Silva, Ageu, Curitiba, Brazil
Thorslund, Gunnar, Stockholm, Sweden

Applied Technical Services (ATS)
Castle, Bill, Marietta, GA
Pratt, Daniel, Louisville, KY
Rawls, Christopher, Marietta, GA

Applied Thermal Coatings
Grant, Harley, Chattanooga, TN

AXA Matrix Risk
Jackson, Christopher, Fox Island, WA

AZZ
Power, Stacy, St. Petersburg, FL

Babcock & Wilcox
Hansen, Kenneth, Madisonville, TN
Jenny, Paul, Atlanta, GA
Kornaker, Greg, Barberton, OH
Krekeler, Danie, Barberton, OH
Kulig, John, Barberton, OH
Leibel, Greg, Charlette, NC
McKelvey, Kenneth, Barberton, OH
Nicol, Laura, Barberton, OH
Osborne, Steve, Barberton, OH
Swartz, Eric, Barberton, OH
Youssef, Simon, Lancaster, OH

Babcock Power
Boris, Amy, Moore, SC

Boiler Service & Inspection (BSI)
Andrews, John, Charleston, SC
Clay, Dean, Simsboro, LA

Buckman Laboratories
Call, Fred, Newry, ME
O'Malley, James, Memphis, TN

ChemTreat
Dunton, Buck, McRae, GA
Graham, Jim, Glen Allen, VA

Clyde Bergemann
Jameel, Ishaq, Atlanta, GA
Miller, Mark, Atlanta, GA

Registered for the meeting were:

CORR Systems
Ruiz de Molina, Eliadio, Birmingham, AL

Day & Zimmermann
Wasson, Eric, Charlote, NC

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

E&E Tech
Garmon, Shane, Atlanta, GA

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

Energy & Environmental Tech (EET)
Brown, Michael, Jacksonville, AL

Envirovac
Baxter, Rick, Fruitdale, AL

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

Fluor Daniel Forest Products
Lewis, John, Greenville, SC

FM Global
Backman, Matti, Helsinki, Finland
Britt, Francisco, McKinney, TX
Chambers, Jeff, Fairhope, AL
Cooke, Craig, Oconomowoc, WI
Cooper, Mark, Woodinville, WA
Crysel, Scott, Frisco, TX
Dondona, Jasbir, Vancouver, BC, Canada
Evans, David, Rockford, MI
Gossen, Derrick, Fairhope, AL
Holzer, Keith, Reston, VA
Huelsbeck, Kevin, Sherwood, WI
Hume, Everett, Norwood, MA
Jackson, Larry, Macon, GA
Keatts, Terry, Spokane, WA

FM Global (Cont.)
King, John, Windsor, UK, Canada
Labonté, Guy, Montreal, Que.
Lane, Matthew, Little Rock, AR
Lindstöm, Jyri, Stockholm, Sweden
MacDonald, Trever, Norwood, MA
Moberg, Eric, Frisco, TX
Onstead, Jimmy, Frisco, TX
Paine, Matthew, Norwood, MA
Rust, Mark, Murfreesboro, TN
Weston, Barnaby, Windsor, United Kingdom
Young, Andrew, Bellevue, WA

Fossil Power Systems (FPS)
Clement, Andy, Dartmouth, NS, Canada
Donahue, Mark, Dartmouth, NS, Canada
Donahue, Peter, Dartmouth, NS, Canada
Dooks, Rick, Dartmouth, NS, Canada

FPInnovations Paprican
Rezaei, Hooman, Vancouver, BC

Fuel Tech
Bohlen, Scott, Buckport, MA
Forte, Chris, Destin, FL

Gecko Robotics
Demmer, Troy, Pittsburgh, PA
Knickerbocker, Dan, Pittsburgh, PA

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

Georgia-Pacific
Browning, John, Atlanta, GA
Davis, Matt, Perdue, Hill, AL
Fanelty, Zackary, Atlanta, GA
Flach, Don, Anacortes, WA
Hidalgo, Carlos, Atlanta, GA
Hill, Wes, St. Helens, OR
Johnston, Jennifer, Atlanta, GA
Kujanpaa, Olli, Atlanta, GA
Lentz, Gregg, Brunswick, GA
Martin, Richard, Perdue, Hill, AL

Registered for the meeting were:

Georgia-Pacific – (Cont.)
Meadows, Tom, Brunswick, GA
Morency, Karl, Atlanta, GA
Rushing, Mike, Monticello, MS
Selner, Dale, Atlanta, GA
Sherlock, Bentley, Atlanta, GA
Slodysko, Evan, Clatskanie, OR
West, Brian, Clatskanie, OR
Wilhite, John, Atlanta, GA

Glatfelter
Forry, Jeffrey, Spring Grove, PA
Wolf, Gary D. (Dwayne), Spring Grove, PA

Global Risk Consultants
Garfield, Michael, Lowell, ME
Macaulay, Charles, Snoqualmie, WA

Graphic Packaging International
Howre, Curtis, West Monroe, LA
Jackson, Dewayne, West Monroe, LA
Jennings, William, West Monroe, LA
Spillers, Jay, West Monroe, LA

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

Hood Container of Louisiana
Adams. Gary, St. Francisville, LA
Terrell, Carl, St. Francisville, LA
Terrell, Josh, St. Francisville, LA

Inco Services, Inc.
Burns, Rick, Alpharetta, GA

Indonesian Pulp & Paper Company
Riseta, Yuniar, Riau, Indonesia
Siahaan, Jonson, Riau, Indonesia

Integrated Global Services
Strauss, Paul, Richmond, VA

International Paper
Adams, Wayne, Clinton, NC
Barreca, Clif, New Bern, NC
Blackard, Vernon, Loveland, OH
Blair, Michael, Loveland, OH
Bruce, Mike, Loveland, OH
Byrd, Joel, Loveland, OH
Camp, William (Bill), Prattville, AL
Childress, Susan, Loveland, OH
Frazier, David, Loveland, OH
Helms, Steve, Loveland, OH
Hendrix, Sam, Loveland, OH
Holley, Steven (Steve), Columbus, MS
Ja'arah, Majed, Rome, GA
Jeffords, Brian, Georgetown, SC
Knowlen, Bruce, Federal Way, WA
Navojosky, Frank, Loveland, OH
Perrett, Jack, Memphisl, TN
Slagel, David, Rome, GA
Thomas, Chris, Columbus, MS
Thompson, Heath, Georgetown, SC
Williams, Jimmy, Georgetown, SC
Wranosky, Tom, Ticonderoga, NY

Interstate Paper
McGowan, Jim, Riceboro, GA
Gill, Michael, Riceboro, GA

Irving Pulp & Paper
Glenn, Matthew, Saint John, NB, Canada
McCracken, Kirby, Saint John, NB, Canada

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

Kadant Black Clawson
Murray, Anthony, Mason, OH
Patel, Jean-Claude, Geneva, IL

Kiewit
Logue, Steve, Lenexa, KS

Registered for the meeting were:

K-Patents
Betts, Herb, Naperville, IL
Hamalainen, Arto, Naperville, IL
Pyörälä, Keijo, Naperville, IL
Wagner, Phil, Naperville, IL

LENRO, Inc.
Olavessen, Len, Bartow, FL

Lewis B. Bringman LLC
Bringman, Lewis, Baltimore, MD

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

Lundberg, LLC
Wass, Greg, Bellevue, WA

MPW Industrial Services
Chandler, Nathan, Hebron, OH
Elam, Monty, Hebron, OH
Hubbert, Micah, Hebron, OH

Nalco
Fox, Jeffrey, Springboro, OH
Moffett, Danny, Sheridan, AR

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

Nautilus Loss Control
Jackson, Christopher, Gig Harbor, WA

New Age Fastening Systems
Swartz, Stephen, Sewell, NJ

NORAM Engineering and Constructors
Bucher, Wayne, Birmingham, AL

Oilon
Tallberg, Johan, Thomasville, GA

Packaging Corporation of America
Holm, Ralf, Gainesville, GA

Peerless Manufacturing
Acree, Michael, Raleigh, NC
Szczachor, Michael, Dallas, TX

Power Specialists Associates (PSA)
Henriques, Fabian, Somers, CT
Hutton, Katherine, Somers, CT
Madersky, Tom, Somers, CT
Przybylski, Tom, Somers, CT
Zawistowski, Bob, Somers, CT

Prosweco Technical Consultants
Bergstrom, Henrik, Stockholm, Sweden

Purolite
DeStefano, Frank, Bala Cynwyd, PA
Downey, Don, Paris, Ont, Canada

Rayonier Advanced Materials
Dean, Sam, Jesup, GA
Gray, John, Fernandina Beach, FL

Resolute Forest Products
Andrijeski, Greg, Childersburg, AL
Watkins, Walter (Butch), Childersburg, AL
Wilmoth, Brian, Coosa Pines, AL

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

Rocky Mountain Industrial Services (RIMS)
Cassel, Raymond, Denver, CO

Rockwell Automation
Hunter, Marc, Burr Ridge, IL

Sappi North America
Carlberg, Landon, Cloquet, MN
Finke, Justin, Cloquet, MN
Fredrickson, John, Cloquet, MN

Registered for the meeting were:

Sheppard T. Powell Associates
McGraw, John, Baltimore, MD

Smurfit Kappa
Franco, Daniel, Cali, Columbia

Solenis
Holloway, Scott, Fayetteville, AR
Meredeth, James, Gulf Breeze, FL

Southern Environmental
Lawton, Roger, Pensacola, FL

Southern Power Sales
Sulliven, Sean, Bogart, CA

Thompson Industrial Services
Benton, Rick, Sumter, SC
Hope, Monty, Sumter, SC
Knight, Jeremy, Sumter, SC
Lantz, Isaac, Sumter, SC
Martin, Emily, Sumter, SC
Wise, Carl, Sumter, SC

United Water Consultants
Kelly, John, West Chicago, IL

Valmet
Bird, Jennings, Charlotte, NC
Burelle, Raymond, Charlotte, NC
Conley, Clark, Charlotte, NC
Daigle, Chad, Charlotte, NC
Merlino, Mark, Charlotte, NC
Osborne, David, Deluth, GA
Reed, Ron, Charlotte, NC
Relangi, Ramana, Charlotte, NC
Rollan, Carlos, Charlotte, NC
Smith, Dan, Charlotte, NC
Trivett, Michael, Charlotte, NC

Verso Paper
Frost, Robert, Wilton, MA
Hicks, Tim, Orrville, OH
Klimowicz, Joseph, Wisconsin Rapids, WI
Lewis, Jason, Bangor, ME
Mitchell, Robert, Jay, ME

W. L. Gore & Associates
Ellis, Jim, Elkton, MD
Gaver, Eric, Elkton, MD
Kiernan, Paul, Elkton, MD

Water Wizard Consulting
Johnston, Norris, Lacey's Spring, AL

WestRock
Barry, Carson, Covington, VA
Clemmons, Curtis, Covington, VA
Cline, Tracey, Stevenson, AL
Hollis, Scott, Panama City, FL
Krepps, William, Richmond, VA
Moye, William, Euadale, TX
Moyer, Scott, Jacksonville, FL
Murch, Douglas, Richmond, VA
Parten, Greg, Demopolis, AL
Tarpley, Donn, Demopolis, AL
von Oepen, David, Dempoulis, AL
Watson, Brett, Not given
Wessler, Fernando, Santa Catarina, Brazil
Weum, Roger, Panama City, FL

XL Catlin
Franks, James, Somerville, TN
Sides, Michael, Ocoee, FL

Zeeco, Inc.
Langstine, Bob, Lawrenceville, GA

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MAIN COMMITTEE MEETING

INTRODUCTION – Dave Slagel - Chairman:

Hello everyone! Thank you all for your attendance here at the fall 2017 BLRBAC meeting. It is with tremendous shock and sorrow that I have to announce that our Chairman and friend, John Gray, passed away yesterday afternoon. John had attended BLRBAC for many years. He was elected Vice-chairman during the October 2012 meeting and held that position until becoming Chairman in the fall of 2014. John served our nation on a nuclear submarine during the Gulf War. He was employed by Rayonier. He leaves behind his wife and five sons. I'd like us to honor him and recognize his service to his family, our nation, his company, his community and to our organization. May we have a few moments of silence in his honor. (Complete silence!) Thank you.

I will now open the Main Committee Meeting. This meeting, as are all BLRBAC meetings, is being held in strict compliance with BLRBAC's Anti-Trust Policy.

I'd like to begin with introduction of the Executive Committee members:

Dave Slagel - BLRBAC Vice-Chairman - International Paper
Everett Hume - BLRBAC Secretary - FM Global
Len Olavessen - BLRBAC Treasurer – Lenro, Inc.
John Phillips – Boiler OEM Representative - Andritz
Jim Onstead – Insurance Representative – FM Global
David VonOepen - Operating Representative – WestRock

OLD BUSINESS

1. **ACCEPTANCE OF THE SPRING 2016 MEETING MINUTES** – David Slagel

The Meeting Minutes for the Spring 2017 BLRBAC session have been posted on the BLRBAC web site. I believe there were a few minor changes to that document. Does anyone else have comments regarding that document as posted? Can I get a motion to accept the Minutes? We have a motion. Seconded? Anybody opposed? All in favor? The Spring 2017 Meeting Minutes have been approved. Is there any other old business that we need to bring to light? If not, then we will move on to new business.

NEW BUSINESS

2. NEW MEMBERS/REPRESENTTIVE CHANGES REPORT – Everett Hume

NEW REGULAR MEMBERSHIP

April Group – PT Real Pulp and Paper - Indonesia
V. Balkrishnan has been designated as the Representative
Ruhut Panagara Sihombing has been designated as the Alternate Representative

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

NEW ASSOCIATE MEMBERSHIPS

Applied Thermal Coatings – Chattanooga, TN
Jeff Henry has been designated as the Associate Representative
Harley Grant has been designated as the Alternate Representative

Oilon USA Inc. – Thompsonville, GA
Johan Tallberg has been designated as the Associate Representative
Jesse Coffee has been designated as the Alternate Representative

Kiewit Energy Group – Lenexa, KS
Steve Logue has been designated as the Associate Representative
Kurt Clardy has been designated as the Alternate Representative

NEW CORRESPONDING MEMBERSHIPS – None reported

REGULAR REPRESENTATIVE CHANGES – None reported

ASSOCIATE REPRESENTATIVE CHANGES

Harbisonwalker International
Chris Hersh remains as the designated Associate Representative
Larry Morley replaced John Bortner as the designated Alternate Associate Representative

CORRESPONDING MEMBERSHIP CHANGES - None reported

MEMBERSHIP COMPANY NAME CHANGES – None reported

MEMBERSHIP COMPANY STATUS CHANGES - None Reported
*{**Secretary's Note**: The Company Membership List posted on the BLRBAC website may be out of date and not reflecting all the mergers, acquisitions, and name changes that have occurred. Anyone who sees something that needs changing should bring it to the attention of the BLRBAC Secretary via* fhholich@aol.com*}*

The Executive Committee voted on those four companies and so they will officially be placed into the BLRBAC database.

We met as a committee yesterday afternoon in a closed session with seven members present. The operating budget was reviewed and approved.

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

Our checking balance as of the close of business yesterday was $83,105.30. Our anticipated expenses for the remainder of the year, including the expense of this meeting, are $30,300.00 which will leave us with an end of the year balance of $52,800.00. Our balance at the beginning of the year 2017 was $60,483.60.

3. **TREASURER'S REPORT** – (Cont.)

The meeting statistics for this meeting are 204 Advance Registrations, 57 At Door Registrations, equaling 261 Total Registrations which is the highest we have had in a number of years. We had 22 paper companies, 4 insurance companies, 3 boiler manufacturers, 40 associate companies and 14 guests of member companies. There were nine off-shore attendees: 1 from Colombia, 3 from Finland, 2 from the United Kingdom and 3 from Sweden. Also, we had 22 first-time attendees.

David Slagel – Chairman: There is one other point of business from the Executive Committee that we want to do and that is to recognize a person who is a first-time attendee to BLRBAC, but has been a part of BLRBAC for a very, very, very long time. She has been the Secretarial Services for BLRBAC for 50 years and maybe a little longer. We do want to recognize Barbara Holich for her participation and for what she has provided to BLRBAC. I think she has probably been here maybe longer than anybody else in this room as a part of the BLRBAC organization. Len if you would, please.

Len Olavessen – Treasurer: It is my privilege to present Barbara Holich with this certificate of appreciation and it reads:

> In recognition of service to the Black Liquor Recovery Boiler Advisory Committee, Barbara Holich has provided outstanding and active administrative support for over 50 years for which we are very grateful. Her attention to detail and caring have been invaluable to BLRBAC as we have carried out our mission of helping the paper industry operate black liquor recovery boilers safely. Barbara shares ownership in the positive contribution BLRBAC has achieved over the years. Presented in October of 2017.

Barbara has truly been one of the pioneers of this organization and we have very few left. So, thank you and don't go away.

Here is something that Barbara can look at. We have a presentation of a world globe because we are a global organization. Our outreach goes everywhere and it is inscribed:

Barbara Holich, thank you, BLRBAC, Fall 2017

Barbara Holich – BLRBAC Secretarial Services: Thank you very much. I'd just like you to know that I started with Factory Insurance Association in 1964 right after I graduated High School. I was 18 years old. One of my bosses was Frank Rademacher and he was the first Secretary for BLRBAC. So, that is how I became involved with BLRBAC because I did the manual labor like stuffing envelopes with Meeting Minutes or Meeting Notices and affixing about $1,500.00 worth of postage. These envelopes were mailed out to everyone in the BLRBAC database. I worked from home at night and was paid by BLRBAC.

Then in about 1987 my boss was diagnosed with Alzheimer's and could not work anymore. Since I was the only one who knew what he had been doing, BLRBAC hired me to work for them as their secretarial services. That is when I actually became the BLRBAC Assistant to the Secretary. It has been a long time and I really do enjoy doing it. I expect to be around for a couple of more year. Thank you everyone!

4. **SECRETARY'S REPORT** – Everett Hume
   (He reported on the names and cities of the abovementioned four new member organizations.)

Dave Slagel – Chairman: Barbara, you can't leave yet. You have to give your report. She came for the first time and, therefore, she needs to give her secretarial report.

SECRETARIAL SERVICES REPORT – Barbara Holich

Really! I would like everyone to know that what I must have is the completed Registration Forms. They need to be mailed with your check. You don't know how often I receive a check with nobody's name on it and no Registration Form enclosed. So, I don't know who to register and I have to start looking for someone to contact within that organization. Who knows to whom this check belongs; who should I register; who can answer these questions? I know this is very hard for some people because corporate or your accounting department is not necessarily located where you reside. Also, if you are going to attend BLRBAC, get your registration in early and have the Registration Form filled out completely because that is the only information I have on who you are, where you reside and other pertinent information, such as, a working e-mail address. When e-mail addresses come back to me at least two times as "undeliverable" that address is removed from the BLRBAC database. For every meeting, that is every six months, I receive approximately 90 to 100 e-mails that are undeliverable for one reason or another. Somebody could be retired, passed away, left their company, just changed their e-mail address or misinterpretation of what was written on a new application for membership. Please be very carefully with handwritten Registration Forms. Late comers who register At Door, but mail them to me after the cut-off date, are harder to register than 50 or 60 who get their registration to me prior to the posted cut-off date because I have to make one badge. When I put a sheet of eight badges in the computer for one name, the other seven blank badges are wasted. I can't use that page again because my printer will lock-up or the badge page will get stuck in the printer.

When someone is sending in any registration by FedEx or UPS and they have asked for a return signature be aware that I work from home, am retired, and I am not sitting there waiting for mail to show up. So, if I'm not home and they have asked for a signature, FedEx or UPS will not leave the envelope. They may try another time, but Frank and I are very often not home during the day; therefore, the package may be sent back to initial company as undeliverable. Then someone shows up at BLRBAC thinking they have been registered. They will tell the Registrar, I know that our registration was sent and Frank will tell them that it was never received. That has happened many times. The Registrar will tell them, "It's $200.00." It is not Advance Registration any more, it is now At Door. If your Corporate or Accounting Department is mailing your registration form and check, please tell them in advance DO NOT REQUEST A SIGNATUARE because we may not be there. Our U.S. mailbox is outside and is locked.

Thank you so much for your hospitality. I'm heading back to Las Vegas!

Dave Slagel – Chairman: Have a safe trip home!

One other point I would like to note is that we did discuss during the Executive Committee meeting yesterday was that for the BLRBAC Fall of 2019 Meeting that dates have been set at October 15th to 17th. So, that would be the week after the holiday weekend. We will now move on to the Subcommittee Reports.

5. SUBCOMMITTEE REPORTS

5.1 AUXILIARY FUEL REPORT – Bruce Knowlen

The meeting was called to order at 1:04 PM. A total of 9 of 11 subcommittee members plus 11 guests were in attendance. The BLRBAC Anti-Trust statement was reviewed.

The meeting agenda and meeting guidelines were presented and the minutes of the last meeting were read. The minutes were approved unanimously.

Under new business, the subject of torches for the treatment of plugged smelt spouts was raised. There was a question regarding tying these burners into the flame safety system of the boiler. Both hand held and fixed torches were discussed. The person bringing this subject was directed to the SFAF document for the examples of other aux burners for points of interface and to SFBL Chapter 10.

Under old business, the subcommittee returned to the Clearing of Superheaters. The task was to examine a proposed change of Figure 4 that included a direction to operators (a dashed box) to be mindful of the clearing of superheater platens after Aux Fuel is permitted to fire. The full description of recognizing the clearing event is to be described in Chapter 16.1.15 when the updated SFAF document is posted. The review generated some suggestions and a final version of the figure was approved. Figures 10, 17, and 21 are similar and will include this same operator directive detail on superheater clearing.

This change to the figures completes a series of changes the subcommittee has been working on. At this time, we plan to be sending the revised document to the Executive Committee for approval and posting for membership review. The hope is that these will be accepted by the membership in the Spring and generate a revision and new posting to our SFAF document.

The subcommittee also took up the long waiting topic of Chapter 5.3 review, **Other Audible Alarms and Visual Indicators.** This section of the SFAF document contains topics that pertain to several other subcommittees. For simplicity, it makes sense to us that these topics should be adopted by other BLRBAC subcommittees dealing with these topics more thoroughly and completely. The work on this was showing good progress when the meeting time ran out. This will be carried into the next meeting.

The group voted to hold a SFAF meeting in the Spring gathering of BLRBAC 2018.

Adjournment occurred at 3:33 PM.

We thank the members and especially the visitors that contributed to this Fall meeting. We always welcome visitors and any that might be interested in joining the subcommittee. Please stop by and lend a hand in our work.

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

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

Karl Morency – Georgia-Pacific: Can you comment on the status of BLRBAC's recognition of NFPA 85?

Bruce Knowlen – Auxiliary Fuel Chairman: I believe that the topic of NFPA 85, if you are talking about the logic functions, we did cover that a few sessions back we indicated that our review of our document regarding that topic we felt that there were no significant changes that we would like to put into our document at this time either to recognize NFPA 85 or to alter our project accordingly. In the new document that we will be releasing, we do have a few changes and one of them does involve the removal of energy to a precipitator in certain situations, but that would be the extent of it. I think if you would like, I could send you a copy of the Minutes from that previous meeting when we did a report on that. Does that satisfy you?

Karl Morency – Georgia-Pacific: Well I wouldn't say it satisfies me, but I understand what you said.

Bruce Knowlen – Auxiliary Fuel Chairman: Thank you, Karl. Any other questions?

5.2 **ESP SUBCOMMITTEE REPORT** – John Andrews
(See ***Appendix I*** – Incident List

The ESP Subcommittee met in closed session on Monday October 4th, 2017 with 11 members represented. The Subcommittee met in open session on Tuesday morning October 4th, 2017 with 11 members represented and about 190 guests.

During the open session, the subcommittee reviewed 28 incident reports from North America and 1 International Incident. Of the 28 incidents, there were no Smelt Water Explosions reported and no Dissolving Tank Explosions. There was an explosion reported at the Peace River Mill in Canada, but we have not received an Incident Questionnaire on that explosion, so we have limited details. Hopefully the mill will submit a report by the next meeting. Eleven (11) of the reported leaks were classified as critical incidents and 16 were non-critical incidents. There was one ESP with no leak reported. An ESP was performed in 12 of the incidents including 7 of the critical incidents representing 73% of the critical incidents that should have been ESP'd. This percentage is higher than we have seen historically.

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

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

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

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

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

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

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

Incident Locations

The incident locations are summarized as follows:

- 12 – Economizer
- 2 – Boiler Bank Screen
- 6 – Superheater
- 4 – Boiler Bank
- 3 – Upper Furnace
- 1 – ESP No Leak

The general locations of the leaks for boilers in North America are shown in Figure 1, which displays a typical boiler, not representing any particular style or model. The yellow circles are the non-critical incidents and the red circles indicate the location of the critical incidents. The two blue dots represent the ESP with no leak.

The attached bar graphs (Figures 2 – 7) show the number of leaks reported by boiler location over the past 13 years in order to see if there is a trend in leaks occurring in a specific area. There does not appear to be any significant trend from any area during that time.

Incidents by Boiler Type

The incidents by the number of drums and the back-end arrangement were reviewed. There were 9 incidents reported in a single drum unit and 19 incidents reported in two drum units.

Five (5) of the reported incidents were in boilers with Cascade Evaporators and 4 of the units had a Cyclone Evaporator. Nineteen (19) of the incidents involved units with extended economizers.

Leak Cause

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

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

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

- 7 –Fatigue
- 6 - Weld Failure
- 4 - Erosion or Corrosion Thinning
- 2 – Mechanical Damage
- 5 - Stress Assisted Corrosion or Stress Corrosion Cracking
- 3 – Overheat

How Discovered

The vast majority of the leaks continue to be discovered by operators walking down the units. Twenty-Two (22) of the leaks (79%) were initially indicated by walkdowns. This shows that operators are continue to be diligent in looking for leaks. Three leaks were detected by Control Room Instrumentation observations. One of the leaks was initially identified by a Leak Detection System. and four of the incidents reported that the leak detection system confirmed the presence of the leak during continued investigation.

Leak detection systems were reported to be installed on units in 15 of the incidents (54%).

Time to Initiate the ESP

The time to initiate the ESP system after the initial indication of the leak ranged from 3 min to 1 hr. 30 min. The median time from the incident reports that provided information on the timing was 30 min. This is better than we have seen in prior meetings.

Incident Review

Figure 8 shows the critical incidents reported each year. There were 11 reported this meeting for a total of 18 for the year which is close to the recent average. Figure 9 shows the history of Recovery Boiler Explosions showing the recent smelt water explosions in 2012 and 2013. Since we have not received any official information on the Peace River explosion it is not represented in the graph. We hope to have more information to share by next meeting.

Figure 10 shows the history of reported dissolving tank explosions with the one reported last year and one reported in the spring so we are continuing to see these incidents. Following the recommendations from Section 10 of the Safe Firing of Black Liquor document would prevent many of the reported dissolving tank incidents that have occurred in the past.

Figure 11 the five-year rolling average which is now at 0.2 indicating only one reported explosion in that five-year period. This should go up next year assuming we are able to include the Peace River incident.

Figure 12 is a plot of explosion history per 100-boiler operating years. This is a statistical summary of the experience across the industry. The smelt water explosion experience has dropped slightly to 0.477 explosions per 100 boiler operating years due to the explosions in the last couple of years, but the total explosions, which includes all boiler explosions and dissolving tank explosions, decreased slightly to .867 explosions per 100 boiler years. The factor is calculated by a summation of all reported explosions since 1948 divided by a summation of the number of boilers reported in service each year during the same period. We have accumulated over 18,463 total recovery boiler operating years in the BLRBAC database for North America and have recorded 88 smelt water explosions. We all need to continue to get those trends going down.

List of Operating Boilers

The BLRBAC Boilers in Service Database currently has 186 active recovery boilers listed, 146 in the US and 40 in Canada with a decrease of two boilers in the. In the US, the average age is 39.2 years and the oldest is 65 years. The average age in Canada is 39.6 years and the oldest boiler is 70 years which is a 1947 Alstom unit at Three Rivers, PQ.

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

Learnings

There are several learnings and suggestions 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.

- Create boiler side view diagram that clearly indicates sections of the boiler where leaks would be potential Critical Incidents that should result in an ESP and where leaks would be considered Non-Critical. Post the diagram in the control room for the benefit of the operators to make decisions on when to initiate the ESP.

- First Assume the Worst – better to assume a worse case and then prove it is wrong than always assuming the best case. Confirmation Bias is the situation where people tend to look for information that supports their ideas and opinions (no leak) and ignore information that is contrary to that idea or opinion.

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

- Boiler should not be hydrostatically tested until bed is sufficiently cool for water wash in case to keep from putting water in the hot bed if there is a leak present.

- Consider bypassing the torque limits of any motorized valve that is part of ESP –not just the Rapid Drain Valves. The ESP guidelines do not specify any other valves other than the Rapid Drain Valves for bypass of the limits but is important to consider especially for the feedwater stop valve where there are multiple boilers being fed by the same feedwater pumps.

- Involve Purchasing and Stores in Management of Change process to assure correct parts are available such as the correct replacement sootblower nozzles.

- When leaks occur, inspect similar areas for the same issue. If there is a leak on one side wall caused by stress it will probably be a problem on the other s ide as well.

- Include roof tubes at superheater sootblower lanes in the tube thickness NDT inspections, especially if the blowers are closer than 3 ft. to roof.

- Review superheater clearing procedures on start up to look for a high temperature spike on tube outlet thermocouples rather than just looking for a specific temperature. Standard startup curves may not be sufficient in unusual cases to confirm that the superheater is clear of condensate.

- Check alignment of sootblowers in superheater section during outages to make sure they are not rubbing on tubes.

- Keep condensate out of sootblowers
  - Utilize thermal drains or orifice plates to drain condensate
  - Make sure steam lines to blowers are sloped back to the steam supply header
  - Maintain poppet valves
  - Maintain pipe insulation

- Inspect boiler screen / rear wall tubes at ash hopper attachment on B&W units for cracking. Review the B&W Service Bulletin on this issue.

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

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

ESP Guideline Changes

The Subcommittee has approved the revision of the ESP Guidelines that combines the Post ESP Guidelines that covers the actions that should take place after the ESP has been initiated with the ESP Recommended Good Practice Document. The draft was submitted to the Executive Committee and should be posted on the BLRBAC web site for membership review and comment. Please contact John Andrews or Dean Clay if you have any comments or suggestions on the document

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.

Dean has updated the questionnaire to be more interactive and should be easier to complete. It has been tested at several mills already so be sure to go to the BLRBAC web site to get the latest Questionnaire whenever you need to report on an incident. When you have completed the report, send the file to Dean Clay at **dclay@bsimail.com**.

Please remember that when you are adding pictures into the questionnaire document, it is best that you import the picture as .JPG files rather than cut and paste to minimize the resulting file size.

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.

Dean Clay – ESP Secretary: Just a request. The US Operating Recover Boiler List that is posted on the BLRBAC WEB site is the latest list. I have cleaned it up and if anybody has told me about new boiler shutdowns on old boilers, it is reflected The Canadian list is several years older and I'm not really getting any input from Canada. So, if anybody knows of mill changes in Canada, if you could let me know so that I can keep that database up-to-date. When you see the questionnaire, I have actually started to use a different e-mail address than the one John had up there. Eventually I am dropping "fuse.net", so I'm generally using my **dclay@bsimail.com**. That will all be on the mail questionnaire.

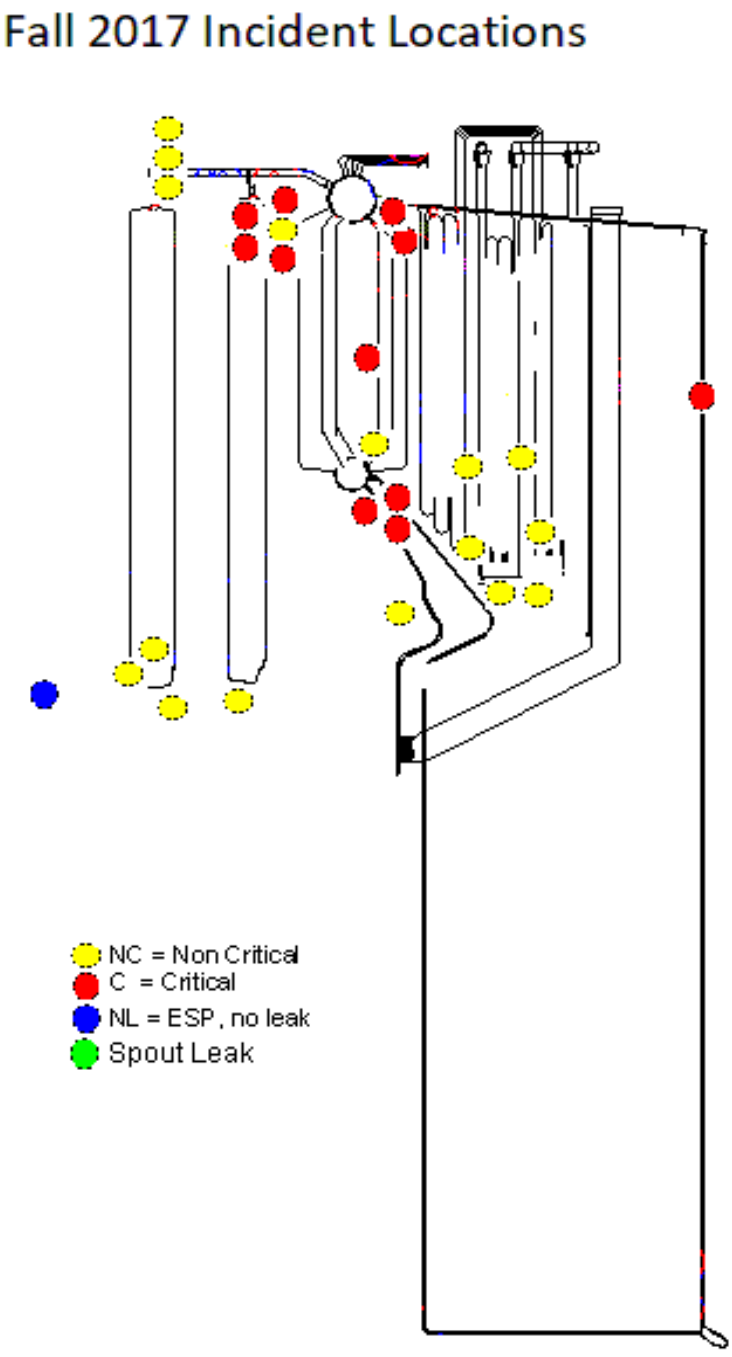

Fall 2017 Incident Locations
NC = Non Critical
C = Critical
NL = ESP, no leak
Spout Leak

Figure 1

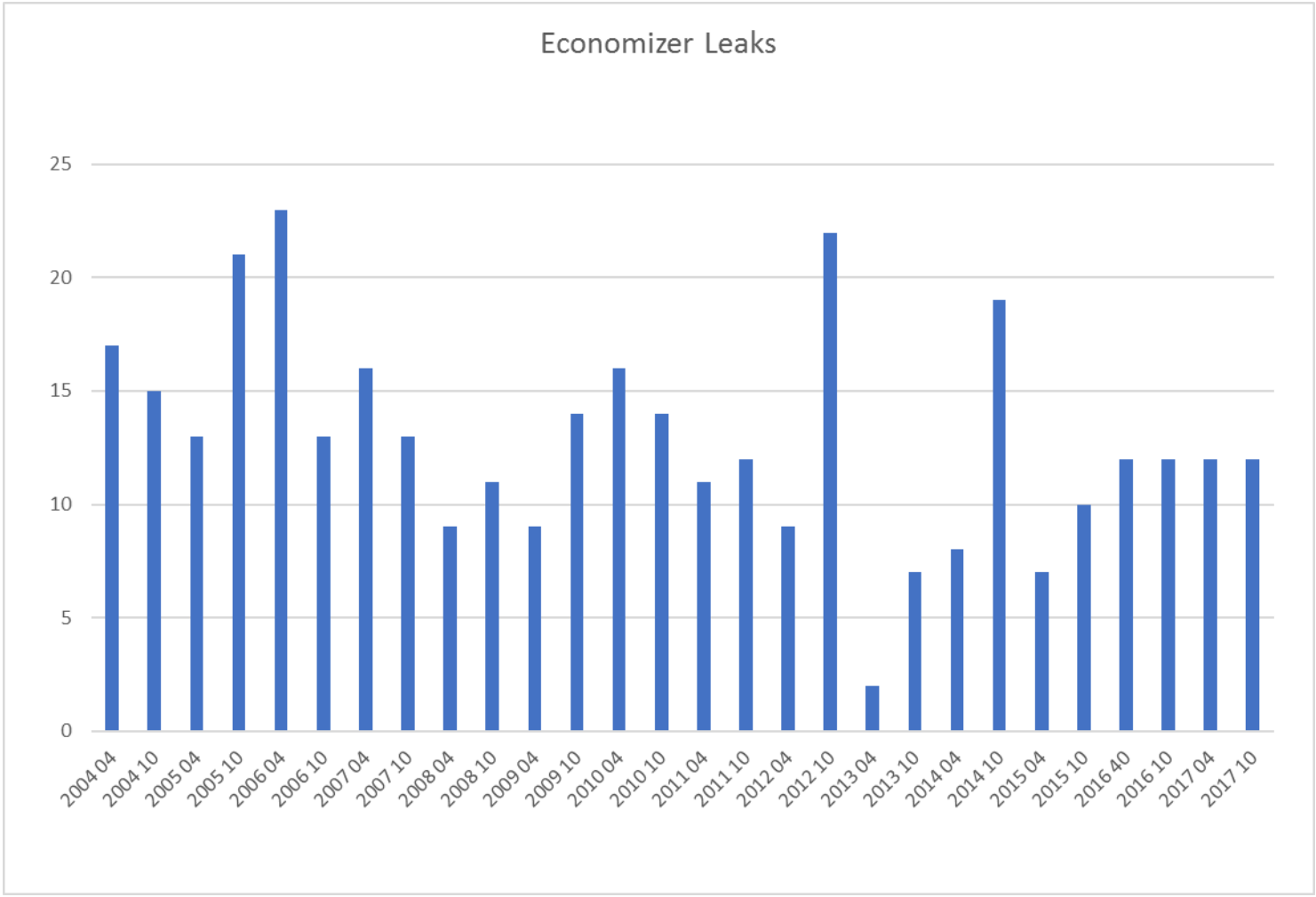
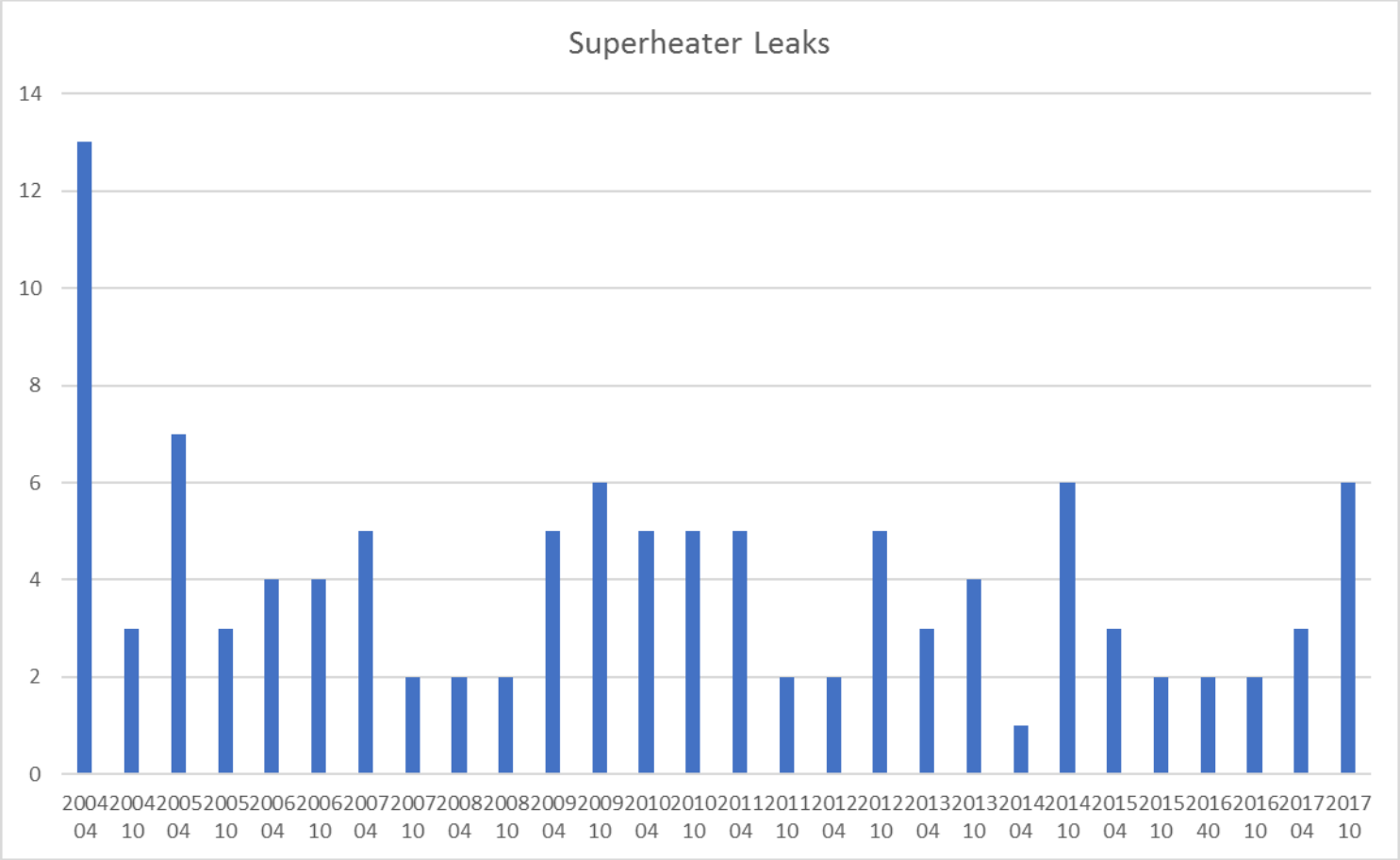

Economizer Leaks
25
20
15
10
5
0
2004 04
2004 10
2005 04
2005 10
2006 04
2006 10
2007 04
2007 10
2008 04
2008 10
2009 04
2009 10
2010 04
2010 10
2011 04
2011 10
2012 04
2012 10
2013 04
2013 10
2014 04
2014 10
2015 04
2015 10
2016 40
2016 10
2017 04
2017 10

Figure 2


Superheater Leaks
14
12
10
8
6
4
2
0
2004 04
2004 10
2005 04
2005 10
2006 04
2006 10
2007 04
2007 10
2008 04
2008 10
2009 04
2009 10
2010 04
2010 10
2011 04
2011 10
2012 04
2012 10
2013 04
2013 10
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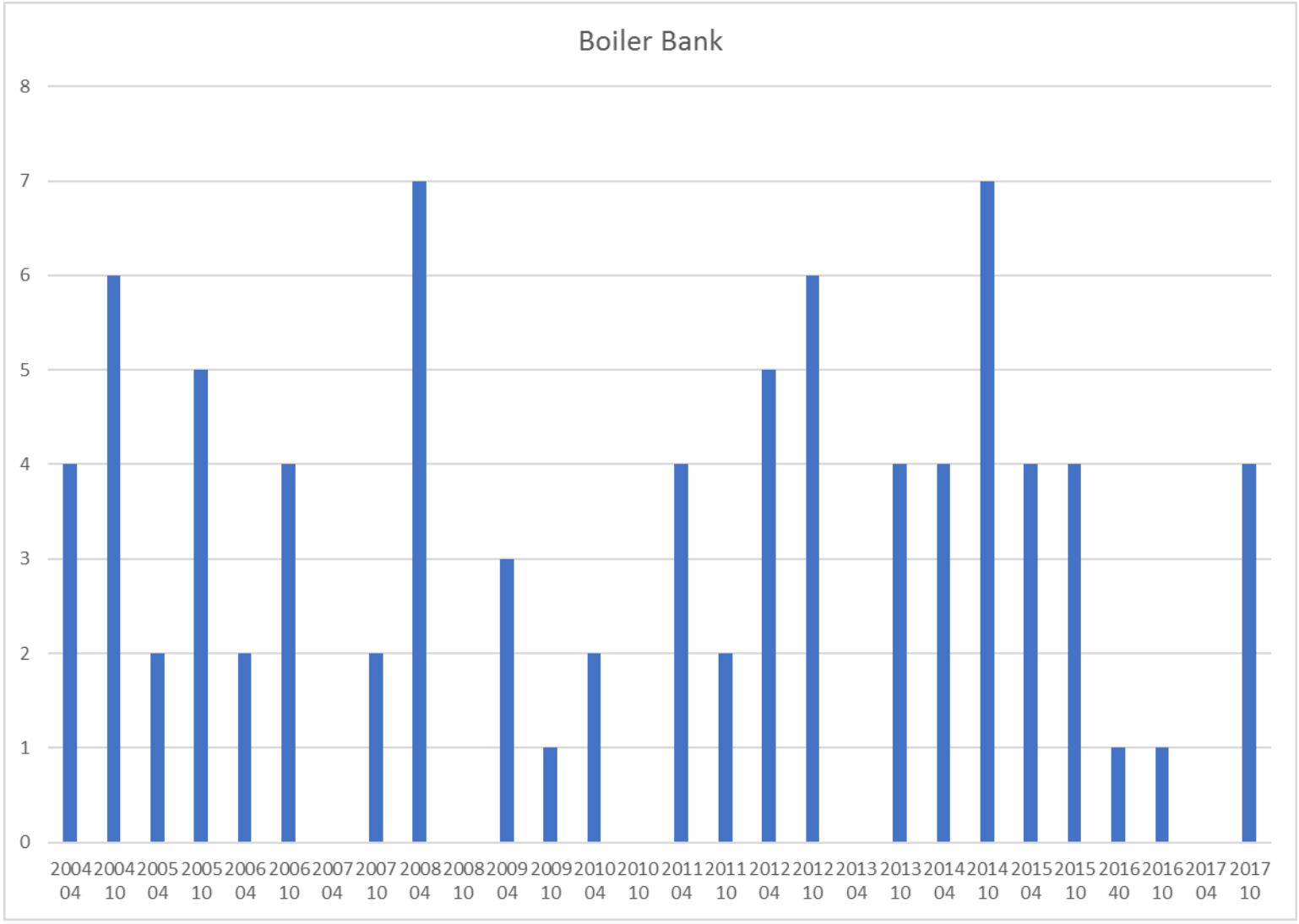
2014 10
2015 04
2015 10
2016 40
2016 10
2017 04
2017 10

Figure 3


Boiler Bank
8
7
6
5
4
3
2
1
0
2004 04
2004 10
2005 04
2005 10
2006 04
2006 10
2007 04
2007 10
2008 04
2008 10
2009 04
2009 10
2010 04
2010 10
2011 04
2011 10
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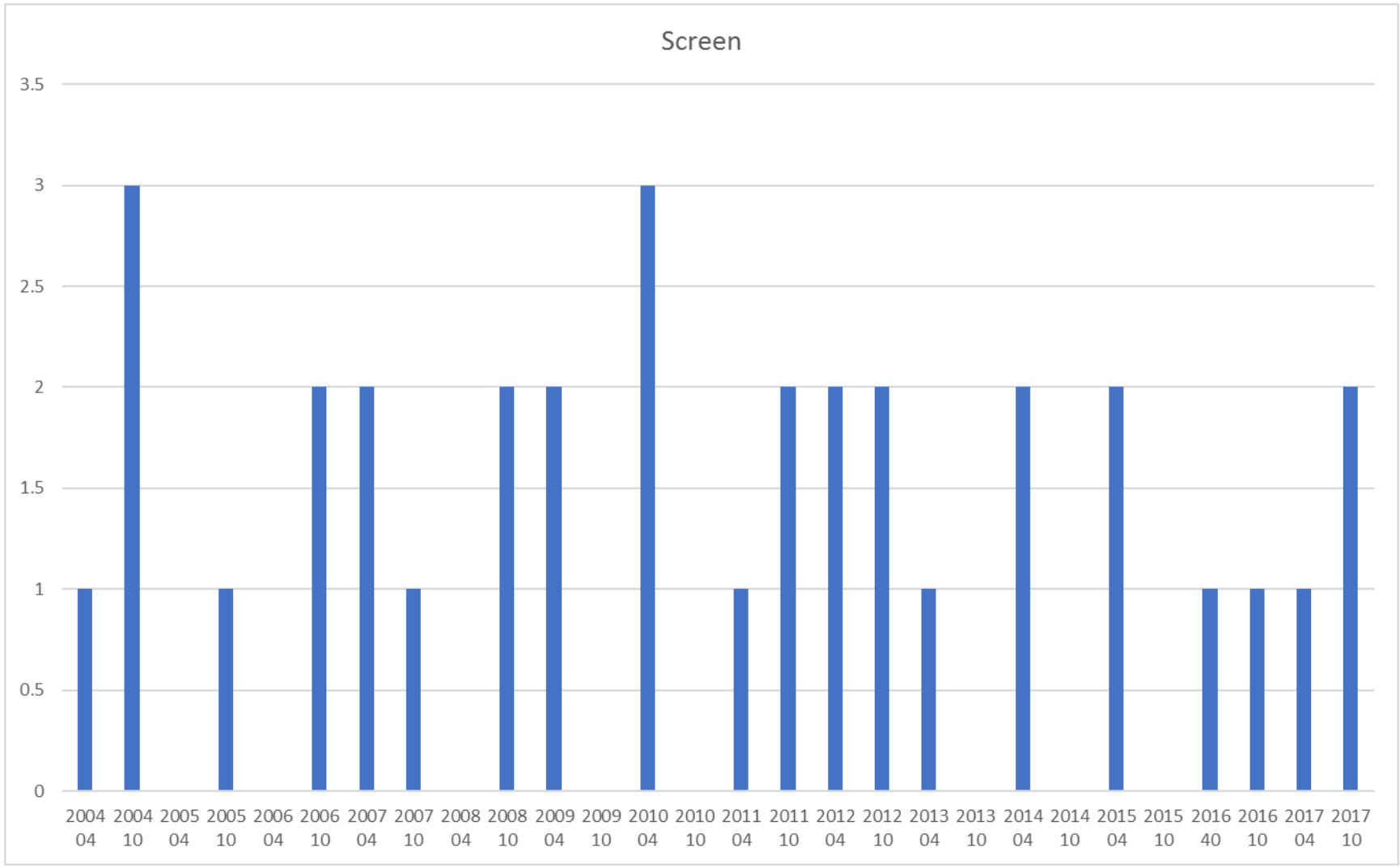
2012 10
2013 04
2013 10
2014 04
2014 10
2015 04
2015 10
2016 40
2016 10
2017 04
2017 10

Figure 4


Screen
3.5
3
2.5
2
1.5
1
0.5
0
2004 04
2004 10
2005 04
2005 10
2006 04
2006 10
2007 04
2007 10
2008 04
2008 10
2009 04
2009 10
2010 04
2010 10
2011 04
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2012 10
2013 04
2013 10
2014 04
2014 10
2015 04
2015 10
2016 40
2016 10
2017 04
2017 10

Figure 5

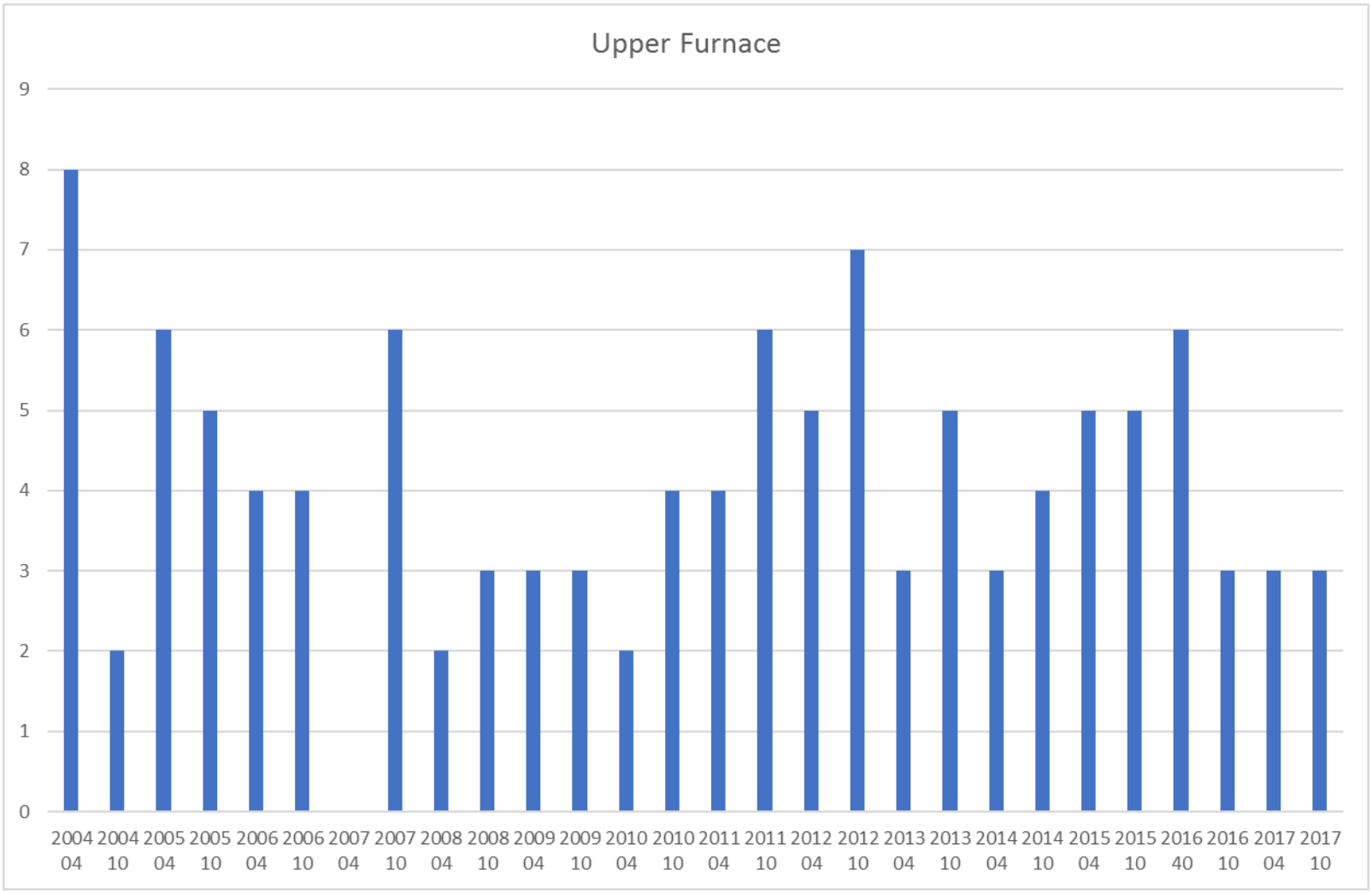

Upper Furnace
9
8
7
6
5
4
3
2
1
0
2004 04
2004 10
2005 04
2005 10
2006 04
2006 10
2007 04
2007 10
2008 04
2008 10
2009 04
2009 10
2010 04
2010 10
2011 04
2011 10
2012 04
2012 10
2013 04
2013 10
2014 04
2014 10
2015 04
2015 10
2016 40
2016 10
2017 04
2017 10

Figure 6

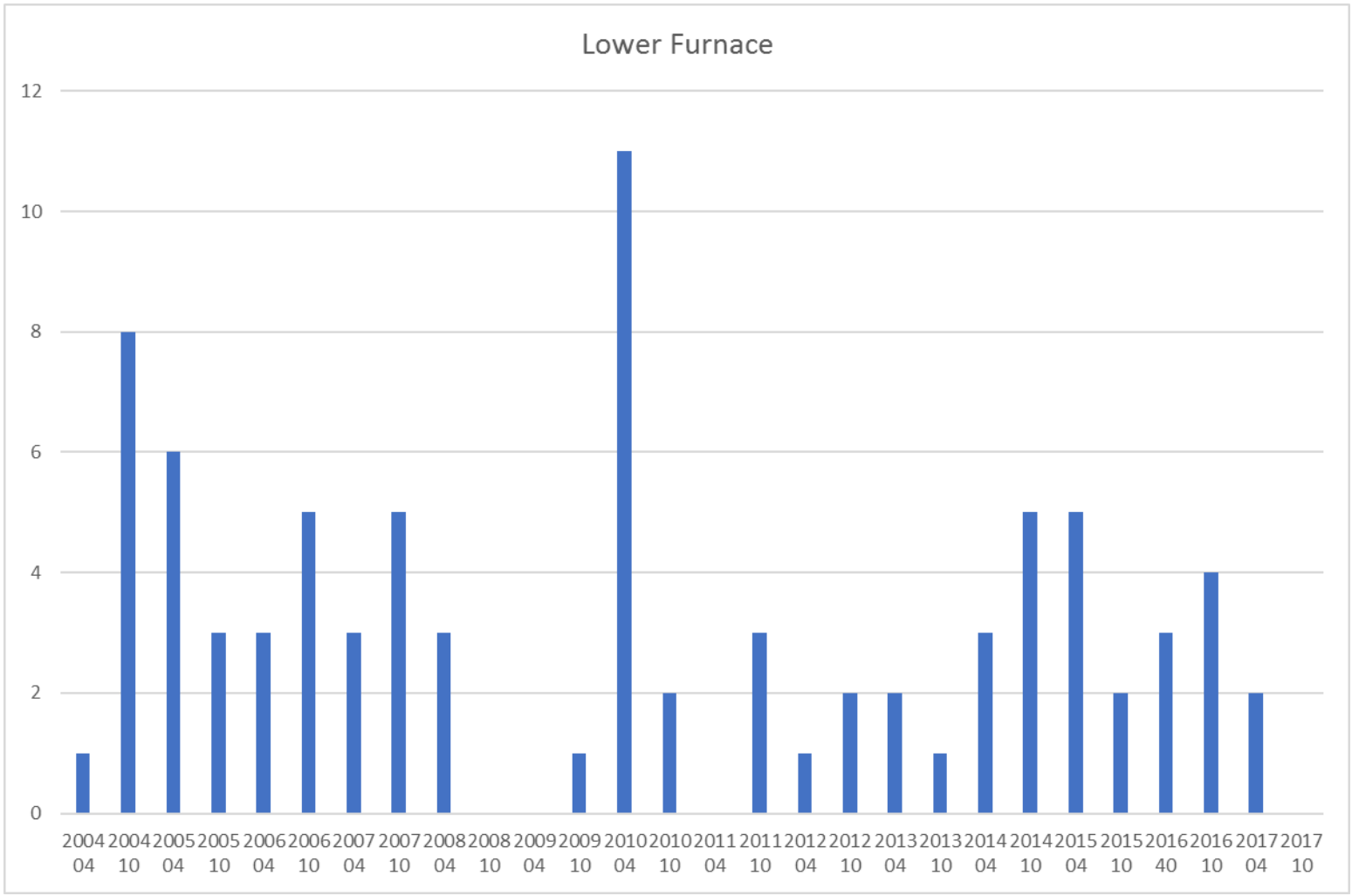

Lower Furnace
12
10
8
6
4
2
0
2004 04
2004 10
2005 04
2005 10
2006 04
2006 10
2007 04
2007 10
2008 04
2008 10
2009 04
2009 10
2010 04
2010 10
2011 04
2011 10
2012 04
2012 10
2013 04
2013 10
2014 04
2014 10
2015 04
2015 10
2016 40
2016 10
2017 04
2017 10

Figure 7

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

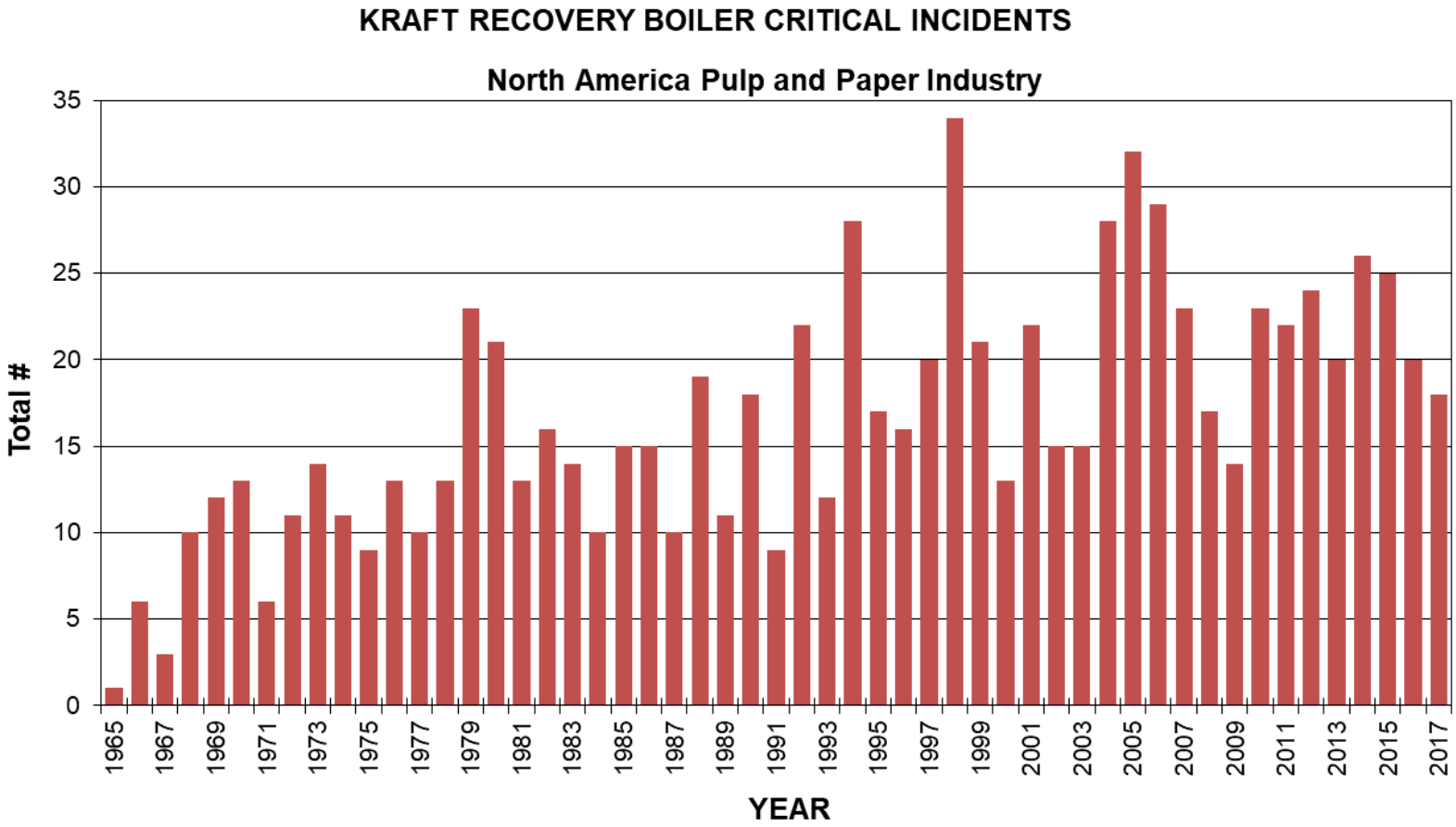
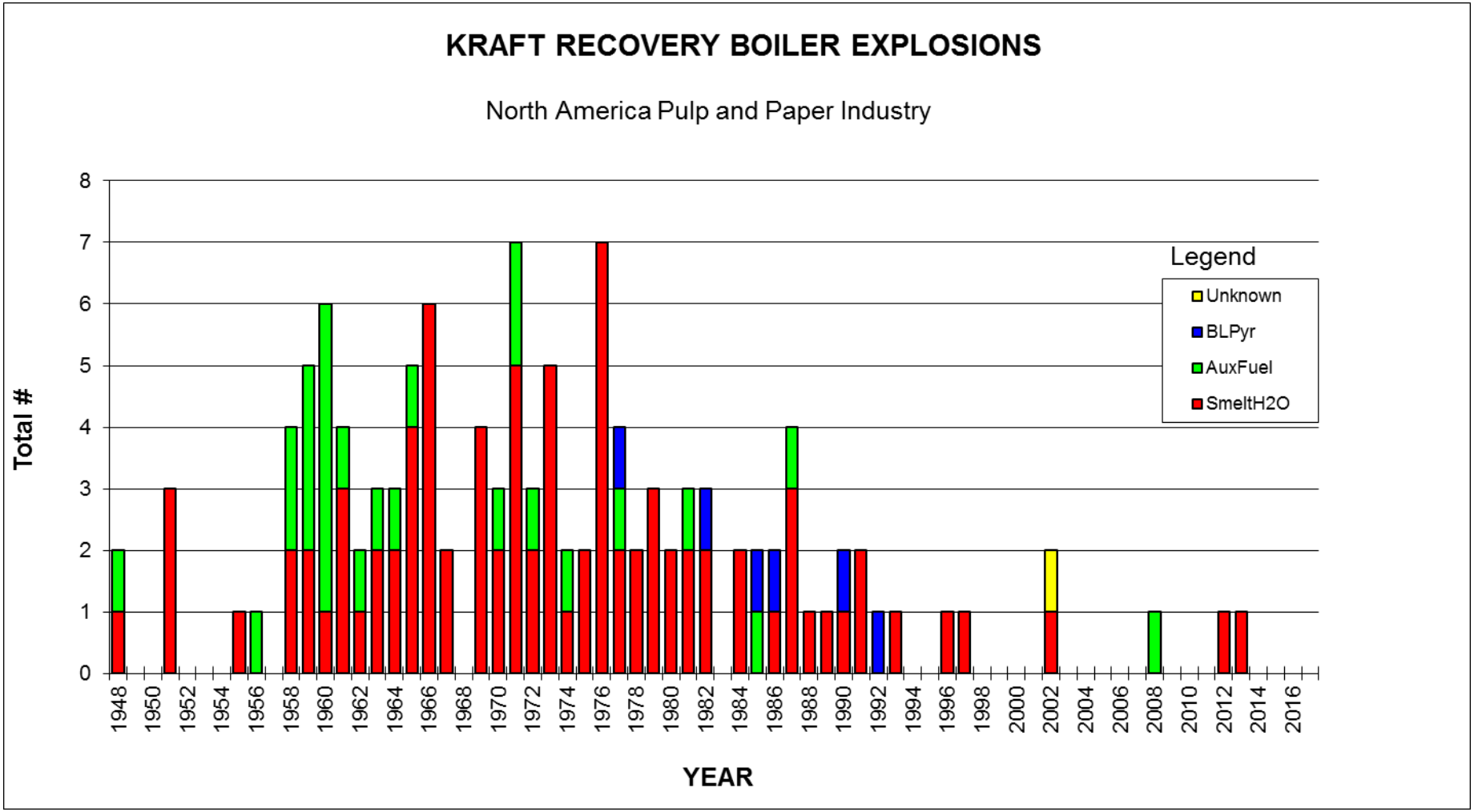


Figure 8


KRAFT RECOVERY BOILER EXPLOSIONS
North America Pulp and Paper Industry
Total #
YEAR
Legend
Unknown
BLPyr
AuxFuel
SmeltH2O
0
1
2
3
4
5
6
7
8
1948
1950
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
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2012
2014
2016

Figure 9

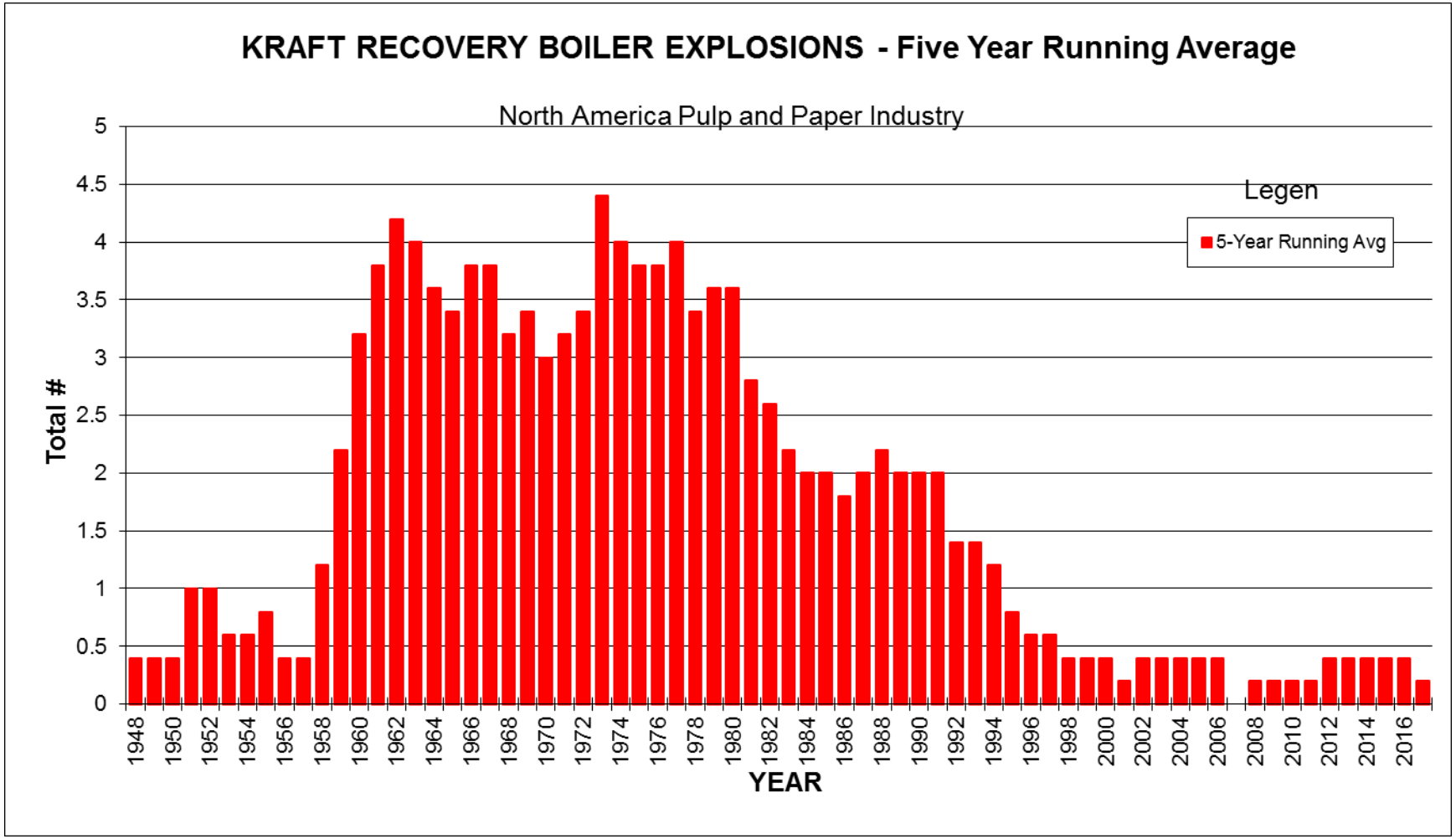
KRAFT RECOVERY BOILER EXPLOSIONS - Five Year Running Average
North America Pulp and Paper Industry
Legen
5-Year Running Avg
Total #
YEAR
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
1948
1950
1952
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Figure 10

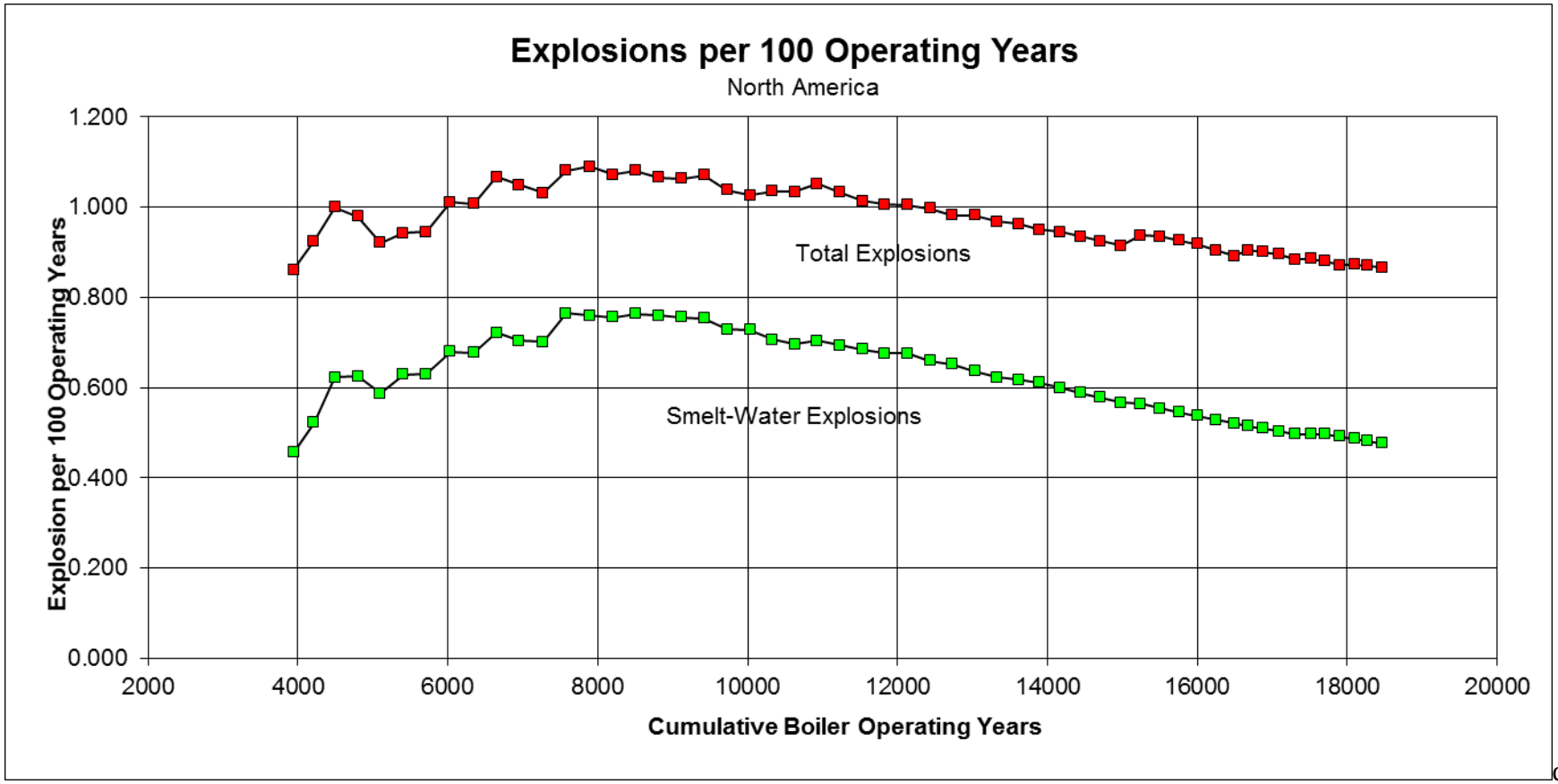

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Figure 11

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

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

This Subcommittee did not meet in the fall of 2017. No report available at this time.

5.4 **INSTRUMENTATION REPORT -** Dave Avery

The Instrumentation Subcommittee met in open session on Monday morning with 11 members and 26 guests. Our session began with reading the Anti-Trust statement continuing with introductions of members and guest. We took a moment of silence to remember one of our subcommittee members "Michael "Mike" Wayne Kiper, Mike passed away on 9/28. Mike was a valuable contributor to our committee and a strong advocate for RB safety, Mike will be missed!

We do have a new member Marc Hunter with Rockwell Automation is now working with us.

We reviewed minutes from our April meeting and approved them as presented. Reaching out to our guest and members a request for topics of interest was presented with the following results:

- Functional testing of the RB NCG system – How can the NCG's ESP functionality be tested under operating conditions? To currently test the NCG / ESP under normal ESP test conditions as the boiler is coming down or going up requires multiple blocks and jumpers to at least simulate operating conditions for the NCG's.

  While this is a method to achieve the test, it is an approach to "Waste streams isolation "it is not the best or most complete way to functionally test the system.

  Discussion continued and a more realistic way to functionally test the system became clearer as the scenario developed. If the existing ESP event trigger can be identified and tested during the normal ESP test occur then later when the boiler is operating under normal conditions and burning NCGS, then under true operating conditions using the identified event trigger (relay) then the NCGS can be stopped without effecting the boiler operations. This would provide a complete functional ESP interlock test for the NCG system!

  Development of this idea will be pursued at the spring meeting and then the developed product will be shared with Waste Streams Subcommittee for their approval and potential submission for inclusion into the Instrument checklist.

- SIL rated systems for combustion controls non-Recovery Boiler units was offered as a question as to whether SIL3 designed system can elect not to include a physical MFT relay? The argument is that when the evaluation of the components reliability is performed, the physical MFT relay is main liability in the system. If the existing SIL3 system can be designed to perform the MFT without the 'old school relay" would that be acceptable? The front-line safety component in this argument is the human interface used when there is a situation where an operator decides that a MFT must occur and that HMI is a single point of action! If the SIL3 system can replicate this function, then it is upon the designer to achieve the SIL3 level of protection to do so.

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

5.4 **INSTRUMENTATION REPORT -** Dave Avery

The Instrument Subcommittee removed references to SIL levels and replaced with RBSS to better cover RB needs. For RBs the existing MFT relay is fail safe choice which is better for safety reasons and is still the accepted method to use!

- Jack (John) Kelly (United Water Consultants) – gave a Presentation about Hydrogen Testing. - **"Hydrogen Analysis as a critical tool for corrosion monitoring in Feed water and Boiler Water"**

  This discussion is about hydrogen monitoring to detect corrosion problems in recovery boilers the failures reported by the ESP Subcommittee are caused by one or more corrosion problems. Jack's opinion is that the Hydrogen Study can help isolate the problem.

- The fundamental of drum level measurement accuracy is a project the subcommittee is undertaking. We intend to have in our document; procedures on how to have proper drum levels, especially during start-up. This will be accomplished by reviewing the technical and physical aspects of drum level measurement and how to apply them. Eladio Molina, John Browning and Bruce Knowlen will be developing this project for the next meeting.

- Additionally, there were several questions around maintenance outage calibrations are they performed in house or contacted out, are our vendors becoming our on-site experts (independent contractors) on specialized equipment? How are we educating our E&I's. These questions were to get us thinking about solutions.

  The afternoon session had 5 members and 8 guests.

  Questions continued around installations ideas for MFT relay when there are several remote I/O racks. Physical Watchdog timer vs soft watchdog's timer.

Old Business:
Submit the Proposed BLRBAC E&I Qualifications Statement to Executive Committee for review and posting.

One final note: We had great attendance this session and good participation this is how we can improve BLRBAC and the Instrument Subcommittee good attendance and great participation.

5.5 **MATERIAL & WELDING REPORT** - Mike Blair

MORNING SESSION:
The Materials and Welding Subcommittee met in Open Session on Monday morning, October 2, 2017.

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

5.5 **MATERIAL & WELDING REPORT** – (Cont.)

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

Attendance

12 members and 9 guests attended the morning session.

Old Business

The meeting minutes from the Spring 2016 Subcommittee meeting were reviewed and accepted. No Old Business other than to continue work on Tube Plugging Bulletin and Document which was addressed following New Business.

New Business

Discussed the recent B&W alert regarding chain graphitization in SA209T1 and SA335 P1 materials. B&W representative stated that this alert was driven by experience in Utility Boiler Sector and would be providing more information on the relevance to Pulp and Paper Sector.

Fabian Henriques (PSA) presented first draft of bulletin concerning copper contamination and liquid metal cracking in welds and in tube metals. The group determined that we need more information: question to general group and AF&PA regarding the number of known instances for this phenomenon, and to try to get metallurgical report from tubes on Mondi Swiecie. Andritz to check with tier shop as well for more information.

Members

Babcock and Wilcox representative attended, will vote on membership to subcommittee next meeting.

Document Development

The Subcommittee worked on the development of Section 2.5 Plugging Tubes in Drums and Headers. Made final mark-ups for correction. Hope to be complete for final review by Subcommittee during the next meeting and then be forwarded to the Executive Committee.

AFTERNOON SESSON:

The Materials and Welding Subcommittee met in Open Session on Monday afternoon, October 2, 2017.

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

Attendance

13 members and 19 guests attended the afternoon session.

Presentations

Afternoon session, AZZ was to make a presentation regarding robotic welding, but were unable due to schedule conflicts. IP representative made presentation regarding water side Stress Assisted Corrosion Cracking and Cold Side Corrosion.

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

5.5 **MATERIAL & WELDING REPORT** – (Cont.)

Document Development

None in the afternoon

Next Meeting Agenda

Section 2.5 Plugging Tubes in Drums and headers. Hope to be complete for final review by subcommittee during the next meeting to then be forwarded to the Executive Committee. Need only a few photos or illustrations.

5.6 **PERSONNEL SAFETY REPORT** – Robert Zawistowski

The Personnel Safety Subcommittee met in an "open" session on Monday, October 2, 2017. There were 9 members (out of 16) plus 38 guests in attendance during the meeting.

Representation at our meeting by regular members and guests included original equipment manufacturer Andritz and Babcock & Wilcox. Equipment suppliers W.L. Gore & Associates. Service Providers INCO Services and Thompson Industrial. Engineering Companies, Kiewit. Representation from insurance and insurance service companies included FM-Global. Operating company representation was present at this meeting with representatives from Georgia-Pacific, Graphic Packaging International, Hood Container of LA, International Paper, Irving Pulp & Paper, SAPPI NA, Rayonier AM, Resolute, Verso and WestRock. Consultant representation included AF&PA, George H. Bodman, Power Specialists Assoc., Inc, and RSI.

The BLRBAC Anti-Trust Statement was read.

The minutes of the last meeting were read.

The "Common Practices" document information ended up submitted late to the Executive Committee later this summer. As a result, there was not enough time for the Executive Committee to review and post the document for Membership review. As of this meeting the Executive Committee has had the document for review and no negative feedback has been received by our Subcommittee. Assuming the document is "clean" we would like to have it posted on the web for Membership review and potentially a vote for acceptance at the Spring 2018 meeting. At the general meeting on Wednesday morning we were advised the document would be posted for Membership review after this meeting.

A presentation, on development of a more smelt resistant material and protective garment design, specifically for spout decks was made by Jim Ellis and Paul Kiernan of W.L. Gore & Associates. This presentation contained excellent information and supporting data. This presentation included additional information compared to the presentation they made at our spring 2017 meeting and included information on the 60-day field trials they ran on the 1st production run of the garments.

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

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

The products are now in production and a number of mills are starting to use them. Jim and Paul also presented material on a separate garment for use in mill areas outside the smelt deck that is acid/caustic resistant and also high visibility. It is clear much technical research and development has gone into these garments. As chairman of this subcommittee I am recommending a repeat of this presentation be made at the spring 2018 BLRBAC meeting following the general meeting held on Wednesday morning.

Jennifer Johnston of G-P made two presentations. First was a video demonstrating good practices when using spout torches to clear a plugged spout opening. A second presentation was made reviewing a fatality of a worker who was replacing a broken sight glass on an evaporator body. Following the presentation there was group discussion on the topics.

We reviewed some notes on projects discussed in the past. Specifically, we discussed the danger of using valve wrenches on Limitorque manual handwheels, ensuring proper medical treatment of injured employees, tinted or shaded eye protection for viewing inside a furnace and dust control/mitigation. I checked with the other subcommittees about language relating to using valve wrenches on Limitorque manual handwheels and it is not covered in any of our other documents, however it is covered in the Limitorque operations guide. We will determine an appropriate location in our document to include this warning. With regard to treating injured employees we will look into developing some language to ensure the mills have an action plan/protocol in place. No one was aware of any operator concerns or injuries relating to using tinted or shaded eye protection, so we will drop this item from our list. I will look into information relating to dust control and bring this new information back to the subcommittee for discussion at the spring 2018 meeting.

Bob Zawistowski ran two videos, one surrounding an injury sustained by a worker in Slovakia and the impact the injury has had on his life and that of his family after initial recovery. A second video, "The Cost of Accidents" was viewed in which the odds of accidents caused by "Unsafe Acts" were explained. Additional discussion was held regarding various examples of unsafe acts, fatalities and near misses.

Wes Hill has stepped down from the subcommittee and moved over to Safe Firing of Black Liquor. We thank Wes for his many years of service. Brook Holland of G.H. Bodmam (formerly of Blue Ridge Paper) and Matthew Glenn of Irving Pulp & Paper, Limited have joined our subcommittee.

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

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

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

BLRBAC continues to post meeting notices on industry magazine websites' event calendars. BLRBAC and TAPPI are continuing with the cross-promotion program allowing for meeting and training advertisements in prominent areas of each other's websites.

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

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

Agenda:

- Open the meetings. Closed and Open.
- Reviewed BLRBAC Anti-Trust statement. Both closed and open meeting.
- Introduced members and guests. 17 members and 56 members and guest in open meeting.
- Reviewed and approved the Spring 2017 meeting minutes.
- Reviewed working draft document for next revisions. Items discussed below:

Chapter 5 page 35 – Figure 2 Add start DT agitators as black liquor fuel permissive in logic.

- Dissolving Tank agitator
  a. In the logic explanation chart referring to Figure 2
     i. Logic Diagram Block: "Prove Dissolving Tanks Agitator(s) in Operations" (ADEQUATE).

- Purpose:
  a. Prevent dissolving tank green liquor from reaching a high density and solidifying

- Hazard:
  a. Uncontrolled green liquor density leading to possible shutdown to physically remove solidify green liquor with jack hammer

Chapter 9.1.6 Spout inspection interval (page 67).

Inspect the smelt spouts during every scheduled major outage. If a spout fails an inspection, replace it. All spouts should be replaced at least once every major maintenance outage with a new spout.

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

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

Replacement spouts should be field hydro tested to manufacturer's specifications prior to use. NEVER REBUILD, REPAIR OR MODIFY A SMELT SPOUT!

At each major outage, cut up at least one removed smelt spout. Thoroughly inspect the cooling water jacket internals, cooling water supply lines, valves and instrument devices, to ensure adequacy of the cooling water quality and the corrosion/deposition control program. Furthermore, a periodic inspection of the cooling water system should be made to ensure the absence of internal buildup or scale that could restrict cooling water flow. Sections of piping with scale or buildup should be replaced or cleaned.

Both smelt spout cooling water head tanks and collection tanks should be inspected and cleaned at each major outage.

Spout cooling water piping, valves and instrument devices should be check for leaks prior to start up. Boiler expansion should be monitored to allow proper movement of any steam or water hoses connected to the spouts.

A condition based decision should be used to determine the proper service run period for smelt spouts beyond the traditional one-year service run. The conditions to extend establish the service run period beyond the traditional one-year service run should include but not limited to; spout failures, operational upsets or. operational changes that can impact spout integrity, significant liquor cycle chemistry changes, past issues with spout cracking, no manufacturing defects, waterside deposits, loss of spout cooling water episodes, or material wastage.

- Additional information for Chapter 9. Smelt spout operating period extending beyond one year. I put together a list of additional inspection and verification that could be included in our document to help better define what could be seen as a smelt spout prolonged life extension program. The program could include the following verifications:

  - Scan the thickness of the surface of the spouts exposed to the smelt, including the inner and outer lips and underside of the spouts

  - Visual inspection of the exposed surface, looking for dents and scratches. Using liquid penetrant in suspected zone for positive indication. This assessment should be conducted by a qualified NDE inspector and a qualified boiler field service engineer.

  - Review the spout cooling water daily log sheets for chemical residual data and water quality. Water quality is very important to monitor.

  - A corrosion coupon placed in the cooling water return tank is analyzed

  - Review the boiler liquor firing rate.

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

- Review of historical alarm for the spout cooling water low flow and high temperature and compare with baseline data
- Major outage hydrostatic test of the spout system
- Internal inspection of the spout system, water side, head tank and receiver
- Spout opening contour tubes are checked with liquid penetrant and elcometer for clad thickness

- HARDNESS, CONDUCTIVITY, RESIDUAL, PH AS A MINIMUM WATER QUALITY MONITORING ON LOG SHEETS.

- ROUTINE TEST FOR EMERGENCY WATER SUPPLY WITH VALVE LEAKBY CHECK.

Major Maintenance Outage: A Major Maintenance Outage is a thorough inspection of fireside and water-side conditions.

This guideline is to be used for establishing the minimum scope of a recovery boiler inspection in order that it meets the criteria for a "thorough major maintenance outage inspection".

Waterside Inspection
- Steam Drum
- Mud Drum

Visual Inspection
- Lower Furnace from the furnace floor
  - Spout openings
  - Primary air ports
  - Secondary air ports
  - Wall tube alignment
  - Superheater and screen tube alignment
  - Any areas with known cracking

- Upper furnace and sootblower lanes from access doors

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

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

- Superheater, screen tube and generating bank condition and alignment from scaffold board or "pick board" installed in sootblower lane in upper furnace (does not require full scaffold)
- Upper furnace and sootblower lanes from access doors
- Superheater, screen tube and generating bank condition and alignment from scaffold board or "pick board" installed in sootblower lane in upper furnace (does not require full scaffold)

Normal hydrostatic test must be performed (90% of normal superheater outlet pressure)
NDT Inspections

- Any area more than one year overdue
- Any area that is due and has any tube that had a thickness reading that would be at code with two years of thinning using the projected corrosion rate

Functional Tests

- ESP
- Drum Level Trips
- Low Solids Trip

I&E Calibrations

- Boiler Safety System instruments and switches

Spouts

- Replacement or inspection as scheduled

Safety Valves

- Lift test safety valves using manual lift handles

Chapter 10.1 Plugged Spouts (pg. 70).

There have been documented cases on recovery boiler master fuel trip situations that sootblowers have continued to run for long periods of time. This practice can lead to removing large amounts of slag from superheater and generating bank tubes and depositing this slag into the lower furnace which can lead to plugged spouts and difficulty in opening spouts on subsequent start-up. For this reason, it is recommended that the sootblower sequence be stopped and sootblowers be retracted on any boiler master fuel trip condition.

Revise figure 4. for MFT to add this logic. Vernon will check with Everett to see how to revise figures and work on this one.

Sootblower MFT retract and Shutdown

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

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

It should be noted that the Instrumentation Checklist and Classification Guide in APPENDIX A, Section E "Boiler Cleaning System" has the "Automatic soot blower blowing sequence control" listed as Class 1 instruments for tripping the steam and retracting the soot blower on MFT.

They have as comment:

Free operator from other duties.

- We can add: "prevent from worsening a bad situation by dropping more salt cake onto the bed" Sootblower MFT retract and Shutdown

a. It should be noted that the Instrumentation Checklist and Classification Guide in APPENDIX A, Section E "Boiler Cleaning System" has the "Automatic soot blower blowing sequence control" listed as Class 1 instruments for tripping the steam and retracting the soot blower on MFT.

b. They have as comment:
   i. Free operator from other duties.
   ii. We can add: "prevent from worsening a bad situation by dropping more salt cake onto the bed"

Chapter 10.2 Design Item 8. Explosion Relief. (Pg. 72)

The following should be considered when designing dissolving tank explosion relief:

- Dissolving tank vent scrubber bypass damper size and capacity.

- Dissolving tank explosion damper size and capacity.

- Dissolving tank overflow capacity as compared to green liquor pumps and tank water/weak wash make up flows.

- Dissolving tank overflow elevation as compared to tank roof elevation to allow proper explosion venting from tank during heavy smelt runs. Not enough "open area" above tank level will severely limit tank venting capacity and allow more damage and less ability for spout shatter jets to work properly during heavy smelt rushes.

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

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

- On units with a high frequency of heavy smelt rushes; consider adding controls on dissolving tank to mitigate possible damage from heavy smelt runs. Possible but not limited to using green liquor flow, weak wash make-up flow, green liquor density, tank level, green liquor temperature, vent temperature. Usually provide a high ramp rate for pumping capacity increase and weak wash capacity increase during heavy smelt runs.

- Operation guidelines to assist with controlling heavy smelt run periods.

- Maintenance guidelines to assist with keeping the systems in good working condition. Check devices/explosion relief equipment for proper cleaning and operation at every major maintenance outage.

CHAPTER 14 AUDIBLE ALARM AND INDICATING SYSTEM (Pg. 86)

Updated alarm list for items 39 through 49.

- Open item discussion from members and guests. Reviewed Figure 5 as it relates to starting black liquor pumps after email question from Rudy Haraga of PSA. Mark Donahue explained how the logic is supposed to work and will revise the explanation part of our document to clarify how the logic is to work.

External BLRBAC Black Liquor Pump Start Permissives - Clarification.msg

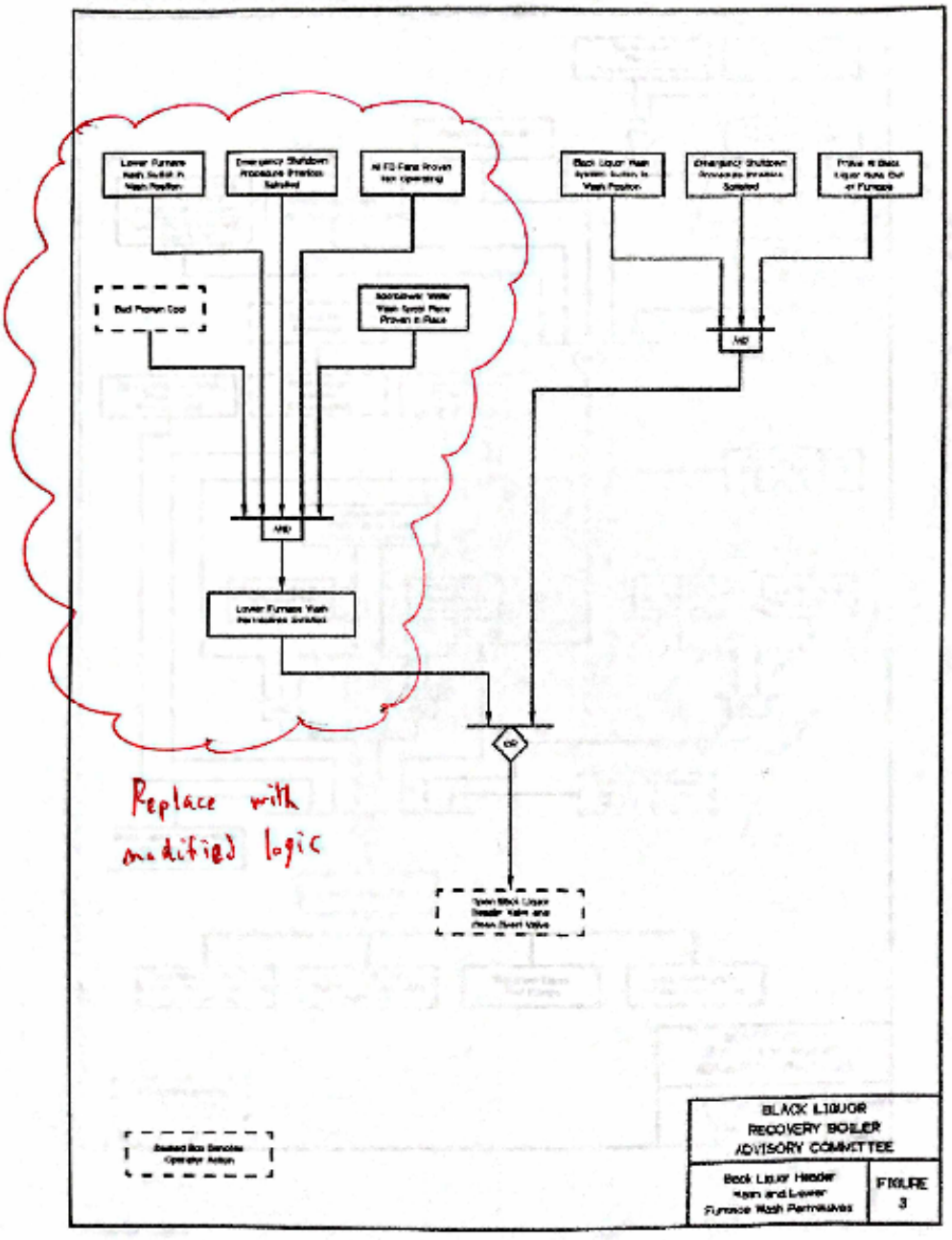


Fig. 3. Black Liquor Header Wash and Lower Furnace Wash Permissives

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

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

- MARK D TO WORK ON KEY LIQUOR WASH LOGIC. PROPOSED CHANGES TO LOWER FURNACE WASH LOGIC WITH OPTIONS TO KEEP BOTH LOGIC SYSTEMS.

- REVISE FOR GUIDEANCE FOR ALL SPOUTS PLUGGED DURING OPERATION. CHAPTER 10 PG 74

The conditions of the last two dissolving tank explosions reported to BLRBAC were a result of continued auxiliary fuel firing when all spouts were plugged. Firing rate should be dependent on bed and spout conditions, with production pressures having minimal impact on the decision-making process. Should a large molten smelt inventory accumulate that cannot be safely removed from the furnace for fear of excessive smelt runoff, operating procedures should exist that instruct operating personnel to shut down the boiler, cool the bed and water wash the material out of the furnace.

- NEW ITEMS & OPEN DISCUSSIONS
  - FIGURE 1-15 REVISION DOCUMENT STATUS
  - GP SPOUT TORCH VIDEO
  - THERMITE EXPLOSION VIDEO
  - U tube smelt reaction videos
  - Discussed safe way to open plugged liquor guns and reduce burn hazard.

5.9 **WASTE STREAMS REPORT** – Paul Seefeld

On October 2, 2017 the Waste Streams Subcommittee met in a closed session at 9:00 AM. There were 8 of 9 members present with 2 guests from member companies. In the afternoon session, there were 8 members and 13 guests present. At the start of both the morning and afternoon sessions the BLRBAC Anti-Trust Statement was reviewed. The April 2017 meeting's minutes were reviewed and unanimously accepted.

Morning (Closed) Session:
Since the previous meeting, there were some minor comments from the Executive Committee regarding the edits to Chapter 6 (liquid waste streams). These changes included the addition of cautionary statements related to environmental regulations and equipment inspection. Instead of trying to push the changes through during the summer, we decided to look over the section again and submit any additional changes to be reviewed, and voted upon in the April 2018 meeting.

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

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

We finished our review of the document by looking through the chip bin source chapter. There were only two items to delete (duplicate notes on two tables). These changes will be documented and submitted for review by the HC along with the changes in the liquid streams chapter. This concludes our *general* document review. Any further updates will be initiated by outside requests or as operating conditions dictate review.

Since the April meeting, there were questions regarding the permissives and interlocks related to introducing CNCG gasses and the disengagement of the continuous igniter. We found that our document clearly addresses these topics, and any attempt at further clarification would probably be more confusing. We decided to highlight the words "and "and "or" in two of the document's tables.

Our next big push will be to get the diagrams updated into an editable form. From the subcommittee chair meeting, it was decided that we could use a MS word based package that IP has employed. We will send one or two of our tables/diagrams to the appropriate person.

Finally, we discussed issuing a questionnaire with the following topics; preference of 30% or 15% MCR permissive on DNCG, who is operating a dedicated chip bid collection system versus combining the source with the DNCG, who has performed a functional (ESP) test on any waste stream systems. This will be crafted before the next session.

Afternoon (Open) Session:

In the afternoon, we reviewed our morning discussions with the visitors. Most of the following conversations were related to operation of chip bin systems and their settings and interlocks. We had visitors from Irving Paper, who are in the process of designing a new DNCG and chip bin collection system and routing it to the recovery boiler. They had a number of questions about design and operation which the subcommittee answered.

The afternoon subcommittee meeting adjourned at 1:59 PM.

MISC:

The subcommittee is going to decide if we want to meet officially only once per year. From the initial discussions, it will likely be in October.

5.10 **WATER TREATMENT REPORT** – Tom Przybylski

Agenda – Morning

- BLRBAC Anti-Trust Statement/Review Action Item List
- Review & Approve October Minutes
- Membership Changes
- Review Edits of the Condensate & Deaerator Sections
- Resume Production of Chemical Cleaning Section

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

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

Agenda – Afternoon

- Continue Production of Chemical Cleaning Section

Item 1: BLRBAC Anti-Trust Policies/Review Action Item List

- Tom Przybylski called the meeting to order around 8:30 am and reviewed the BLRBAC Anti-Trust Policies with attendees. Tom Przybylski quickly reviewed the agenda. There were 15 members in attendance.

Item 2: Review Minutes from October Meeting

- Tom Przybylski noted that the minutes from the fall were sent out for review; albeit last minute. A hard copy was distributed to the group in the morning session for their review. Don Flach motioned to accept the minutes as written. Motion seconded by Jeff Fox and carried.

Item 3: Membership Changes

- Tom Przybylski went through the current membership list and with the group's help modified the list to reflect changes in representation for current participating companies. John McGraw taking Bob Bartholemew's place. Scott Holloway taking Virginia Durham's place.

Item 4: Review Executive Committee Comments to Condensate & DA System Documents

- Tom Przybylski started the proceedings by reviewing the EC comments for sections 5.1.4.6 and 5.1.6.6 of the Condensate document. Tom discussed the intention of 5.1.4.6 may have been misunderstood and Don further commented on the intent. Group proposed no change to 5.1.4.6. Next Tom discussed the section 5.1.6.6 and whether intermittent use applications are included in this section. This section will be left as is. Tom next discussed the question whether sample flowrates need to be referenced in 5.1.6.1 monitoring section. Don asked whether we should include reference to the ASME document. Tom will locate during the break and this will be forwarded to EC for review. Tom made change to "5 ft^2" to read "5 ft./sec." in section 5.1.6.1 and added source as ASME per EC comment request.

- Deaerator section EC comments around NACE addressed next (section 3.1.6.1). Group discussed whether there are other requirements other than NACE that should be included. Don looked it up and there are the National Board and NACE documents available for deaerators. Norris and Don recommended we add reference to the National Board document as well in section 3.1.6.1. Przybylski added "or National Board XXX requirements" to this section. Przybylski made note and will look up the National Board document number at the break. The NACE document has a new update. Przybylski changed section 3.1.6.1 to reflect the updated document (NACE SP0590-2015). Przybylski changed Inspection Techniques section to reflect the new NACE document number and referenced the "National Board System Design, Operation and Inspection of Deaerators" document. Przybylski will pull up ASME document for review after break.

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

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

Item 5: Review Original and Reformatted Chemical Cleaning Documents

- Since last meeting, Kelli Bastarache went through and edited document for formatting consistency with all docs already submitted and published.

- Susan agreed we should keep the formatting with previous documents consistent. Mike and Buck asked if any of the content was changed. Przybylski confirmed that the content was unchanged, only the formatting modified. Fred Call made note that the Monitoring Tools sections numbering is not consistent and recommended sub headings in these sections to further clarify. Tom confirmed the WTSC Audit checklist would support this format as well. Group decided that we need to maintain consistency in formatting and numbering and we will need to review this document once more in the Spring 2018 meeting before sending to EC for comments.

Section 4.3.2 Cleaning Determination Protocol

- Przybylski asked whether the wording in this section was ok as written. Susan proposed "should" be changed to "may". Michael proposed "Critical" be added instead of "Numerous". Buck proposed "Critical" may be too strong. Scott proposed "Critical" be changed to "Key". Norris proposed "planning" be changed to "evaluating". Group accepted these changes and Tom changed document.

- Norris asked what is the difference between 4.3.2 Cleaning Determination Protocol and 4.3.3 Cleaning Criteria. Group agreed section 4.3.3 should be removed as a heading and moved to a new sub section 4.3.2.5. Fred proposed moving sections 4.3.3.1 and 4.3.3.2 into section 4.3.3.3 as one section under Time-Based Criteria and Data-Based Criteria. Group agreed that Section 4.3.3.1 and Section 4.3.3.2 should be removed and info transferred to "Typical Cleaning Criteria" section 4.3.3.3.

Section 4.3.3.3 Typical Cleaning Criteria

- Monitoring Tool #1 – Group discussion on whether the wording dictates that 12-20 g/ft^2 is too strong. Przybylski asked whether we want to include power boilers as well as recovery boilers. Michael and Susan recommended we include power boilers as a note. Fred and Ken made note that the B&W document wording includes both recovery boilers and power boilers in the 12-20 g/ft^2 range. Norris recommended we as a group recommend our own range of deposit weight density and reference the B&W document as a supporting document. Norris asked Ken how B&W came up with the 12-20 g/ft^2 range in their document. Ken and John McGraw noted that it came from a combination of heat transfer coefficients and EPRI. Scott mentioned that our document doesn't include ranges of pressure for different ranges of deposit weight density, but nothing on other factors such as historical upsets, type of water treatment, composition of deposit, etc. Przybylski made note to add B&W document into this section once he receives it on the SharePoint site. Susan asked group if we are okay with just listing the 12-20 g/ft^2 range and reference B&W document PSB-44. Don agrees that

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

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

(Cont.) we should reference the table in the B&W document and move the section that begins "Range because thermal conductivity...." down to below "Reference: B&W PSB-44". The "Range because thermal conductivity…" wording will have to be changed. Przybylski pulled up the B&W document up from the website for review. Group agreed the table info should be pulled straight from the B&W document table and put into our document.

- Norris mentioned there are differences in bead blast method vs. scraping method and that bead blasting method gives a higher reading. Group disagreed that this is the case and that this is outside the scope of this section. Buck noted that there is a paper published documenting the differences between the two test methods. Przybylski made changes to wording of "Range because thermal conductivity…" section.

- Michael and Ray made note that hot side and cold side deposit weight densities can vary dramatically. After checking the NACE and B&W documents, they both refer to the hot side of the tube.

- Susan asked whether we are going to move this section of Monitoring Tools to the section at the end. Group agreed this would be moved to the end of the document with the other monitoring tools.

Break

- Tom pulled up Valmet and B&W papers and group compared these. Jason Miller is searching to see if there is an Andritz paper available. Group agreed that the ranges for each OEM should be included in our document.

- Group review of the ASME document and agreed we should reference this in section 5.1.6.1 section.

- Group discussion on what range do we think is good range to use. It is agreed that 12-20 may be too low and 20-40 g/ft^2. Don recommended we make note that a criterion should be established and then list the different OEM ranges as guidelines. XXX mentioned that some customers are going to a 100% borescope over a 5-year period in lieu of DWD testing as a criterion. Susan mentioned that IP has started using boroscoping as a method to determine where to look for issues.

- Przybylski adding comments based on group input under 4.3.3.3 Monitoring Tool #1 - "Operating companies should develop DWD criteria for establishing a trigger deciding when to clean a recovery boiler. The following are some OEM recommendations for evaluating chemical cleaning needs:". B&W, Valmet, and other OEM's ranges will be included below this. Will include data from Andritz and GE Power once located. Ken and Don mentioned wording in our document needs to be exactly as written in OEM tables. Przybylski asked group if this new comment section should be put under "DWD/Deposit Analysis" section and group agreed.

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

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

- Group discussion on adding comments under "Excursions" section. Michael asked if we should list types of excursions. Group noted that we already list types of excursions in 4.3.2.1 so making note to "see section 4.3.2.1 for some examples of excursion. The severity and duration of the excursion will also need to be considered".

- Group discussion on adding comments under "Tube Failures" section. Przybylski added comment based on group input.

- Group discussion on adding comments under "Borescope Inspection" section. Susan and Fred made note that "Videoscope" should be included in title.

Lunch Break - Tom Przybylski adjourned the meeting for a lunch break, to reconvene at 1:00 p.m.

- Tom Przybylski reviewed the BLRBAC Anti-Trust Statement again when meeting reconvened at 1:00 p.m.

Item6: Continue Review of Chemical Cleaning Section

- Przybylski added Videoscope/borescope in definitions with feedback from group.

- Videoscope (borescope) Inspection section under Monitoring Tool #1 added by Przybylski with feedback from the group. Also created new generic section called "Other non-destructive tests". Group is in disagreement about whether or not to actually list different types of testing. Group decided (with input from the audience) to include types with a disclaimer that they "may" provide tube deposit indication. Fred discussed new videoscope technology abilities with group. Przybylski read through 4.3.3 as re-written and group accepted as written.

4.3.4 Cleaning Options

- Group decided to keep the table. Norris recommended we reference the definitions or remove abbreviations.

- Mike asked whether section 4.3.4.1 Risk Assessment needed to be at the top of the 4.3.4 section. The group decided to move the table down to section 4.3.5.2 "Chemical Cleaning Selection Criteria" and remove section 4.3.4 completely. Group discussed the word "shall" in 4.3.5.1 in regards to taking a tube sample and sending out for analysis prior to cleaning. Decision by group to change to "shall". Przybylski asked group should we mention that tube sample should be taken from high heat zone. Ray asked whether a localized tube sample should be taken when you have an upset condition. Tom asked if the interval and where the

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

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

(Cont.) samples taken should be included in a different section. Already have Quantitative & qualitative data section in previous section 4.3.2.1. Przybylski adding verbiage addressing locations where tube samples should be taken if areas of visible overheat or previous tube failures in thermal conductivity paragraph of Monitoring Tool #1 section.

- Based on feedback from a guest, the group decided to add the word "deposits" to the end of "Tube failures from waterside" statement in section 4.3.2.1.

4.3.5 Chemical Cleaning

- Section 4.3.5.1 – John McGraw gave the ASME reference section number as CRTD-Vol 103. Przybylski added this to the document. Group removed several grammatical mistakes in this section. Added "Once removed, the tube sample should be dry saw-cut. After extraction," and changed "removed" to "handled carefully". Group also added statement "Chemical cleaning labs prefer tube samples that are a least 18 inches in length" to the last paragraph beginning with "Several sections…".

- Section 4 3 5 3 changed "though" to "through".

- Section 4.3.5.4 added "etc." after "nickel/copper alloy".

- Section 4.3.5.5 – guest noted that the waste disposal section just needs to mention waste disposal and not include cost mention. Group agreed that waste disposal is a critical part of the planning process and should be stressed in this document. Przybylski added sentence stressing criticality of this is pre-clean planning process.

- Section 4.3.5.6 – Ken proposed that removal of the deposit be included in this section as a primary concern. Norris and several guests recommended removal of the entire economics section. Buck motioned to remove this section. Seconded by Norris.

- Section 4.3.5.7 – Norris suggested we change name of this section to "Pre-planning" or "Execution". John McGraw suggested "Pre-engineering". Group agreed on "Pre-engineering" for this section name. Fred noticed a "return" needs to be changed to "resuming" in Engineering required paragraph. Don proposed removal of "Length of cleaning" paragraph. After further discussions, this paragraph wording was changed to reflect allocating sufficient time for cleaning and changing paragraph heading from "Length of cleaning" to "Schedule" and the second paragraph removed. Guest recommended adding a section on hydro in this section as well. Group raised the question whether waste disposal needs to be moved down below this section or left above in chemistry selection. Przybylski explained that this is possibly not the place to put the waste disposal mention. Michael proposed we add "Consideration for utilities including electrical, hot and cold water, steam, nitrogen, and instrument air must be reviewed" in this Pre-engineering section. Group agreed and Tom added. Guest recommended "from chemical cleaning waste disposal" added to first Engineering required paragraph sentence.

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

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

- Section 4.3.5.10 – Guest mentioned checking existing piping/valves for leaks prior to the outage is a significant step. Przybylski added wording to section 4.3.5.10 with help from the group.

- Section 4.3.5.8 – Susan asked if the italicized sentence in red is really part of the bid specification. Group decided to highlight this section for future discussion. Ken brought up that the piping sizing needs to be included in the bid specification. Fred asked if the first sentence could be reworded to "A competitive bid package should include". Group agreed and Przybylski made change. Group question raised as to who is responsible to spell out the chemistry needed. This depends on whether there is a consultant involved or only a chemical cleaning contractor. Don and Norris and guest made motion to strike this entire section 4.3.5.8 and 4.3.5.9. Seconded by Jason.

Adjournment

- There being no further new business, Norris Johnston motioned to adjourn the meeting. Jason Miller seconded and motion passed unanimously. Meeting adjourned at 3:31 p.m.

6. **AMERICAN FOREST & PAPER ASOCIATION RECOVERY BOILER REPORT** – Wayne Grilliot (See ***Appendix III*** – Slide Presentation)

No written report submitted.

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

I will tell you a little about TAPPI. Of course, we have a TAPPI meeting for the Energy Recovery & Recaust Committee every spring and every fall just like BLRBAC. The mission of TAPPI is to foster vitality of the global forest products, pulp paper, tissue, packaging and associated industry by delivering unsurpassed technical knowledge, viable networks and professional growth.

We had the Energy Recovery & Recaust Committee, formerly known as Steam & Power Energy Management; we renamed ourselves this year to try to get a little better explanation of what we do in the name. The group includes the Power and Boiler Subcommittee which is the one probably most relevant to this group. We have the Energy Management Subcommittee. We also have Water Treatment which is also a piece of BLRBAC and they are a very important component in the boiler operation. We have the Kilns and Recausting Subcommittee which was added in 2016 which was developed as a need identified by asking the mills what other areas might need to be covered. TAPPI also supports technical programs like PEERS and IDBC. We have the International Biomass Conference this fall as well.

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

The primary activity for the TAPPI Committee Meetings is to work on TIPS (Technical Information Papers), you guys, I am sure, have been very familiar with a lot of these papers which contain technical specialized information on different topics, calculations and discussions on how to build your specifications for the purchasing of various equipment, etc. The information is put together by people knowledgeable in the industry. The technical informational papers are put together a working group. A working group consists of a working group chair, two or more working group members, three of which need to be TAPPI members, and we have that two of the working group members must work for different companies. This is so that we don't have one outfit doing the whole thing. It gives us a broader spectrum and input. There are published guidelines on the TAPPI WEB site on how to go about this process.

Last year we had a lot of new TIIPS published and we are working on several new ones. I'm not going to go through all of these. You can go on the WEB site to access all this information. We are making good progress with a lot of them in the works. We have three other ones we are working on this year.

Up for review this year, we have the Recovery Boiler Energy Efficiency Improvements TIP which is being led by Andrew Jones. Every few years these TIPS come up for review and to be updated to be sure that the information contained therein is accurate and up-to-date.

We have some ideas for TIPS we are looking into. We are always looking for new ideas for TIPS. If you guys want to participate and put together something, just let us know. Right now, we have dissolving tanks operations in response to upset conditions. Then a TIP on smelt spouts will be another one we possibly will be looking into.

In upcoming events, we have PEERS and IBBC coming up here next month, November7th through 9th in Norfolk, VA. The early bird registration closes on Friday. So, we have two more days to get the early bird registration submitted. The committee meetings will be on Monday, November 6th. Right now, we are looking forward to the event. So, I hope you guys will come on out to attend that.

Any questions?

Christ Jackson – Nautilus Loss Control: I would just like to add to what Bentley just said. You don't have to pay the registration to PEERS. The registration is open to anyone who wants to take the trouble in getting to Norfolk, VA. Attending the conference is not a requirement in attending that meeting.

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

No report was given at this meeting.

9. **ACTIVITIES OUTSIDE NORTH AMERICA REPORTS**

No report was given at this meeting.

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

The Operating Problems Session started at 1:00 p.m. on Tuesday afternoon with very good attendance. We had roughly ten questions that were submitted which covered a variety of topics. The most active topic of discussion was regarding the requirements of NFPA 85 verses how the BLRBAC documents provide recommendations. So, certainly I believe that is going to be a topic of conversation that we will continue to move forward with. We also had two presentations from the membership. Evan Slodysko from GP showed a video on spout torches and Jennifer Johnston from GP shared some key learnings from a fatality they had at one of their facilities resulting from a high vacuum incident on an evaporator set. This concludes the Operating Problems Session Report.

CLOSING COMMENTS:

David Slagel - CHAIRMAN: I do have a reminder that we have two Technical Presentations coming up right after the conclusion of this meeting, as follows:

"Analysis of Dissolving Tank Violence" - A review of the AF&PA study.
PRESENTED BY: Frank Navojosky of International Paper

"Reducing Hazard Exposure and Downtime on Recovery Boiler Shutdowns"
PRESENTED BY: Monty Hope of Thompson Industrial Services

One last announcement is that on an interim basis, I'll be moving from the Vice-Chair position into the Chairman position and David von Oepen will move from the Operating member company position to the Vice-Chair position until we get to the vote in the fall of next year for making the next Executive Committee elections. That will leave an opening in the short term in the Operating company's chair; therefore, we will be looking to fill that position within the next couple of weeks. So, we will be exploring recommendations for that position**. Are there any questions regarding that?**

Thank you all for your attendance and your time away from home. Our next meeting is slated for April 9, 10 & 11, 2018, here at the Crowne Plaza Hotel.

This concludes the Main Committee Meeting. I'll now entertain a motion to adjourn? Do I have a second? All in favor? Anybody opposed? Safe travel everyone!

APPENDIX I
INCIDENT LIST
(Insert List)

NO LEAK

FALL 2017-01	
Classification:	
Location:(Mill, city, ST)	**WestRock – Hodge Mill**, 100 Mill street Hodge, LA 71247
Unit:	RB2, Combustion Engineering, 1971, 20370, 2 drums, large economizer
Unit Size:	3.7 MM lb ds/day; 658,000 lb/hr steam at 1250 psig, 900°F, 1475 psig design
Incident Date:	June 24, 2017
Downtime hrs, leak/total	7 hrs
ESP?	Yes – Inadvertent
Leak/Incident Loc:	N/A
How discovered:	N/A
Wash adjacent tube:	N/A
Root cause:	Electrical troubleshooting and replacement of faulty relay.
Leak detection:	None
Bed cooling enhanc	No
Last full inspection:	November 2016
Sequence of events:	• RB2 Tripped on Low Drum Level at 12:20 pm • E&I were notified to assist in resetting the Aquarian High/Low Drum Level Trip. • At 12:55 pm, E&I activated the (CRL51) Relay in attempt to reset the Low/High Drum Level Trip. • ESP was activated at 12:55 pm due to the (CRL51) Relay being activated. • Operations reacted immediately, closing off all Rapid Drain valves to prevent the boiler being drained, as well as maintaining what pressure they could. • E&I located the Aquarian Drum Level Trip (Reset) in the Integrator room. By E&I resetting the correct Drum Level Trip, the original problem was identified. We are making recommendations that all critical instrumentation is labeled properly, to prevent this issue from occurring again. • Conducted the ESP Leak Inspection walk down, per WestRock procedure. The ESP Leak Inspection Walk down consisted of verifying that we did not actually have a tube leak at any location in RB2. • <u>Boiler Inspection Time and Locations - 2:00 pm – 2:55 pm</u> • Floor 15-South Economizer-Dry No noise • Floor 14-West Superheater section-Good both doors • Floor 13-West Superheater section-Good 4 doors • Floor 12-South Bottom of Economizer-Good • Floor 11-Southside-Good • Floor 9 ½ -Brick No Access • Floor 7-Top Extended Economizer-Good • Floor 6-Tertiary Floor-Good • Floor 3rd-Spray Floor-Good • Floor 2nd-Spout Floor-North and South Sides-Good-All Dry • Inspection confirmed that the boiler was free of any leakage and that all the sections were verified dry and safe to fire at 2:55 pm. Established Drum Level at 3:25 pm • Burner in RB2 at- 3:30 pm- Boiler is now being brought up on a startup curve, based on the current boiler pressure. • Boiler is on schedule to be online at 8:00 pm

	• Online at 8:00 pm
Repair procedure:	N/A
Future prevention:	Focus on training, identifying critical electrical equipment, and labeling all critical relays. E&I have already completed their training course with operators and are focused on labeling the remaining relays. An SOP will be developed regarding resetting of drum level devices. An SOP has been established in the case we have another inadvertent ESP on RB2.

ECONOMIZER

FALL 2017– 02	
Classification:	
Location:	**Hood Container of Louisiana, St. Francisville, LA**
Unit:	RB1, 1965, B&W, PR 85, Two drum, economizer, Long-flow economizer Low odor
Unit Size:	3.0 MM lb ds/day; 481, 000 lb/hr steam at 600 psig, 750°F, 675 psig design (MAWP)
Incident Date:	March 7, 2017
Downtime hrs, leak/total	40 hours
ESP?	**No**
Leak/Incident Loc:	Top crossflow economizer header, tube 17 from left wall. Washed tube 16 directly across header
How discovered:	Operator walkdown
Wash adjacent tube:	Yes
Root cause:	Metal fatigue, corrosion, and cyclic stresses imposed on the tube from sootblowing in the area.
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	June 2016
Sequence of events:	• 3/6/17 – 19:30 Operator was making a walkdown and discovered water dripping out of the longflow economizer. Crews removed hopper bottom and the leak appeared to be from a hand hole cap. This unit has a history of hand hole leaks and this seemed to be another one. • 3/6/17 – 20:00 Department manager was notified of the issue. He then instructed the operators to verify that there was no water in the generating bank/crossflow hopper and the ash pipe down to the longflow bottom. The areas were confirmed dry. The operators were instructed to button up the hopper and to continue operating until morning. Frequent rounds were made listening for leaks and checking hoppers. • 3/7/16 – 07:15 Department supervision checked the longflow economizer, generating bank/crossflow hopper, and ash pipe from generating bank hopper, and decided that the leak was from a hand hole cap in the longflow. No sounds from within the boiler indicated a leak. • 3/7/17 – 09:00 Operators were instructed to cease firing liquor and burn the bed out in order to make repairs. • 3/7/16- 12:50 Department management opened inspection doors on the longflow economizer and discovered that water was falling from above. Upon further investigation, it was determined that water was dripping from the duct between the crossflow and longflow economizers. Operators were instructed to cease firing fuel (natural gas), shut down the primary FD fan, close off primary and secondary dampers, and to open tertiary damper wide open. At this time, no bed was present in the furnace. Inspection doors were opened on the top crossflow headers and the leaks were identified. • 3/7/17 – 20:00 LOTO performed on unit and cooling down for repair • 3/8/17 – 17:00 Repairs complete, successful hydro, and unit prepped for startup, then brought on line following warm up curve. • 3/8/17 - 22:00 Liquor fire in boiler

Repair procedure:	Plugged tubes at headers
Future prevention:	A leading edge sootblower was inadvertently installed in the area thus causing undue stress on the tube. The LE sootblower was removed and blowing frequency was reduced. The economizer is scheduled for replacement in 2018.

ECONOMIZER

FALL 2017-03	
Classification:	
Location:	**Domtar, Hawesville, KY, Hwy 1406**
Unit:	#4 Recovery, 1997, Ahlstrom, contract # 59072, 1 drum, large econ.
Unit Size:	2.7 MM lb ds/day; 415,880 lb/hr steam at 1250 psig, 860°F, 1550 psig design (MAWP)
Incident Date:	May 18, 2017
Downtime hrs, leak/total	20hr 58min
ESP?	**No**
Leak/Incident Loc:	Economizer
How discovered:	Walkdown
Wash adjacent tube:	No
Root cause:	Edge of old pad weld. Leak is the eighth similar leak in a weld in the #1 economizer since March of 2009.
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	March 2017
Sequence of events:	On Wednesday May 17th operator was doing shift walkdown at 9:00 and notice water in #1 economizer conveyor. We took off liquor at 9:30 am and located the leak. Plan was made for an orderly shutdown later that night. Liquor was out at 23:10 5/17/17 once it stopped smelting we took fire out at 00:22 5/18/17. We made the repair and passed hydro and lit boiler off at 17:30 PM 5/18/17. Steaming on gas 21:20 and on liquor 22:20.
Repair procedure:	The leak was ground out re-welded.
Future prevention:	N/A

ECONOMIZER

FALL 2017-04	
Classification:	
Location:	**Georgia Pacific, Palatka, Florida**
Unit:	#4 Recovery Boiler, 1976, CE, Contract #22974, 2-drum, long flow economizer
Unit Size:	5.0 MM lb ds/day; 850,000 lb/hr steam at 1250 psig, 900°F, 1500 psig design
Incident Date:	July 3, 2017
Downtime hrs,leak/total	48 hours
ESP?	**No**
Leak/Incident Loc:	Economizer. The leak was from a 1/16" pinhole in the weld of a repair window used to access the plugged tube. The window was installed as a repair for economizer tube following the Andritz repair procedure and material. The window is located on the top economizer header and was installed for tube 50-2.
How discovered:	Operator – normal round
Wash adjacent tube:	No
Root cause:	Porosity – repaired weld
Leak detection:	Yes
Bed cooling enhanc	No
Last full inspection:	June 2016
Sequence of events:	The operator saw a wet area in the rear economizer ash hopper. The operator opened additional doors on the economizer hopper and on the side of the economizer. The operator determined the leak was in the top of the economizer and there was no possibility of spraying back to the generating bank. The boiler was taken down in an orderly manner. One leak was found in the top header of the rear economizer.
Repair procedure:	The window weld was ground and re-welded.
Future prevention:	The mill is developing a plan for economizer replacement

ECONOMIZER

FALL 2017-05	
Classification:	
Location:	**Georgia Pacific, Palatka, Florida**
Unit:	#4 Recovery Boiler, 1976, CE, Contract #22974, 2-drum, long flow economizer
Unit Size:	5.0 MM lb ds/day; 850,000 lb/hr steam at 1250 psig, 900°F, 1500 psig design
Incident Date:	July 27, 2017
Downtime hrs, leak/total	32 hours
ESP?	**No**
Leak/Incident Loc:	Economizer
How discovered:	Operator – normal round
Wash adjacent tube:	No
Root cause:	Porosity in a window weld in an upper mini-header. The leak was a 1/16" pinhole in an existing window weld that was made when plugging tube 63-2 per the Andritz repair procedure. The window is located on the top economizer header.
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	June 2016
Sequence of events:	The operator saw a wet area in the rear economizer ash hopper. The operator opened additional doors on the economizer hopper and on the side of the economizer. The boiler was taken down in an orderly manner. One leak was found in the top header of the rear economizer.
Repair procedure:	The weld defect was ground out and weld repaired.
Future prevention:	The mill has developed and tested a new repair procedure with NDT to verify window weld quality

ECONOMIZER

FALL 2017-06	
Classification:	
Location:	**Georgia Pacific, Palatka, Florida**
Unit:	#4 Recovery Boiler, 1976, CE, Contract #22974, 2-drum, long flow economizer
Unit Size:	5.0 MM lb ds/day; 850,000 lb/hr steam at 1250 psig, 900°F, 1500 psig design
Incident Date:	August 21, 2017
Downtime hrs, leak/total:	36 hours
ESP?	**No**
Leak/Incident Loc:	Rear economizer. The leak was a 1/16" pinhole in a window weld in the upper mini header that was made when plugging tube 58-2 of the rear economizer. A window weld is required as part of the Andritz procedure for plugging a leaking economizer tube. During the hydro, a second leak was found on 34-2 – same conditions and repair
How discovered:	Operator – normal round
Wash adjacent tube:	No
Root cause:	Weld porosity
Leak detection:	Yes
Bed cooling enhanc	No
Last full inspection:	June 2016
Sequence of events:	The operator saw a wet area in the rear economizer ash hopper. The boiler was taken down in an orderly manner. Two leaks were found in window welds in the top mini-headers on the rear economizer.
Repair procedure:	The weld defects were ground out and weld repaired.

Future prevention:	The mill has developed and tested a new repair procedure with NDT to verify weld quality.

ECONOMIZER

FALL 2017– 07	
Classification:	
Location:	**Georgia Pacific, Alabama River Cellulose, Perdue Hill, AL**
Unit:	No. 7 RB, 1978, B&W, 524-0192, 2 drum, large economizer,
Unit Size:	5.4 MM lb ds/day; 697,100 lb/hr steam at 1250 psig, 900°F, 1425 psig design (MAWP)
Incident Date:	May 16, 2017
Downtime hrs, leak/total:	48
ESP?	**No**
Leak/Incident Loc:	Rear economizer, front lower hdr., 14th internal tube from the right wall, just above the header. Failure was circular crack on the internal bend just above the header. We have experienced multiple economizer leaks over the past several years all with similar mechanism (fatigue cracking in heat effected zone).
How discovered:	Operator Rounds
Wash adjacent tube:	No
Root cause:	Fatigue failure. Economizer is at end of life
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	April 2017
Sequence of events:	During a walkdown an operator noticed moisture in the rear economizer hopper. He notified his crew leader. They inspected the generating bank hoppers, and noted no liquid. A manager was notified, and the decision was made to monitor the leak and hoppers with increased frequency. In the morning, the manager walked the boiler and verified there to be minimal possibility of moisture reaching the furnace. The boiler was taken down in a controlled manner
Repair procedure:	Base metal restoration
Future prevention:	Economizer is scheduled for replacement in 2018

ECONOMIZER

FALL 2017– 08	
Classification:	
Location:	**WestRock Mahrt, Cottonton, AL**
Unit:	RB2, 1990, Tampella, Contr. #337, single drum, econ, no DCE
Unit Size:	3.75 MM lb ds/day; 581,800 lb/hr steam at 890 psig, 825°F, 1100 psig design (MAWP)
Incident Date:	May 15, 2017
Downtime hrs, leak/total:	31.5
ESP?	**NO**
Leak/Incident Loc:	Yes/ east economizer. ½ - ¾" circular hole Near toe of fin weld, just above previous leak repair
How discovered:	Operator walkdown
Wash adjacent tube:	No
Root cause:	Erosion/flue gas
Leak detection:	Mass Balance
Bed cooling enhanc	No
Last full inspection:	October 2016
Sequence of events:	Operator found leak on routine walkdown around 3:00 PM, but no water was seen going into generating bank or salt conveyors. Operator reported it to recovery foreman, who began orderly shutdown procedures. Bed was burned out and repairs began soon thereafter
Repair procedure:	Ground hole, welded to repair, PT to ensure good weld
Future prevention:	Platen 24 was plugged off in the June mini-outage to ensure this tube does not leak again.

ECONOMIZER

FALL 2017-09	
Classification:	
Location:	**WestRock, Panama City, Fl.**
Unit:	RB 1 1970, Combustion Eng, Contract 26669 ,Drums - 2, DCE - Cascade, Floor - Decanting
Unit Size:	2.97 MMlb DS/day, 398000 lb/hr steam, 450 PSIG, 750ºF, 570 PSIG Design
Incident Date:	August 9, 2017, 7:20pm
Downtime hrs, leak/total	30hrs
ESP?	NO
Leak/Incident Loc:	Economizer Header Inspection Access, Lower Econ. Header
How discovered:	Boiler Trip, Boiler tripped on low water
Wash adjacent tube:	YES
Root cause:	Fatigue, Small pin hole at the toe of weld on adjacent Vertical Econ tube, Tube with pin hole was coming off header vertically.
Leak detection:	YES
Bed cooling enhance:	NO
Last full inspection:	Mar-17
Sequence of events:	At approximately 7:15pm operator noticed his drum level was lower than normal, Feedwater valve was opening based on what he could see from the control room. Called field operator and E&I to feedwater control valve, to verify. (two days before this event we had an air dryer malfunction and filled the instrument air lines with desiccant dust. Millwide we replaced over 50 ItoP's. First thought from the operator was valve is not opening. 7:20pm Boiler tripped on low water. Valve was checked in the field and determined to be OK. Approximately 7:35pm discussion was had between Foreman and crew to walk boiler down and look for tube leak. 7:50pm leak was found in the lower Economizer section header. Boiler was allowed to cool and prepared for maintenance. After 14 hours of cooling the Economizer section was washed to allow Mech work in the area.
Repair procedure:	The original leak was a small pin hole from the header side toe of the weld. This leak washed 2 adjacent tubes thin and one of those tube burst. With NDT testing the other tube was identified as thin. Both tubes were plugged. The pin hole was ground out to no relevant indication of crack could be found with PT and weld repair completed.
Future prevention:	

ECONOMIZER

FALL 2017-10	
Classification:	
Location:	**International Paper, Vicksburg, MS**
Unit:	RB1, 1967, B&W, PR-105, 2 Drums, DCE Cyclone,
Unit Size:	3.50 MM lb ds/day; 495,000 lb/hr steam at 1000 psig, 750°F, 1150 psig design (MAWP)
Incident Date:	March 31, 2016
Downtime hrs, leak/total	56.5 Hours
ESP?	**YES**
Leak/Incident Loc:	A 1" circ crack in the weld where the tube is welded into the upper header. Leaking tube caused an adjacent tube to rupture (fish mouth). 10th Floor
How discovered:	PPO experienced a RB master fuel trip due to high furnace pressure. He also noticed low drum level. The crew noticed water coming out from the upper economizer and informed PPO to initiate ESP.
Wash adjacent tube:	YES
Root cause:	Suspect manufacturing original weld defect.
Leak detection:	YES
Bed cooling enhance:	NO
Last full inspection:	March 2015
Sequence of events:	On 3/30/2016 at 10:15PM, the Power Plant operator experienced a RB master fuel trip due to high furnace pressure. He also noticed a low drum level. He asked the crew to walk the boiler down to see if there was a tube leak. The operators found water coming out of the upper Economizer and informed the PPO who then initiated an ESP (emergency shutdown procedure) at 10:30PM. The ESP functions worked and the leak was identified to be a crack in the weld where the tube is welded into the upper header. The leaking tube caused an adjacent tube to rupture which caused the sudden increase in furnace pressure and loss of water in the boiler.
Repair procedure:	Plug the ruptured tube. Ground out and repaired original leaking weld
Future prevention:	Increased the economizer inspection during the AO 2016 and Subsequent Major outage inspection of all tubes using PT and X-ray and did not find anything additional.

ECONOMIZER

FALL 2017-11	
Classification:	
Location:	**Georgia Pacific, Naheola Mill, Pennington, AL**
Unit:	1993, Babcock & Wilcox, PR-220, 1-drum, Long-flow, mini-header
Unit Size:	5.4 MM lb ds/day; 883,000 lb/hr steam at 1300 psig, 905°F, 1625 psig design
Incident Date:	February 24, 2017
Downtime hrs, leak/total	52 hrs
ESP?	**No**
Leak/Incident Loc:	Rear economizer, pinhole leak at fin attachment, bank #10, tube #4, elevation 226'
How discovered:	Operator walk down following ID fan oil fire and boiler MFT
Wash adjacent tube:	No
Root cause:	External corrosion
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	September, 2016
Sequence of events:	Oil fire on one ID fan. 2nd ID fan trip causing MFT. During walkdown of boiler after repairs to fan, operator found water coming from economizer hopper. All water sources were investigated and it was concluded that it was a tube leak.
Repair procedure:	Pad weld, GTAW, manual
Future prevention:	Improved cleaning to remove salt cake. Follow-up inspection of area next outage

ECONOMIZER

FALL 2017-12	
Classification:	
Location:	**Georgia Pacific, Toledo Mill, Toledo, OR**
Unit:	#2 RB, 1962, CE, 5959, 2-drum, Cascade evaporator
Unit Size:	1.05 MM lb ds/day; 170,000 lb/hr steam at 600 psig, 750°F, 750 psig design (MAWP)
Incident Date:	May 8, 2017
Downtime hrs, leak/total	30 hrs
ESP?	**No**
Leak/Incident Loc:	Economizer tube, ½" crack in previous weld repair, 1 ½" from the upper header, 2nd tube from the left side.
How discovered:	Operator walkdown
Wash adjacent tube:	No
Root cause:	Fatigue
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	March 2017
Sequence of events:	Water was discovered on the left side buckstay below the upper economizer header. No FW / steam differential. No other indications of a leak existed other than water on the buckstay. Due to the location, the boiler and leak area were monitored for any changes. As the leak progressed the boiler was shut down and the leak was repaired.
Repair procedure:	Ground out crack and weld repaired
Future prevention:	Plans are being made for replacement on the economizer.

ECONOMIZER

FALL 2017-13	
Classification:	
Location:	**Georgia Pacific, Toledo Mill, Toledo, OR**
Unit:	#2 RB, 1962, CE, 5959, 2-drum, Cascade evaporator
Unit Size:	1.05 MM lb ds/day; 170,000 lb/hr steam at 650 psig, 750°F, 750 psig design (MAWP)
Incident Date:	July 10, 2017
Downtime hrs, leak/total	30 hrs
ESP?	**No**
Leak/Incident Loc:	Economizer tube leak, ½" crack in previous weld repair (5/8/17) on 2nd tube from the left end 1 ½' from the upper header.
How discovered:	Operator making rounds
Wash adjacent tube:	No
Root cause:	Weld Failure
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	March 2017
Sequence of events:	Water was discovered on the north side buckstay below the upper economizer header. No FW/ steam differential. No other indications of a leak existed other than water on the buckstay. Due to the location, the boiler and leak area were monitored for any changes. Leak was determined to be small. Boiler was scheduled down 4 days later to repair on 7/10/17.
Repair procedure:	Tube was plugged at both ends
Future prevention:	Plans are being developed for replacement of the economizer.

SUPERHEATER

FALL 2017-14	
Classification:	
Location:	**Verso Corporation, Wisconsin Rapids, WI**
Unit:	RB3, 1989, CE, 86107, 2 drum, DCE - cascade
Unit Size:	1.60 MM lb ds/day; 230,000 lb/hr steam at 1275 psig, 890°F, 1450 psig design
Incident Date:	February 15, 2017
Downtime hrs, leak/total	97.25 hours total
ESP?	**No**
Leak/Incident Loc:	High Temperature Superheater #17 Q-Loop
How discovered:	Operator walkdown, later Hydrostatic Pressure Test
Wash adjacent tube:	No
Root cause:	Previously, a crack on #17 Q-loop was improperly repaired with Weld Overlay Procedure (against Verso Policy), which allowed crack to propagate & created a larger linear crack on the spot repaired section.
Leak detection:	Not equipped
Bed cooling enhance:	Not conducted
Last full inspection:	August 2016 (Annual Outage)
Sequence of events:	Operator suspected leak in Economizer based on loud, roaring noise at 11:30 AM (2/15) & decision was made to pull liquor at 12:00 PM (Noon). Burned out bed. A hydrostatic pressure test ensued thereafter & no leak was found in the Economizer; however, a leak was discovered on in the HTSH section towards the RHSW of boiler on the #17 Q-Loop (Reference Picture). At this point, the boiler was water-washed to allow scaffolding & safe access to repair. There was a ~1" crack on #17 Q-loop on a previously weld-overlayed repair. Acuren UT thickness survey also found 3 other SH tubes at or near T-min (#14 Q-Loop and #17 & #18 P-Loops in HTSH).
Repair procedure:	Dutchmen (Acuren EIP-14 Rev. 1) Replaced Q-Loops w/ 2" SA213 347SS & P-Loops w/ 2" SA213 T22
Future prevention:	Avoid practice of utilizing weld overlay on stainless steel superheaters (per Verso policy)

SUPERHEATER

FALL 2017-15	
Classification:	
Location:	**WestRock, West Point, VA**
Unit:	RB#4,1976, CE, #21975, Drums - 2, DCE - Cascade, Floor - Decanting
Unit Size:	2.7 MMlb DS/day, 427,000 lb/hr steam, 1225 PSIG, 900^{o}F, 1360 PSIG Design
Incident Date:	July 12, 2017, 8:45 am
Downtime hrs, leak/total	107/107
ESP?	YES
Leak/Incident Loc:	Superheater, 4 lower loops on outlet leg of primary superheat failed. Appears to be short term overheat
How discovered:	Control Room, First operator noticed abnormal sound, steam blowing, then he noticed steam to feedwater differential increased from typical 25K lbs/hr to 125K lbs/hr
Wash adjacent tube:	NO
Root cause:	Overheat, Short Term
Leak detection:	NO
Bed cooling enhanc	NO
Last full inspection:	Mar-17
Sequence of events:	At 5:30 pm on July 10th #4 Recovery Boiler experienced a MFT when the hydraulic coupling on the ID fan failed. At the time of the MFT, the boiler had a typical char bed. However, due to the fan failure the boiler was not cooled down as normal following a shutdown. Warm up fire was put into the boiler at 6:30 pm July 11th after being off line for 24 hours. #4 Recovery Boiler came on line @ 12:10 am and was firing liquor @ 2:05 am. Boiler was started up adhering to manufacture's startup curve based off of drum temperature. However, since the boiler was hotter than normally seen following a 24-hour outage the boiler was brought on line using less natural gas guns. At 5:30 am on July 12th the sootblower system was turned off and the leak detection walk down, which is completed once a shift, was performed. No abnormal sounds were identified during the walk down. At 8:30 am on July 12th steam flow to feedwater flow comparison deviated greater than 38k lb/hr, high/high deviation alarm set point. Initially the Recovery Operator thought that the alarm was due to the drum level going high following a header pressure swing. This increase in drum level had caused the feedwater to cut back and then the feedwater swung the other way to catch the drum. Assistant Supt. (OMC) entered the control room at approximately 8:30 am to review a lock out for a scheduled maintenance job. At that time, he was informed of the steam to water deviation alarm. He proceeded to assist in investigating issue. At approximately 8:35 am the first assistant noticed an abnormal sound coming from an area that appeared to be in the vicinity of the load burners elevation. Sootblowers were shut off at 8:40 am. Sound did not go away, however main sootblower flow indication continued to show flow. Individual steam flow meters to odd and even sootblower flow controllers indicated 0 flow. After ESP was initiated it was determined that flow indication (strip chart recorder pin) was stuck. At 8:40 Assistant Recovery Supt. entered the control room. He reviewed with operator drum level (no issues), ID Fan amps (no issues), discussed fact that sootblowers were off but still showed steam flow, abnormal sound coming from area that appeared to be just above the liquor sprays, and steam to water deviation (increasing). At 8:45 am boiler experienced a furnace blow back. At 8:45 am ESP was initiated.
Repair procedure:	Five (5) dutchmen were installed and 1 weld overlay was performed on one loop that was found to be below mill flag but above ASME min wall.
Future prevention:	Startup thermocouples will be added to primary superheat during the next annual outage. In addition, hot restart procedure will be modified to discontinue use of startup curve if boiler has been down more than 8 hours. If boiler has been down more than 8 hours the boiler will be brought on line using the 8-hour curve

SUPERHEATER

FALL 2017-16	
Classification:	
Location:	**International Paper, Bogalusa, LA**
Unit:	RB20, PR-66 (rebuilt as PR-202 in 1980), 1964, B&W, 2 drum, long flow, two cyclone DCE
Unit Size:	2.8 MM lb ds/day; 388,000 lb/hr steam at 852 psig, 825°F, 1050 psig design
Incident Date:	November 2, 2016
Downtime hrs, leak/total:	45 hrs 53 minutes – Steam to Steam (an additional 9 hrs to get on liquor)
ESP?	**Yes**
Leak/Incident Loc:	South wall (left side) -2nd Super Heater – 1st platen-1st tube – about 8" above IK-27 – tube facing the sootblower pass
How discovered:	Mechanic making sootblower round
Wash adjacent tube:	No
Root cause:	Severe condensate damage on the tube from the sootblower (IK-27). (Condensate impingement) Thermal cycle.
Leak detection:	No
Bed cooling enhance:	No
Last full inspection:	March 2016
Sequence of events:	RB 20 was off liquor executing a cyclone boil (Boiler had been off liquor about 15 hrs) on 11/2/16, when a mechanic making IK (sootblower) rounds heard a distinctive noise coming out of IK-27. He contacted and met with the Recovery Operator around 2:30 PM to further investigate. Recovery Operator and Mechanic agreed that it sounded like leak, but could not see any evidence of water. They suspected a Super Heater leak near IK-27. At 2:42PM, Recovery Operator initiated ESP and informed Management of the current situation. Once the Boiler was cooled down and water washed, the leak was suspected to be in a Super Heater tube in IK-27 pass. Once scaffold was installed and entry to the furnace obtained, the tube failure appeared to be caused by severe condensate damage on the tube from the sootblower. A Dutchman of approximately 28" using a SA-210 material was installed at the location of the tube leak (secondary superheater – 1st platen & 1st tube facing IK pass). 2nd platen next to the leak area had a tube shield previously installed that was damaged so a new tube shield was installed during this emergency outage. Dutchman welds were X-ray and passed. Also, a dry hydro was achieved on November 4 at 3AM. The inside scaffold was removed, the boiler was unlocked and put back in service.
Repair procedure:	Replaced tube with 28in Dutchman
Future prevention:	Plan to inspect all IK passes on 2017 March annual outage and perform any necessary repairs. Completed sootblower and steam trap system inspection to eliminate condensate carryover.

SUPERHEATER

FALL 2017-17	
Classification:	
Location:	**International Paper, Bogalusa, LA**
Unit:	RB 21, 1989, Babcock & Wilcox, PR-211, Single Drum, Low Odor, Long Flow Economizer
Unit Size:	3.3 MM lb ds/day; 504,600 lb/hr steam at 850 psig, 825°F, 1050 psig design (MAWP)
Incident Date:	March 7, 2017
Downtime hrs, leak/total:	Annual two-week maintenance outage was moved up two days early
ESP?	**YES**
Leak/Incident Loc:	Sheared rearmost tube in the Secondary Superheater section 30 feet from the roof
How discovered:	Sound of steam venting in the Secondary Superheater section after sootblower steam had been shut off.
Wash adjacent tube:	NO
Root cause:	A broken handcuff style attachment clamp on the #30 Secondary Superheater section failed and allowed six tubes to move into the path of #12 IK sootblower. This allowed a section of the tubes to drop in front of the #12 IK sootblower path and become impacted by the lance tube. The impact caused sootblower IK #12 to become jammed between six (6) tubes located at the front of the Secondary Superheater section, to bend and one (1) to shear just below a welded attachment. The sheared tube was the rear most tube in this section and connects this section to the rear Secondary Superheater section. Metallurgical analysis of the sheared tube sample concluded that it failed from tearing fatigue in the heat affected zone (HAZ) of a welded attachment. The non-uniform microstructure and graphite nodules indicate a reduction of strength from prolonged exposure to elevated temperatures. This graphitization made the tube more susceptible to the fatigue failure. Chemical composition tests indicate that the tube material was carbon steel, which is consistent with what the OEM boiler drawing and the P-3 data form list for this Secondary Superheater section.
Leak detection:	NO
Bed cooling enhance:	Yes, nitrogen and sodium bicarbonate
Last full inspection:	March 2016
Sequence of events:	Secondary Superheater IK #12 did not retract and could not be pulled out of the boiler. Sootblowing steam was shut off, but sound of steam venting in Secondary Superheater section continued. Boiler feedwater and steam production trends did not indicate a problem, an ESP was initiated.
Repair procedure:	Replaced tubes and repair ties
Future prevention:	Add Superheater ties to NDE matrix and improve maintenance around ties

SUPERHEATER

FALL 2017-18	
Classification:	
Location:	**International Paper, Rome, GA**
Unit:	RB5, 1989 Tampella, 254-583, 1-Drum, Long Flow BB, Long Flow Economizers, Low Odor
Unit Size:	5.44 MM lb ds/day; 655k lb/hr steam at 850 psig, 780°F, 1160 psig design (MAWP)
Incident Date:	March 2, 2017
Downtime hrs, leak/total	78hrs
ESP?	**No**
Leak/Incident Loc:	Rupture (fishmouth) and 3" cracks in bend on the 3rd Tube counting from the outside in, on Secondary SH, Platen No. 1.
How discovered:	Operator
Wash adjacent tube:	No
Root cause:	Short term overheat, failed to clear SH Tube
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	October 2016
Sequence of events:	On 3/1/2016 operator was making round and started hearing loud noise at the liquor firing level. He called Front Line Leader to verify what he was hearing. IK's were held and noise continued and the two started ascending the boiler to where the noise was the loudest. The CRO operator reported his drum level was swinging and the steam/water trends separated slightly. The Area Process Manager was notified and investigated by listening and opening doors right at the Secondary SH Area. Vapor was observed at an IK opening and a boiler door was opened 4ft away and it was the audible and visual findings needed to determine it was a superheater leak and the call was made to take the boiler down in a controlled manner.
Repair procedure:	Installed 2 dutchmen on the two trailing tubes to the failed tube to correct the alignment and installed 2 caps at the header on the ruptured tube loop.
Future prevention:	Upon review of start-up procedure there were gaps identified that didn't cover verification that all tubes had blown clear before exceeding 900F. Revised procedure and trends to give operators tools needed to successfully clear SH's on start-up.

SUPERHEATER

FALL 2017-19	
Classification:	
Location:	**International Paper, Pensacola Mill, Cantonment FL**
Unit:	RB1, 1975, B&W, PR171A, 2-DRUM, Tampella economizer
Unit Size:	3.0 MM lb ds/day; 450,000 lb/hr steam at 850 psig,1000°F, 00 psig design (MAWP)
Incident Date:	February 4, 2017
Downtime hrs, leak/total	21hrs 5min
ESP?	**Yes**
Leak/Incident Loc:	Superheater section,
How discovered:	Operator heard a loud noise from 3rd floor gun port and walk boiler down to determine leak location.
Wash adjacent tube:	No
Root cause:	Mechanical damage from sootblower. Overheating of tubes and tie issues resulted in misalignment, also possible that flue gas directed to one side of the boiler.
Leak detection:	Yes
Bed cooling enhance:	No; bed was allowed to cool & bed was probed
Last full inspection:	February 2017
Sequence of events:	• At 8:00pm on 02/04/2017 operators heard a loud noise from inside the control room. • At 8:10pm on 02/04/2017 operators immediately went to 10th floor and started walking boiler down. • At 8:20pm on 02/02/2017 operations had all soot blowers shut down on both recovery boilers to inspect for a possible leak while walking boiler down. • At 8:40pm on 02/04/2017 operators on the 7th floor heard the loud noise coming from inside the boiler to confirm what they were hearing operations open the 7th floor inspection door to confirm that the noise they were hearing was coming from inside the boiler furnace. • At 9:00pm on 02/04/2017 operations return to satellite control room to contact recovery team leader B to confirm what they had found which sound like a tube leak from inside the boiler furnace. • At 9:15pm on 02/04/2017 recovery team leader B initiated ESP on RB1.
Repair procedure:	• Removed tubes with IK rubs. • New outer and inner loops with straight tubes to restore IK lanes. • Side to side spacer tubes replaced where needed. • Back to back tube clamps on hot and cold side of IK lanes. • New T&G ties where needed. • New pac man ties where needed.
Future prevention:	Re-evaluate how we bring boiler up on curve and monitor SH tubes temperatures through Technology support. Tie maintenance. Currently we have review and changed our heat up curve to extend time from a four-hour curve up to 6 hrs. and monitoring SH tubes temperatures not to exceed 900 degrees.

BOILER BANK

FALL 2017-20	
Classification:	
Location:	**ALPAC, Boyle AB Canada**
Unit:	Babcock and Wilcox, 1992, 134-7634, Single drum, One drum external to furnace
Unit Size:	7.3 MM lb ds/day; 1,029,268 lb/hr steam at 900 psig, 850°F, 1150 psig design (MAWP)
Incident Date:	April 21, 2017
Downtime hrs, leak/total	104
ESP?	**Yes**
Leak/Incident Loc:	The tube failure occurred on the generating bank leading edge tube on element 47 approximately 12 inches below the upper header.168ft above the floor
How discovered:	Boiler tripped on high furnace pressure, operator noticed that drum level was dropping faster than previous trips.
Wash adjacent tube:	None
Root cause:	Short term overheating. This episode of short term overheating appears to have been the result of plugging of the superheaters to local channeling of flue gases. The leading edge of the tube was protected by the pluggage from the hot flue gases therefore the rupture was on the trailing face. Also, the result of the elevated flue gas temperature, accelerated drop out of deposits occurred.
Leak detection:	Buckman Recovery Boiler Advisory
Bed cooling enhance:	None
Last full inspection:	Sept 2016
Sequence of events:	April 21st/2017 21:59-First out furnace pressure. Total fuel trip. 22:00-Primary, secondary and tertiary force draft fans tripped out due to high furnace pressure. 22:00-Steam drum level alarms in low level @ -3 inches 22:00-22:06- Shift engineer and control room operators working on stabilizing the plant and consulting with the field technicians. 22:06-The Shift Engineer ESP'd the boiler April 22nd/2017 08:00- Steam Chief assessed boiler conditions and came to the conclusion to allow access to the recovery area. April 22nd-26st – Waterwash/Repairs and inspections completed on the boiler. April 26st: boiler passed hydro @1562psi
Repair procedure:	The failed tube was measured for thickness and bulging above and below the ruptured section. The cutline was established approximately 3 inches below the mini header and approximately 50 inches in length. The original tube material was SA 178 C 0.180 MWT this was replaced with SA 210 A1 0.203 MWT. The new tube was welded in place the butt welds were radiographed and found acceptable.
Future prevention:	Waterwash boiler before excessive fouling occurs. Chemical clean the boiler.

BOILER BANK

FALL 2017-21	
Classification:	
Location:	**Georgia Pacific, Naheola Mill, Pennington, AL**
Unit:	RB 4, 1993, Babcock & Wilcox, PR-220, 1-drum, Long flow, mini-header
Unit Size:	5.4 MM lb ds/day; 883,000 lb/hr steam at 1300 psig, 905°F, 1625 psig design
Incident Date:	June 30, 2017
Downtime hrs, leak/total	31 hrs.
ESP?	**No**
Leak/Incident Loc:	Generating bank sidewall, LHSW @ IK 67, 1 ft. below IK – very small leak in tangent of tube at a membrane weld joint.
How discovered:	Sootblower mechanic inspecting IK 67
Wash adjacent tube:	No
Root cause:	Fatigue crack in membrane weld joint propagated into the tube.
Leak detection:	Yes
Bed cooling enhance:	No
Last full inspection:	September, 2016
Sequence of events:	Mechanic inspecting sootblowers discovered the leak 1 ft. below IK 67. Inspection confirmed the leak was external to the boiler. The bed was burned out and the boiler brought down for repairs.
Repair procedure:	Removed membrane, ground out crack, made a weld repair, and PT the repair. Hydroed the boiler, replaced the membrane, and PTed the membrane welds.
Future prevention:	Wall boxes were all replaced when new sootblowers were installed in 2013-2015. Wall boxes not tied to tubes. Crotch plate inspection is a part of sootblower inspection on each annual outage.

BOILER BANK

FALL 2017-22	
Classification:	
Location:	**International Paper, Red River, Campti, Louisiana**
Unit:	**RB3, Andritz,** 400084, 2007, **Drums**: 1
Unit Size:	6 MM lb ds/day; 916,500 lb/hr steam at 1250 psig, 950°F, 1500 psig design (MAWP)
Incident Date:	August 30, 2016 thru 9/2/2016
Downtime hrs, leak/total	102.17 hrs **ESP:** 12/102.17
ESP?	**Yes,** it was much closer to the nose arch than previously believed, and concluded to perform ESP
Leak/Incident Loc:	~¾ '' crack in wall tube at Gen Bank Sootblower opening G21 on the 10th Floor
How discovered:	Operator while walking down the boiler.
Wash adjacent tube:	**No**
Root cause:	MThermal cycle fatigue, general and localized thermal fatigue cracking due to cyclic temperature (From condensate from the I.K entering the boiler) and causing Thermal cyclic cracking of the closure plate and tube.
Leak detection:	Buckman Chemical System
Bed cooling enhance:	Yes, Nitrogen Gas / Bicarbonate
Last full inspection:	Annual Outage November 2015
Sequence of events:	**1:30 AM –** Operator noticed potential leak on #3 RB he found on a boiler walk down. Water was found coming out of the insulation at an economizer IK. Suspected a poppet valve on an IK could be leaking by. The automatic steam valve was opened to 100% and the leak did not appear to get any better or worse. The automatic steam valve to the east IKs was shut to no effect. After valving out the steam to the individual IK, the leak continued. Operators proceeded to check the IK on the 10th floor directly above it, G21. Audio inspection indicated that the leak was at G21 IK. G21 IK was isolated and the leak continued. The IK above G21 was valved out as well, to no effect. Manual isolation valves to all east sootblowers were closed, again to no effect. The bed did not appear blacked out. An inspection port was opened and no sound could be heard from the furnace. **2:00 AM** – P/R crew met in the control room for a safety meeting and decided to perform an orderly shutdown of the boiler, since G21 was past the nose arch. **2:15 AM –** Initiated orderly shutdown of Recovery Boiler. **2:30 AM –** Reviewed side view drawing of Recovery Boiler and located G21 IK. It was much closer to the nose arch than previously believed, and the decision was made to ESP Recovery Boiler. **2:50 AM** – Initiated ESP for Recovery Boiler
Repair procedure:	Installed a Dutchman
Future prevention:	• Future Prevention Increased soot-blower temperature. • Modified operator checklist to verify, with temperature gun, if the poppet valves are leaking through. • Opened 2" drain valve on each soot-blower supply header to reduce the amount of condensate buildup in header. Total of 10. • Installed thermal drain system in soot-blower condensate lines. • Completed outage in December 2016 and performed inspection on all soot-blowers. (Found 2 additional cracking indications on closure plates at other SB openings (1 in critical area, 1 in non-critical area) • Continue annual soot-blower opening inspections. • Capital project in development for long term solution. (Replacement of all openings)

BOILER BANK SCREEN

FALL 2017-23	
Classification:	
Location:	**International Paper, Orange Mill, Orange, TX**
Unit:	RB2, 1967, B&W, PR-108B, 2 drum, direct contact cyclone evaporator,
Unit Size:	2.7 MM lb ds/day; 254,000 lb/hr steam at 850 psig, 835°F, 975 psig design
Incident Date:	July 21, 2017 6:48 pm
Downtime hrs, leak/total	46 hrs /
ESP?	**Yes**
Leak/Incident Loc:	Rear wall to right side wall at top of gen bank hopper
How discovered:	Operator Boiler walk down
Wash adjacent tube:	Yes
Root cause:	Crack at weld attachment to side wall tube washed rear wall tube
Leak detection:	Yes. Trasar
Bed cooling enhance:	Yes
Last full inspection:	April 2017
Sequence of events:	At approx. 6:45 pm, boiler was firing 200 gpm and steaming 230,000 #/hr. During normal operations walk down of the boiler, operator noticed steam/water coming from the right side wall at the top of the gen bank hopper. After inspection, it was suspected that a side wall tube was leaking and could not be verified if the leak was internal or external. ESP of the boiler was activated at 6:48 pm. There were no observable changes in boiler operation. Feedwater usage was not increased. The Trasar system did not detect the leak but it did confirm it.
Repair procedure:	Repairs were made to the side wall tube by burring out the indication and verifying the indication was removed with dye-penetrate testing. Dye-penetrate testing and x-ray were also done on the weld repair. The rear wall tube was UT tested and pad weld over layed to cover the pin hole and the thin area. The area of the pad weld was 1"x1". The repair was dye-penetrate tested and x-rayed. The area near the leaks was x-rayed for SAC and no issues were found.
Future prevention:	Inspection and scheduled repairs, replace tubes next annual outage

BOILER BANK SCREEN

FALL 2017-24	
Classification:	
Location:	Hood Container of Louisiana, St. Francisville, LA
Unit:	RB1, 1965, B&W, PR85, Two-Drum, Economizer, Long-Flow Economizer Low Odor
Unit Size:	3.0 MM lb ds/day; 481,000 lb/hr steam at 600 psig, 750°F, 675 psig design (MAWP)
Incident Date:	March 28, 2017
Downtime hrs, leak/total	64 hours
ESP?	Yes
Leak/Incident Loc:	Generating bank screen tube, 1 1/4" circular crack, bottom of tube, near drum on screen tube: pin hole leak atop generating bank tube also at drum.
How discovered:	Operator Rounds
Wash adjacent tube:	Yes
Root cause:	Cracking due to stress from sootblowing. Corrosion near drum and fatigue caused by cyclic stress imposed on the tubes due to sootblowing in the area compounded by having inadvertently installed leading edge sootblowers in the area
Leak detection:	No
Bed cooling enhance:	Yes
Last full inspection:	06/09/16
Sequence of events:	3/28/17 15:20 – Operator was performing a walkdown of the boiler with sootblowers halted and noticed water spraying out of an inspection port that was installed during a previous leak. 3/28/17 15:30 – Utilities area manager was notified of a potential leak and crews were instructed to shed load and prepare to ESP the boiler.

	3/28/17 15:50 – Operator initiated an ESP. All systems performed as designed.
Repair procedure:	Tube replacement of screen tube and plugged generating bank tube.
Future prevention:	Future Replacement of Components and removal of leading edge sootblowers

UPPER FURNACE

FALL 2017-25	
Classification:	
Location:	**Augusta, GA**
Unit:	RB3, 1988, Gotaverken, 711-181, 1 Drum, Large Economizer
Unit Size:	5.5 Virg MM lb ds/day; 817,000 lb/hr steam at 900 psig, 900°F, 1110 psig design (MAWP)
Incident Date:	October 14, 2016
Downtime hrs, leak/total	36 Hours
ESP?	**NO**
Leak/Incident Loc:	The leak was on the right hand wall just above the generating bank lower header 100' above the floor on the cold side at the nose arch dead air space
How discovered:	Field operator was making his daily walk down and noticed steam coming from under the boiler insulation
Wash adjacent tube:	No, due to shielding installed by the mill
Root cause:	The membrane weld was terminated on the tube during original manufacture instead of on the membrane. The same type of failure on the left hand side wall on a tube just above the generating bank header in the nose arch dead air space. The failure was repaired in similar fashion and other similar weld terminations were inspected on the subsequent annual outage with no issues found.
Leak detection:	**NO**
Bed cooling enhance:	**NO**
Last full inspection:	March 2016
Sequence of events:	Summary of 10/14/16 Leak Events On 10/14/16 at approximately 7:00 AM the recovery boiler outside operator was performing their daily boiler walk down and noticed steam coming out of the insulation on the boiler on the 8th floor right hand side wall. We then proceeded to get scaffolding erected to access the location of the steam and contacted our onsite insulation company to remove the lagging and insulation to see the leak. Once the leak was exposed it was determined that the leak was external and in the nose arch dead air space at the end of the membrane spraying on an adjacent tube. Mill maintenance personnel were called to fabricate a shield for the adjacent tube to minimize further damage. The mill advised our technology group and decided that due to the location of the leak and being a single drum boiler that there was no way for water to get to the furnace floor, so the unit was left on line until 10/25/16 before repairs were made.
Repair procedure:	The weld repair was made with GTAW (Tig) using 70-S2 wire filler metal, weld repair of tube was finished and the weld metal was "wrapped" around bottom of membrane and terminated on membrane. Final PT was accepted and boiler hydro-tested successfully.
Future prevention:	We basically have increased inspections in this area and looking for other improper weld terminations throughout the boiler.

UPPER FURNACE

FALL 2017-26	
Classification:	
Location:	**International Paper, Bogalusa, LA**
Unit:	RB#20,1980, B&W, PR-202, Drums - 2, DCE - Cyclone, Floor - Decanting
Unit Size:	2.8 MMlb DS/day, 850 lb/hr steam, 825 PSIG, 825^{o}F, 1050 PSIG Design
Incident Date:	May 14, 2017, 4:30 a.m.
Downtime hrs, leak/total	80 Hours
ESP?	YES
Leak/Incident Loc:	Upper Furnace, above air entry, Pinhole with corrosion at observation door membrane
How discovered:	Walkdown, SO1 was inspecting boiler when he heard steam blowing on the 11th Floor. Turned sootblowers off to verify steam sound was not coming from sootblowers.
Wash adjacent tube:	YES
Root cause:	Thinning External, A hole developed in an area where the wall thickness was very thin (0.006"). Based on the lab analysis, corrosion on the outside surface of the tube was the root cause of the wall thinning. Analysis of the scale on the outside surface of the tube indicated high levels of sulfur and sodium.
Leak detection:	NO
Bed cooling enhance	YES
Last full inspection:	Mar-17
Sequence of events:	SO1 was walking the boiler as part of making rounds. He heard an unusual steam sound on the 11th floor. He had the sootblowers turned off to determine if the steam blowing sound was coming from sootblowers. An ESP was initiated right after it was verified the steam blowing sound was not coming from sootblowers
Repair procedure:	Sectioned tubes out with new tubes and membrane wall following BLRBAC Materials and Welding Guidelines
Future prevention:	A tube sample was sent out for lab analysis. Based on the findings the following actions will occur: Upper furnace observation door wall boxes and refractory will be removed for tube inspection/replacement in 2018. Routine inspection of the door opening tubes will be performed on a 3-year interval. The boiler's NDE Matrix was updated to include these items.

UPPER FURNACE

FALL 2017-27	
Classification:	
Location:	**Verso Corp. Androscoggin, Jay, Maine**
Unit:	RB2, 1976, B&W, PR-182, 2 Drum, long flow economizer
Unit Size:	3.0 MM lb ds/day; 365,000 lb/hr steam at 900 psig, 810°F, 1050 psig design (MAWP)
Incident Date:	May 19, 2017
Downtime hrs, leak/total:	42 Hours
ESP?	**Yes**
Leak/Incident Loc:	1. Rear wall (nose arch) tube 30 from the left wall at old hopper seal plate attachment weld. A circumferential crack of approx. 1" long at the toe of the weld. 2. Rear wall (nose arch) tube 29 from the left wall was washed out by the leak on tube 30 and developed a pin hole about 1/16" in diameter.
How discovered:	Operator, Leak detection system & boiler chemistry
Wash adjacent tube:	Yes
Root cause:	SAC
Leak detection:	Buckman Recovery Boiler Advisor
Bed cooling enhanc	Injection of Liquid CO2 into remaining bed
Last full inspection:	June 2016
Sequence of events:	RB2 was operating normally with a steaming rate of 330Klb/hr on liquor (228gpm). Liquor solids were normal at 69%. On 5/19/2017 at 1648 hrs, during normal operator rounds to inspecting/cleaning the mud drum hoppers, the operator heard what he thought was a tube leak at the West hopper. The Operator immediately notified his supervisor of what he was hearing. The operating crew retracted and isolated sootblowers, performed a walkdown of the boiler, reviewed liquor solids trends, reviewed recovery boiler leak detection system and re-ran boiler water tests. Although sound of a possible leak could be heard from both, the East and West hoppers, there was no sound of a leak from the furnace doors, dead air space under the nose arch or the economizer (there was no observation of liquor solids decay. no steam feedwater separation, no initial indication on the leak detection program, no initial indication on boiler water retest). The shift supervisor notified other power plant managers and the boiler water chemistry rep. to assist with the investigation. Operators preformed additional boiler chemistry tests and saw a drop in PO4 and alkalinity. Liquor was also removed from the boiler for a more thorough inspection/better visibility. The mass balance shown on the Buckman leak detection system did begin to present a mismatch, but not enough to trigger an alarm. Another thorough walkdown was performed and at 1727 hrs, a supervisor observed (from the 8th floor level) water spraying toward the gen. bank, near the middle of the boiler at the top of the nose arch. He made an immediate call to ESP the boiler. The ESP was initiated and all functions of the system performed as designed. The ESP checklist was completed, personnel headcount completed, and the boiler was isolated for 4-hour minimum wait period per policy. Floor Thermocouples were monitored and all registered decreasing following the ESP. After a four hour wait period, the boiler was inspected top to bottom. A washed area was confirmed at top of nose arch/mud drum hopper attachment area. Very little bed remained in furnace (between 0-2' wide and 0-2' high in front of each spout and at the corner of the front wall and right hand side wall. The remaining floor area was bare. Bed geometry was mapped and temperatures readings were recorded. Liquid CO2 was used to inject into each area on map. All bed areas were below 800 degrees after 8 hours. CO2 continued to be injected in all areas of the remaining bed until all temperatures were probed and found to be below 500 degrees after 16 hours
Repair procedure:	Weld repair per Verso policy.
Future prevention:	Annual inspection area for SAC. Dutchmen the tubes 29 and 30

UPPER FURNACE

FALL 2017-28	
Classification:	
Location:	**International Paper, Pensacola Mill, Cantonment, FL**
Unit:	RB2, 1975, B&W, PR171B, Two drum, Tampella economizer
Unit Size:	3.0 MM lb ds/day; 450,000 lb/hr steam at 850 psig, 850°F,1000 psig design (MAWP)
Incident Date:	January 13, 2017
Downtime hrs, leak/total:	23hrs 9min
ESP?	**Yes**
Leak/Incident Loc:	West corner side wall water tube external leak to furnace, RHSW junction of generating bank sidewall tie channel-furnace sidewall tiebar. External leak near #26IK.This IK is on the furnace side of the generating bank, near the elevation of the mud drum and just above the transition between furnace nose arch tubes and the mud drum hoppers, after shutting down noise was still heard and lagging and insulation was removed from boiler at 26IK., no leak found. Additional casing removed and moisture spot noted,5''longitudinal indication identified external to furnace.
How discovered:	Leak detection system provided initial alert, then operator investigation of hopper and boiler walk down.
Wash adjacent tube:	No
Root cause:	Where external leak was found is a highly stressed area due to boiler cycles of heating and cooling the various components expand and contract at different rates. Crack caused by high stress. B&W has a technical bulletin out concerning this location of the boiler is highly stressed SAC susceptible area. Due to the fact that this area is the junction of several components. After many boilers cycles of heating and cooling the various components expand and contract at different rates
Leak detection:	Yes
Bed cooling enhanc	Yes, Southland
Last full inspection:	February 2016
Sequence of events:	• At 1:00pm on January 13,2017 the operator observed a yellow visual alarm on the leak detection system and had the field operator investigating for a boiler leak. Area Manager was called and informed of a potential leak. • At 1:10pm Field operator verifies that both mud drum and economizer hoppers are dry with no water present. • At 1:15pm APM contacts Power Reliability Engineer to help with inspection of possible tube leak in boiler. • At 1:20pm during boiler walk down, water was notice near 26IK, with IK's isolated with all steam off, noise was still evident. • At 1:30pm, Power Reliability and APM contacts M&E Manage and Mill Manager. • M&E Manager, Power Reliability Engineer and APM reviewed findings. There was uncertainty as to whether the leak was internal or external to the boiler. • At 2:00pm Boiler was ESP
Repair procedure:	Grind out defect and make pad weld repair. Section replaced 2 months later (March) on annual outage.
Future prevention:	Extensive X-Ray testing in this highly stressed SAC area on future outages. Added to Inspection matrix.

International
UPPER FURNACE

FALL 2017-1156	
Classification:	
Location:	**International Paper, Mogi Mill, Mogi Guaçu-SP**
Unit:	RB#4, 1985, B&W, PR-208, 2 drums w/ DCE
Unit Size:	0,64 MM lb ds/day; 77161 lb/hr steam at 400 psig, 622°F, 550 psig design (MAWP)
Incident Date:	December 31, 2016
Downtime hrs, leak/total:	23 hours from discovery to solving the presented leak.
ESP?	**No,** not needed.
Leak/Incident Loc:	Tube 1 of row 13, boiler bank left side wall, south side, 6th floor.
How discovered:	Field inspection.
Wash adjacent tube:	No.
Root cause:	The leak was caused by a disk grinder in the past. The thicknesses in the region adjacent to the repair presented values above the minimum required by the policy (minimum thickness verified = 4.2 mm).
Leak detection:	Not available.
Bed cooling enhanc	Not used.
Last full inspection:	April/2016.
Sequence of events:	At 4:30 am Dec 31st, 2016, during walk down inspection, humidity was detected by operator on insulation of the south wall near to the boiler bank level (6 ° floor), after removing the insulation and plate it was confirmed external hole in the south wall pipe. After removing the protective plate, a channel (wear) was observed on the side wall tube of the boiler bank with approximately 20 mm long, 4 mm deep and perpendicular to the tube. At this point, we could confirm that the wear was caused by a sander in the past (leak with easy access to close inspection). At 19pm, with the boiler out, depressurized and the tube at 100°C, welding was performed to repair the crack (procedures used are described in section 2 c).
Repair procedure:	Weld repair of defect.
Future prevention:	Contractor communication and procedures alignment.

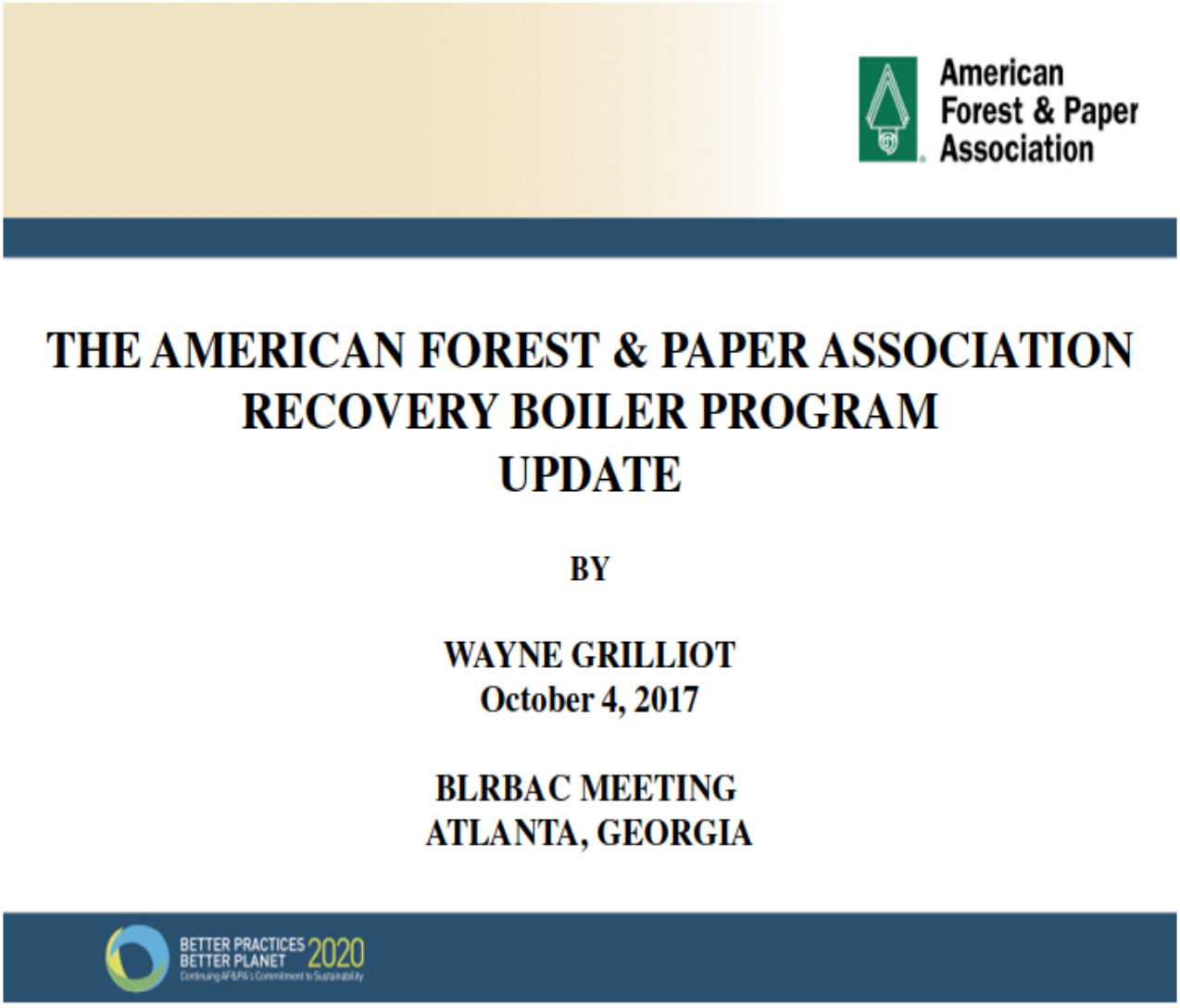
LOWER FURNACE

FALL 2017-1157	
Classification:	
Location:	**International Paper, Mogi Mill, Mogi Guaçu-SP**
Unit:	RB#4, 1985, B&W, PR-208, 2 drums w/ DCE
Unit Size:	0,64 MM lb ds/day; 77161 lb/hr steam at 400 psig, 622°F, 550 psig design (MAWP)
Incident Date:	July 3, 2016
Downtime hrs, leak/total:	27 hours from discovery to solving the presented leak.
ESP?	**No,** not needed**.**
Leak/Incident Loc:	Tube next to the spout of the lower furnace front wall (behind plate of smelt spout box (drawing attached)).
How discovered:	Field inspection.
Wash adjacent tube:	No.
Root cause:	Crack has characteristics indicating crater crack (fatigue). It begins at the end of the weld bead fixing the spout box on the tube.
Leak detection:	Not available.
Bed cooling enhanc	Not used.
Last full inspection:	April/2016.
Sequence of events:	At 1pm June 3rd, the boiler started its heating curve, with one fuel oil burner on, after scheduled outage to caps repair. At 5 pm, during field inspection, an external leak on the front wall was notice with water going between the protective thermal isolation plate of the smelt spout and the front wall was noticed. The boiler pressure was at 16kgf/cm². There was neither bed on furnace nor did any problem appeared on hydrostatic test before startup. To confirm whether or not it could be a leak on the smell spout, nitrite test was performed, resulting in negative result for spout water, the pH of the water leaking was 10.5, being this possibility, then, discarded. At 7pm, with the boiler out and depressurized, the fans were stopped to check air ducts and possible leak in air boxes, also discarded. At 9:50 pm, the fans were turned on to cool inside the boiler, in case it was needed to get inside. A scaffold could be set under the smelt spout box. With an endoscope, it was possible to detect the exact point of leak, the protective thermal isolating plate was cut and welding was performed to repair the crack (procedures used are described in section 2 c).
Repair procedure:	Initial inspection with fluid penetrant at the crack - Total elimination of the crack with rectifies and rotary lime - New Inspection with fluid penetrant for full confirmation of crack - Root welding - New inspection with fluid penetrant - Final Welding - New inspection with fluid penetrant - Inspection by ultrasound on repair - Weld OK -Test Hydrostatic = 30.0 kgf / cm²
Future prevention:	Inspection with replacement of the spout tube panel for the next outage. Inspection will include RT, PT and boroscope of tubes in this area.

APPENDIX II
ESP POWER POINT PRESENTATION

(None - these are embedded in the minutes above)

APPENDIX III
AF&PA
Slide Presentation
(see attachment for presentation)



APPENDIX IV
TAPPI
Slide Presentation
(see attachment for presentation)