BLACK LIQUOR RECOVERY BOILER
ADVISORY COMMITTEE

MINUTES OF MEETING
Crowne Plaza Hotel/Atlanta Airport
Atlanta, Georgia
October 7, 8 & 9, 2013

OBJECTIVE

BLRBAC's objective is to promote improved safety of chemical recovery boilers and their auxiliaries through the interchange of technical knowledge, experience, and data on past and any future recovery boiler incidents.
Bylaws - 2.1

OFFICERS

Chairman:	**Scott Moyer** RockTenn 9469-I Eastport Road	Tel: 904-437-7149 smoyer@rocktenn.com
Vice-Chairman:	**John Gray** Rayonier Performance Fibers 4470 Savannah Highway P. O. Box 2070 Jesup. GA 315998	Tel: 912-588-8213 john.p.gray@rayonier.com
Secretary:	**Mike Polagye** FM Global P. O. Box 9102 Norwood, MA 02062	Tel: 781-255-4730 michael.polagye@fmglobal.com
Treasurer:	**Len Olavessen** LENRO, Inc.	Cell: 901 573 8343 olavessen@aol.com

REGULAR MEMBERSHIP

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

ASSOCIATE MEMBERSHIP

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

CORRESPONDING MEMBERSHIP

A company residing outside of the United States which finds it impractical to attend meetings on a regular basis because of distance and expenses, but desires to be involved and informed of BLRBAC activities.
Bylaws - 3.1

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

EXECUTIVE COMMITTEE

Scott Moyer
BLRBAC Chairman
RockTenn
9469-I Eastport Road
Jacksonville, FL 32218
Tel: 904-437-7149
Cell:
smoyer@rocktenn.com

John Gray
BLRBAC Vice-Chairman
Rayonier
4470 Savannah Highway
P. O. Box 2070
Jesup, GA
Tel: 912-588-8213
john.p.gray@rayonier.com

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

Len Olavessen
BLRBAC Treasurer
LENRO, Inc.
5303 Atascocita Road, #117
Humble, TX 77346
Cell: 90-573-8343
olavessen@aol.com

Don Flach
Operator Representative
Georgia Pacific
2737 N. Derby Ct.
Maricopa, Arizona
Tel: 386-336-5584
don.flach@gapac.com

John Weikmann
Manufacturing Representative
Metso Power
3430 Toringdon Way, Ste. 201
Charlotte, NC 28277
Tel: 704-414-3431
john.weikmann@metso.com

Jimmy Onstead
Insurance Representative
FM Global
5700 Granite Parkway, Suite 700
Plano, TX 75024
Tel: 972-731-1656
jimmy.onstead@fmglobal.com

****

Secretarial Services
Barbara Holich
5500 Irish Spring Street
Las Vegas, NV 89149
Frank's Cell: (630) 269-1005
Barbara's Cell: (630) 640-1805
E-Mail: fhholich@aol.com

****

BLRBAC SUBCOMMITTEES

AUXILIARY FUEL, SAFE FIRING OF
Bruce Knowlen, Chairman
Weyerhaeuser Company
WTC 1B22
PO Box 9777
Federal Way, WA 98063
Tel: 253-924-6434
bruce.knowlen@weyerhaeuser.com

BLACK LIQUOR, SAFE FIRING OF
Vernon Blackard, Chairman (NEW)
International Paper
P.O. Box 1069
Orange Beach, AL 36561
Cell: 251-284-3471
vernon.blackard@ipaper.com

EMERGENCY SHUTDOWN PROCEDURES
John Andrews, Chairman
MeadWestvaco Corporation
5255 Virginia Ave.
North Charleston, SC 29406
Tel: 843-746-8214
john.andrews@mwv.com

FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS
Craig Cooke, Vice Chairman
FM Global
815 Byron Drive
Oconomowoc, WI 53066
Tel: 262-567-7370
craig.cooke@fmglobal.com

INSTRUMENTATION
David Avery, Chairman
Domtar Paper Company
P. O. Box 678
Bennettsville, SC 29512
Tel: 843-454-8937
david.avery@domtar.com

MATERIALS & WELDING
Dave Fuhrmann, Chairman
International Paper
6285 TriRidge Blvd.
Loveland, OH 45140
Tel: 513-248-6954
dave.fuhrmann@ipaper.com

PERSONNEL SAFETY
Robert Zawistowski, Chairman
Power Specialists Associates, Inc.
531 Main Street
Somers, CT 06071
Tel: 860-763-3241, Ext. 135
bob.zawistowski@psaengineering.com

PUBLICITY & NEWS RELEASE
Everett Hume, Chairman
FM Global
1151 Boston-Providence Turnpike
Norwood, MA 02062
Tel: 781-255-4733
Cell: 413-323-6781
everett.hume@fmglobal.com

WASTE STREAMS
Paul Seefeld, Chairman
A.H. Lundberg Associates, Inc.
6174 Kissengen Springs Ct
Jacksonville, FL 32258
Tel: 904-614-6492
paul.seefeld@lundbergassociates.com

WATER TREATMENT
Tom Madersky, Chairman
Power Specialists Assoc. Inc.
531 Main Street
Somers, CT 06071
Tel: 860-763-3241
tom.madersky@psaengineering.com

BLRBAC MEETING SCHEDULE

Spring	**April**	**7, 8 & 9**	**--**	**2014**
Fall	**October**	**6, 7 & 8**	**--**	**2014**
Spring *	**March-April**	**30, 31 & 1**	**--**	**2015**
Fall	**October**	**5, 6 & 7**	**--**	**2015**
Spring	**April**	**4, 5 & 6**	**--**	**2016**
Fall	**October**	**3, 4 & 5**	**--**	**2016**

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

■ Past Chairman Lon Schroeder

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*Changed by Executive Committee Member from previously posted dates due to religious holiday.

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

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

BLRBAC MEETING NOTICE

COVER LETTER — General Information

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

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

SCHEDULE — List of subcommittee activities on Monday and Tuesday

AGENDA — Reports given to Joint BLRBAC Meeting on Wednesday

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

Mrs. Barbara Holich
BLRBAC Secretarial Services
5500 Irish Spring Street
Las Vegas, NV 89149

Frank's Cell Phone: 630-512-0144
Barbara's Cell Phone: 630-640-1805
fhholich@aol.com

These are available at the **BLRBAC INTERNET ADDRESS**:

www.blrbac.org

BLRBAC Guidelines & Recommended Practices

LEGAL NOTICE

Waste Stream Incineration
(Dated: February 2012)

Emergency Shutdown Procedure
(Dated: October 2012)

Safe Firing of Black Liquor in Black Liquor Recovery Boilers
(Dated: October 2012)

Materials & Welding Guidelines
(Dated: February 2012)

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

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

Personnel Safety & Training
(Dated: February 2012)

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

Post ESP Water Level
(Dated: January 2005)

Checklist and Classification Guide for Instruments and Control Systems
(Dated: February 2012)

Post ESP Guidelines
(Dated: October 2002)

If you have any questions, contact:

Mike Polagye
BLRBAC Secretary
FM Global
P. O. Box 9102
Norwood, MA 02062

Phone: 781-255-4730
michael.polagye@fmglobal.com

AUXILIARY FUEL SUBCOMMITTEE

‡**Bruce Knowlen – Chairman**
Weyerhaeuser Company
P. O. Box 9777 / WTC-1B22
Federal Way, WA 98063-9777
Tel: 253-924-6434
bruce.knowlen@weyerhaeuser.com

‡**Chad Harrod – Vice Chairman** Georgia Pacific Cellulose Brunswick Cellulose, Inc. PO Box 1438 Brunswick, GA 31520 Tel: 912-265-5780 x7757 chad.harrod@gapac.com	**Allen L. Ray – Secretary** Barron Industries, Inc. 105 19th Street South Birmingham, AL 35210 Tel: 205-956-3441 aray@processbarron.com	‡**Tom DeBeer** Chartis Insurance 5001 Willow Creek Drive Woodstock, GA 30188 Tel: 678-494-6026 Cell: 404-218-8613 thomas.debeer@aig.com
Lino DiLeonardo Zurich 400 University Ave., 16th Floor Toronto, ON M5G 1S7 Tel: 519-824-4548 lino.di.leonardo@zurich.com	‡**Kevin R. Huelsbeck** FM Global Property Insurance Midwest- Chicago Ops N8955 Willow Lane Menasha, WI 54952. Cell: 920.205.5529 kevin.huelsbeck@fmglobal.com	‡**Greg Kornaker** Babcock & Wilcox Company P. O. Box 351 Barberton, OH 44203-0315 Tel: 330-860-2009 gjkornaker@babcock.com
‡**Nick Merriman** Andritz Waagner-Biro-Platz 1 8074 Raaba/Graz, Austria Tel: +43-316-501-2810 Cell: +43-676-89-501-2810 nicholas.merriman@andritz.com	**Joe Proterra** Proterra-Power, LLC 3382 Harbour Point Pkwy. Gainesville, GA 30206 Tel: (home) 770-297-7688 Cell: 678-296-1805 jproterra@yahoo.com	‡**Ivan Semyanko** Alstom Power, Inc. 200 Day Hill Road Windsor, CT 06095 Tel: 860-285-3953 ivan.semyanko@power.alstom.com

‡ Denotes attendance at meeting in October of 2013

EMERGENCY SHUTDOWN PROCEDURES SUBCOMMITTEE

‡ **John Andrews – Chairman**
MeadWestvaco
2347 MacLaura Hall Avenue
Charleston, SC 29414
Tel: 843-509-4926
FAX: 843-740-2206
E-mail: john.andrews@mwv.com

‡ **Shawn Casey** Paper Excellence 3838 Port Mellon Highway Port Mellon, BC V0N 2S0 Tel: (604) 884-2712 Fax: (604) 884-2178 shawn.casey@hspp.ca	‡ **Scott Crysel** FM Global 5700 Granite Parkway, Suite 700 Plano, TX 75024 Tel: (972) 731-1658 Fax: (972) 731-1820 scott.crysel@fmglobal.com	‡ **James Franks** XL GAPS 855 Dogwood Road Somerville, TN 38068 Tel: (901) 465-0771 Fax: (888) 964-7348 James.Franks@xlgroup.com
‡ **Julius (Jules) Gommi** GommiTech 25804 214 Avenue SE Maple Valley, WA 98038 Tel: (425) 432-0867 Cell: (206) 930-1195 (no Fax) j.gommi@comcast.net	‡ **John Harmon** Alstom Power Inc 200 Great Pond Drive Windsor, CT 06095 Tel: (860) 285-4436 Fax: (860) 285-2872 john.m.harmon@power.alstom.com	‡ **Chris Jackson** Nautilus Loss Control 1362 11th Court, Fox Island, WA 98333 Tel (253) 303-0289 Cell (503) 840-5775 chris.jackson44@comcast.net
‡ **John A. Kulig** Babcock & Wilcox Company P. O. Box 351, BTAD2A Barberton, OH 44203-0351 Tel: (330) 860-6438 Fax: (330) 860-9427 jakulig@babcock.com	‡ **Wayne MacIntire** International Paper Co 6283 Tri-Ridge Blvd Loveland OH 45140-7810 Tel: (513) 248-6834 Fax: (901) 214-0894 wayne.macintire@ipaper.com	‡ **Karl Morency – Vice Chairman** Georgia-Pacific 133 Peachtree Street NE Atlanta, GA 30303 Tel: (404) 652-4629 Fax: (404) 654-4748 ktmorenc@gapac.com
‡ **John Phillips** Andritz Inc. 1115 Northmeadow Parkway Roswell, GA 30076 Tel: (770) 640-2434 Fax: (770) 640-2521 john.phillips@andritz.com	‡ **David Slagel** Weyerhaeuser Co. 1 Bonneybridge Road Port Wentworth, GA 31407 Tel: (912) 966-4312 Fax: (912) 966-4324 david.slagel@weyerhaeuser.com	‡ **John Weikmann** Metso Power 3430 Toringdon Way, Suite 201 Charlotte, NC 28277 Tel: (704) 414-3431 Fax: (704) 541-7128 john.weikmann@metso.com

‡ Denotes attendance at meeting October 2013

Andrews Casey Crysel Franks Gommi Harmon Jackson
Kulig MacIntire Morency Phillips Slagel Weikmann

FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS AND ASSOCIATED EQUIPMENT SUBCOMMITTEE

‡**Craig Cooke** - Chairman
FM Global
815 Byron Drive
Oconomowoc, WI 53066
Tel: 262-567-7370
craig.cooke@fmglobal.com

Phil Ramsey - Vice-Chairman Kapstone Paper P. O. Box 118005 Charleston, SC 29423-8005 Tel: 843-745-3480 phil.ramsey@kapstonepaper.com	**Randy Baker** Buckeye Technologies One Buckeye Drive Perry, FL 32348 Tel: 850-584-1380 randy_baker@bkitech.com	**Robert Goddard** XL Group 129 Drive 1143 Tupelo, MS 38804 Tel: 662 844-5897 robert.goddard@xlgroup.com
‡**Michael Hollern** New Page Corporation 300 Pratt Street Luke, MD 21540 Tel: 301-359-3311, Ext. 3280 mfh3@newpagecorp.com	‡**Kevin Huelsbeck** FM Global Property Insurance Midwest-Chicago Ops N8955 Willow Lane Menasha, WI 54952 Tel: 920-205-5529 kevin.huelsbeck@fmglobal.com	**Nick Merriman** Austrian Energy & Environment Graz, Austria Tel: +43 316 501-2810 nicholas.merriman@aee-austria.at
Daniel Nesmith Kapstone P.O. Box 118005 Charleston, SC 29423-8003 Tel: daniel.nesmith@kapstonepaper.com	**Christopher Skorton** Kapstone P.O. Box 118005 Charleston, SC 29423-8003 Tel: 843-745-3242 christopher.skorton@kapstonepaper.com	‡**Alarick Tavares** Georgia-Pacific 133 Peachtree St. NE Atlanta, GA 30303 Tel: 404-652-4606 najtavare@gapac.com
Jim Taylor Graphic Packaging International P. O. Box 20700 1701 Jefferson Parkway Pine Bluff, AR 71612 jim.taylor@graphicpkg.com		

‡ Denotes attendance at meeting in October of 2013

.PUBLICITY & NEWS RELEASE SUBCOMMITTEE

‡**Everett Hume – Chairman**
FM Global
1151 Boston-Providence Turnpike
Norwood, MA 02062
Tel: 781-255-4733
Everett.hume@fmglobal.com

‡Denotes attendance at meeting in October of 2013

INSTRUMENTATION SUBCOMMITTEE

‡**David Avery – Chairman**
Domtar Paper Company
PO Box 678; Bennettsville, SC 29512
Tel: 843-454-8937
david.avery@domtar.com

‡**Rick Matarrese – Sec** FM Gobal 655 Engineering Dr. #300 Norcross, GA 30092 Tele: 770-777-3684 rick.matarrese@fmgobal.com	**David T. Boudreau** SAPPI (S.D. Warren Company) 1329 Waterville Road Skowhegan, ME 04976 Tel: 207-238-7502 dave.boudreau@sappi.com	**John Browning, Jr** Alabama River Cellulose Georgia Pacific P.O. Box 100 Perdue Hill, AL 36470 Office: (251) 743-8336 Cell: (251) 593-6096 Cell: (251) 593-6254 john.browning@gapac.com
William Camp International Paper Company 100 Jensen Rd Prattville, AL 36067 Tel: 334-361-5620 bill.camp@ipaper.com	‡ **John Cover** John E. Cover Engr., Inc. P.O. Box 35010 5425 Caldweld Mill Road Birmingham, AL 35236-6010 Tel: 205-991-7106 coverj@asme.org	‡ **Michael Kiper** International Paper Co. 6285 Tri-Ridge Blvd. Loveland, Ohio 45140 Tel: 513-248-6517 michael.kiper@ipaper.com
‡**Bruce Knowlen** Weyerhaeuser Company WTC1B22 P. O. Box 9777 Federal Way, WA 98063 Tel: 253-924-6434 bruce.knowlen@weyerhaeuser.com	‡**Gregory J. Kornaker** Babcock & Wilcox Power Generation Group, Inc. 20 South Van Buren Avenue P.O. Box 351 Barbenton, OH 44203-0351 gjkornaker@babcock.com	‡**Alan LaFlamme** Lincoln Paper & Tissue LLC 50 Katahdin Avenue P. O. Box 490 Lincoln, ME 04457 Tel: 207-794-0685 alaflamme@lpandt.com
‡**Eladio Ruiz de Molina** CORR System, Inc. 3026 Overhill Road Birmingham, AL 35223 Tel: 205-879-4382 eladiordm@aol.com	**Dan Mott** Irving Pulp & Paper Ltd. P. O. Box 3007, Station B Saint John, NB, E2M 3H1 Canada Tel: 506-632-4149 mott.dan@irvingpulp.com	‡**Andy Smith** Global Risk Consultants 2971 Flowers Road. South Atlanta, GA 30341 Tel: 770-451-8056, Ext. 308 **andysmith@globalriskconsultants.com**
‡ **Harri Soderlund** Andritz 1115 Northmeadow Parkway Rosewell, GA 30076 Tel: 770-640-2409 Cell: 678-644-9882 **harri.soderlund@andritz.com**	**Jari Sopanen** Jari Consultoria de Automacao Ltda Rua Rio Grande do Sul, 505 Agua Verde, Curitiba Brazil 80620-080 Tel:+55413244-7059 jari@jariautomation.com	‡ **Gordon L. Vandenburg** Liquid Solids Control, Inc. P.O.Box 259, Farm St. Upton, MA 01568 Tel: 508-529-3377 gordie@liquidsolidscontrol.com
‡**C.A. Vossberg** Electron Machine Corp. P.O.Box 2349 Umatilla, FL 32784 Tel: 352-669-3101 ca@electronmachine.com		

‡ Denotes attendance at the meeting in October 2013

MATERIALS & WELDING SUBCOMMITTEE

Dave Fuhrmann – Chairman
International Paper
6285 TriRidge Blvd.
Loveland, OH 45140
Tel: 513-248-6954
dave.fuhrmann@ipaper.com

‡**Jesse Worsham - Co Chair** Domtar Paper Marlboro Mill P. O. Box 678 Bennettsville, SC 29512 Tel: 843-479-0200, Ext. 8879 jesse.worsham@domtar.com	**Lynn Barrett** Zampell Refractories 6801 Parke East Blvd. Tampa, FL 33610 Tel: 770-714-9125 lbarrett@zampell.com	**Jennings Bird** Metso Tel: 803-235-9091 jennings.bird@metso.com
‡**George Bodman** 13 Kingwood Villas Court Kingwood. TX 77339 Tel: 800-286-6069 or 281-359-4006 Cell: 713-557-2118 blrclgdr@aol.com	**Yurij Duda** **Savcor** yurij.duda@savcorinc.com	‡**Dave Duplissey** National Boiler Services 176 North Industrial Drive Trenton, GA 30752 Tel: 706-657-6200 dduplissey@nationalboiler.com
John Hefferman Zampell Refractories 262 Titus Avenue Warrington, PA 18976 Tel: 215-491-9300 jheffernan@zampell.com	**Fabian Henriques** Power Specialists Assoc. 531 Main Street Somers, CT 06071 Tel: 614-440-4284 fabian.henriques@psaengineering.com	‡**Dennis Hollenbach** Alstom Power 2000 Day Hill Road Windsor, CT 06095 Tel: 860-285-9140 dennis.hollenbach@power.alstom.com
‡**Michael Hollern** New Page Corporation 300 Pratt Street Luke, MD 21540 Tel: 301-359-3311, Ext. 3280 Cell: 301-802-2470 mfh3@newpagecorp.com	‡**Mark Hovinga** Babcock & Wilcox 20 S. VanBuren Avenue Barberton, OH 44203-0351 Tel: 330-860-6434 mnhovinga@babcock.com	‡Terry Lane Georgia Pacific 4559 Lenora Drive Gardendale, AL 350072 Tel: 412 506 8168 terry.lane@gapc.com
‡**Dave Lang** FM Global P. O. Box 1567 Little Elm, TX 75068 Tel: 972-731-1882 david.lang@fmglobal.com	‡**Mark LeBel** Andritz 1115 Northmeadow Parkway Rosewell,GA 30076-3857 Tel: 770-640-2643 Cell: 678-577-8613 mark.lebel@andritz.com	‡**Bingtao Li** Aquilex - WSI 2225 Skyland Court Norcross, GA 30071 Tel: 678-431-5163 bli@aquilex.com
Michael Lykins Packaging Corp. of America 1061 Woodcliff Drive South Elgin, IL 60177 Tel: 630-384-5272 Cell: 630-659-7115 mlykins@packagingcorp.com	‡**Mike Mesamore** National Boiler Trenton, GA Tel: 706-657-1584 Cell: 205-908-9829 mmesamore@nationalboiler.com	**Max Moskal** M&M Engineering 11020 W. 72nd Street Indiana Head Park, IL 60525 Tel: 708-784-3564 max_moskal@mmengineering.com

‡ Denotes attendance at meeting in October 2013

MATERIALS & WELDING SUBCOMMITTEE

Ron Lansing - Alternate M&M Engineering 14405 SE Ellis Str. Portland, OR 97236 Tel: 503-706-8124 **ronald_lansing@mmengineering.com**	**Joe Nelson** Georgia-Pacific 4559 Lenora Drive Gardendale, AL 350072 Tel: 205-31-6457 Cell: 770-339-7924 **jgnelson@gapac.com**	**Dan Phillips** Wesco Welding Engineering Services Portland, Oregon 97062 Tel: 503-720-9270 **phillipsdan@comcast.net**
‡**Bob Roy** RMR Mechanical P. O. Box 170 Cumming, GA 30028 Tel: 770-205-9646 **bob.roy@rmrmechanical.com**	**Douglas Singbeil** FPInnovations - Paprican 3800 Wesbrook Mall Vancouver, BC V6S 2L9 Tel: 604-222-3254 Cell: 604-839-3254 **douglas.singbeil@fpinnovaions.ca**	

‡ Denotes attendance at meeting in October of 2013

PERSONNEL SAFETY SUBCOMMITTEE

‡Robert E. Zawistowski - Chairman
Power Specialists Assoc., Inc.
531 Main Street
Somers, CT 06071
(860) 763-3241, ext. 135
bob.zawistowski@psaengineering.com

Ken Baker RockTenn Company P.O. Box 100544 Florence, SC 29501-0544 Tel: 843-269-0179 kbaker4@rocktenn.com	**‡Steve Bogart** Weyerhaeuser 3401 Industrial Way P. O. Box 188 Longview, WA 98632 Tel: 360-414-3337 steve.bogart@weyerhaeuser.com	**‡John Fredrickson** Sappi Fine Paper NA 2201 Avenue B P.O. Box 511 Cloquet, MN 55720 Tel: 218-878-4378 john.fredrickson@sappi.com
‡Robert Fry Northern Pulp P.O. Box 549, Station Main 260 Abercrombie Branch Road New Glasgow, NS B2H 5E8 Tel: 902-752-8461, ext. 206 robert.fry@northernpulp.com	**‡Wes Hill** Georgia-Pacific Corporation 410 NE Adams Street Camas, WA 98607 Tel: 360-834-8434 wes.hill@gapac.com	**‡Daryl Hoffman** FM Global Granite Park Two, 5700 Granite Parkway, Suite 700 Plano, TX 75024 Tel: 972-731-1978 daryl.hoffman@fmglobal.com
‡Jennifer Johnston Georgia-Pacific Corporation 133 Peachtree St., NE Atlanta, GA 30303 Tel: 404-652-4632 jennifer.johnston@gapac.com	**Michael Kaiser** International Paper Company 275 Muscogee Road Contonment, FL 32533 Tel: 850-968-3014 michael.kaiser@ipaper.com	**‡Randy Lombardi** Babcock & Wilcox Company 20 S. Van Buren Avenue Barberton, OH 44203-0351 Tel: 330-860-2028 rllombardi@babcock.com
Louis Mangelli Diamond Power International, Inc. P.O. Box 40145 Baton Rouge, LA 70835-0145 Tel: 225-907-8185 lmangelli@diamondpower.com	**‡Jason Miller** Boise Paper 4200 Highway 190W P.O. Box 1060 DeRidder, LA 70643 Tel: 337-462-4054 jasonmiller@BoisePaper.com	**Frank Navojosky** International Paper Cincinnati Technology Center 6283 Tri-Ridge Blvd. Loveland OH 45140-7910 frank.navojosky@ipaper.com
‡William Plappert, Jr Glatfelter 228 South Main Street Spring Grove, PA 17362 william.plappert@glatfelter.com	**‡John Stelling** Packaging Corporation of America N. 9090 County Road E. Tomahawk, WI 54487 Tel: 715-453-2131, ext. 309 jstelling@packagingcorp.com	**Brian Fiala - Alternate** Packaging Corporation of America N. 9090 County Road E. Tomahawk, WI 54487 Tel: 715-453-2131, ext. 551 bfiala@packagingcorp.com
Chris Suresh Domtar Paper Company, LLC 100 Kingsley Park Drive Fort Mill, SC 29715 Tel: 803-802-8325 chris.suresh@domtar.com	**Arthur G. Thomson** Domtar Pulp & Paper Products, Inc. P.O. Box 800 2005 Mission Flats Road Kamloops, BC V2C 5M7 Tel: 250-828-7372 art.thomson@domtar.com	**‡David Von Oepen** Rock-Tenn 28270 U.S. Highway 80 West Demopolis, AL 36732-5121 Tel: 334-289-6315 dvonoepen@rocktenn.com

‡ Denotes attendance at meeting in October of 2013

SAFE FIRING OF BLACK LIQUOR SUBCOMMITTEE

‡**Mark Sargent – Chairman (Retiring)**
International Paper
6283 Tri-Ridge Blvd.
Loveland, OH 45140-7910
Tel: 513-248-6086
mark.sargent@ipaper.com

Clif Barreca Weyerhaeuser P. O. Box 1391 New Bern, NC 28563 Tel: 252-633-7696 **clif.barreca@weyerhaeuser.com**	‡**Joe Bush** Alstom Power 1119 Riverfront Parkway Chattanooga, TN 37402 Tel: 423-752-2931 Cell: 423-619-8123 **joe.bush@power.alstom.com**	‡**Vernon Blackard (new Chair)** International Paper P.O. Box 1069 Orange Beach, AL 36561 Cell: 251-284-3471 **vernon.blackard@ipaper.com**
Raul Das Buckeye Technologies One Buckeye Drive Perry, FL 32348 Tel: 850-584-1514 Cell: 850-672-2326 **raul_das@bkitech.com** **raul_das@comcast.net**	‡**Mark Donahue** Fossil Power Systems, Inc. 10 Mosher Drive Dartmouth, NS B3B 1N5 Canada Tel: 902-468-2743, Ext. 238 Cell: 902-468-2323 **donahuem@fossil.ca**	‡**Len Erickson** Boise, Inc. P. O. Box 50 Boise, ID 83728-0001 Tel: 208-384-4933 **lenerickson@boiseinc.com**
‡**Majed Ja'arah** Verso Paper 6775 Lenox Center Court Suite 400 Memphis, TN 38115 Tel: 901-317-5589 **majed.jaarah@versopaper.com**	‡**Guy Labonte** FM Global 600 de la Guachetiere Ouest, 14th Floor Montreal, Que H3B 4L8 Canada Tel: 514-876-7412 Cell: 514-942-3651 guy.labonte@fmglobal.com	‡**Scott Moyer** RockTenn 9469-I Eastport Road Jacksonville, FL 32218 Tel: 904-531-9394 Cell: 386-227-8991 smoyer@rocktenn.com
Doug Murch MeadWestvaco 11013 West Broad Street Glen Allen, VA 23060-5937 Tel: 804-327-5245 Cell: 513-288-5750 **douglas.murch@meadwestvaco.com**	**Bob Phelps** Extra Hand, Plant Support Services 5440 Karma Road Chester, VA 23831 Ph. (804) 921-7374 Cell: 804-748-4391 **robert.pheleps1@verison.net**	‡**Aaron Rose** Georgia-Pacific 133 Peachtree St. NE P.O. Box 105605 Atlanta, GA 30348-5605 Tel: 404-652-2968 Cell: 770-596-7704 **aaron.rose@gapac.com**
‡**Alvaro Timotheo** Andritz Pulp & Paper 1115 Northmeadow Parkway Roswell, GA 30076-3857 Tel: 770-640-2642 Cell: 770-630-4577 **alvaro.timotheo@andritz.com**		

‡ Denotes attendance at meeting in October of 2013

WASTE STREAMS SUBCOMMITTEE

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

Mark E. Cooper FM Global 550Birmard St., Ste. 1788 Bentall 5 Vancouver, BC V6C2B5 Tel: 604-694-8262 Cell: 425-877-9735 mark.cooper@fmglobal.com	**Wendy Coyle** International Paper 7600 Highway 10 West Pine Hill, AL 36769 Office: 334-963-2362 Cell: 541-285-1867 wendy.coyle@ipaper.com	‡**Meville Hedges** Babcock & Wilcox 2302 Parklake Drive, NE Suite 300 Atlanta, GA 30345 Tel: 770-621-3907 mhedges@babcock.com
Arnie Iwanick Harris Group Inc 1750 NW Naito Parkway Portland, OR 97209-2530 Tel: 503-345-4516 arnie.iwanick@harrisgroup.com	‡**Olli Kujanpaa** Andritz 10745 Westside Parkway Alpharetta, GA 30004 Tel: 770-640-2571 olli.kujanpaa@andritz.com	‡**John Lewis** Fluor Daniel Forest Products 100 Fluor Daniel Drive Greenville, SC 29607-2762 Tel: 864-517-1683 john.lewis@fluor.com
‡**Steven L. Osborne** Babcock & Wilcox 20 S. Van Buren Avenue Barberton, OH 44203 Tel: 330-860-1686 slosborne@babcock.com	**Michael D. Sides** XL GAPS 1360 Olympia Park Circle Ocoee, FL 34761 Tel: 407-656-4275 Mobile: 407-462-4622 michael.sides@xlgroup.com	**John Veltre** Chartis 2565 Mohawk Trail Acworth, GA 30102 Tel: 678-347-5406 john.veltre@chartis.com
‡**Arie Verloop** Jansen Combustion and Boiler Technologies 12025 115th Avenue N.E., Ste 250 Kirkland, WA 98034-6935 Tel: 425-952-2825 arie.verloop@jansenboiler.com	**Marla Weinberg** International Paper Corporate Technology Center 6285 Tri-Ridge Blvd. Loveland, OH 45140 Tel: 513-248-6789 marla.weinberg@ipaper.com	‡**Roger Lawton** Jansen Boiler 220 Fieldstone Court Alpharetta, GA 30009 Tel: 770-797-5527 Cell: 425-736-0172 roger.lawton@jansenboiler.com
‡**Bentley Sherlock** Georgia Pacific Corp. Atlanta, GA Tel: 404-652-4608 Cell: 404-884-4872 bentley.sherlock@gapac.com	‡**David Frazier** International Paper 3819 Blue Springs Trace Evans, GA 30809 Tel: 706-210-3470 Cell: 706-305-5321 david.frazier@ipaper.com	

‡ Denotes attendance at meeting in October 2013.

WATER TREATMENT SUBCOMMITTEE

‡**Tom Madersky**
Power Specialists Assoc., Inc.
531 Main Street, Somers, CT 06071
Tel: 860-763-3241
tom.madersky@psaengineering.com

‡**Craig Aderman** Sappi Fine Paper NA 89 Cumberland Street P.O. Box 5000 Westbrook, ME 04098-1597 Tel: 207-856-3517 Cell: 207-831-2472 craig.aderman@sappi.com	**Robert Bartholomew, P.E.** Sheppard T. Powell Associates, LLC 1915 Aliceanna Street Baltimore, MD 21231 Voice: 410-327-3500 rdb@stpa.com	‡**Kelli Bastarache** Power Specialists Assoc., Inc. 531 Main Street Somers, CT 06071 Tel: 860-763-3241 kelli.bastarache@psaengineering.com
‡**Wayne Bucher** Process Consultant NORAM Engineering Birmingham, AL Tel: 205-408-1874 Cell: 205-368-9396 wayne.bucher@gmail.com	‡**Susan Childress** Staff Engineer IP Technology Power Mfg. Solutions 5870 Anderson Road Grovetown, GA 30813 Tel: 706-339-1631 susan.childress@ipaper.com	‡**Frank DeStefano** The Purolite Company 500 Locust Grove Spartanburg, SC 29303 Cell: 864-617-0881 fdestefano@puroliteusa.com
‡**Buck Dunton** ChemTreat, Inc. 4301 Dominion Blvd. Glen Allen, VA 23060 Tel: 804-935-2000 buckd@chemtreat.com	‡**Don Flach** Georgia-Pacific Corporation 133 Peachtree Street Atlanta, GA 30303 Tel: 386-336-5584 don.flach@gapac.com	‡**Steve Hoefs** Nalco Company 1601 W. Diehl Road Naperville, IL 60563-1198 Tel: 630-305-1461 Cell: 262-313-8036 jmorgan@nalco.com
Claude Gauthier, P.E. The Purolite Company P.O. Box 308, Paris, Ontario Canada N3L 3G2 Tel: 800-461-1500 Tel: 519-448-4512 cgauthier@puroliteUSA.com	‡**John Gray** Rayonier Performance Fibers, LLC 4470 Savannah Hwy. Jesup, GA 31545 Tel: 912-588-8213 Cell: 912-432-2921 john.p.gray@rayonier.com	**Ken Hansen** Babcock & Wilcox Company 20 South Van Buren Avenue Barberton, OH 44203 Tel: 330-860-6443 kehansen@babcock.com
‡**Greg Imig** Andritz Inc. 1115 Norhmeadow Pkwy. Roswell, GA 30076-3857 Tel: 770-640-2500 greg.imig@andritz.com	‡**Norris Johnston** Ashland Hercules Water Technologies 37 Hough Road Lacey's Spring, AL 35754 Tel: 256-650-0049 Cell: 256-520-1011 nnjohnston@ashland.com	**Dave Kittel** Metso Power 3430 Toringdon Way, Suite 101 Charlotte, NC 28277 Tel: 704-414-3434 Cell: 912-342-9711 david.kittel@metso.com

‡ Denotes attendance at meeting in October 2013.

WATER TREATMENT SUBCOMMITTEE - (Cont.)

‡**Sam Lewis** Delta Training Partners, Inc. 4020 Oleander Drive Wilmington, NC 28403 Tel: 910-790-1988 slewis@deltatraining.com	‡**Michael Lykins** Packaging Corporation of America 1061 Woodcliff Drive South Elgin, IL 60177 Cell: 630-659-7115 mlykins@packagingcorp.com	‡**Mitch Morgan** Nalco Company 1601 W. Diehl Road Naperville, IL 60563-1198 Tel: 630-305-1000 jmorgan@nalco.com
‡**Rick Morgan** FM Global Granite Pkwy. Plano, TX 75024 Tel: 972-731-1869 rick.morgan@FMGlobal.com	**Richard Morris** Metso Power 3430 Toringdon Way, Suite 101 Charlotte, NC 28277 Tel: 704-281-4703 richard.morris@metso.com	**Fred Neubauer** Ashland Hercules Water Technologies 1600 Sugar Creek Drive East Mobile, AL 36695 Tel: 251-633-5566 Cell: 251-591-2297 faneubauer@ashland.com
‡**Kurt Parks** Packaging Corporation of America 5495 Lake Park-Clyattville Road Valdosta, GA 31601 Tel: 229-559-2257 Cell: 229-415-8557 kparks@packagingcorp.com	‡**Tom Przybylski** Boise Inc. 400 Second Street Int'l Falls, MN 56649 -2327 Tel: 218-285-5011 tomprzybylski@boisepaper.com	‡**Jim Robinson** GE (Infra, Water) 4636 Somerton Rd. Trevose, PA 19053 Tel: 215-942-3381 james.robinson@ge.com
Alarick Tavares Georgia-Pacific Corporation 133 Peachtree Street Atlanta, GA 30303 Tel: 404-652-4000 ajtavare@gapac.com		

‡ Denotes attendance at meeting in October 2013.

Registered for the meeting were:

A.H. Lundberg Associates
Cory, Scott, Bellevue, WA
Seefeld, Paul, Jacksonville, FL

Acuren Inspection
Harley, Todd, Birmingham, AL
Spires, L. P., Augusta, GA

AIG
Carmody, Liz, Boston, MA
DeBeer, Thomas, Woodstock, GA

AirTek Construction
Baines, Troy, Troy, AL
Bringman, Lewis, Linthicum, MD
Moore, Ronnie, Troy, AL

Alstom Power
Bush, Joe, Chattanooga, TN
Harmon, John, Windsor, CT
Hollenbach, Dennis, Windsor, CT
Semyanko, Ivan, Windsor, CT
American Forest & Paper Assoc.
Grant, Tom, Yonkers, NY

Andritz
Aura, Kari, Tampere, Finland
Berkovich, Igor, Roswell, GA
Burnner, Ben, Roswell, GA
Collins, Peter, Roswell, GA
Crotty, Steve, Roswell, GA
Imig, Greg, Suwanse, GA
Kujanpaa, Olli, Roswell, GA
LeBel, Mark, Roswell, GA
Merriman, Nick, Raaba, Austria
Phillips, John, Roswell, GA
Ribeiro, Christian, Roswell, GA
Soderlund, Harri, Roswell, GA
Timotheo, Alvaro, Roswell, GA

Ashland
Lewis, Marshall, Birmingham, AL
Roof, David, Wake Forest, NC

Atlantic Combustion Technologies
Digdon, David, Amherst, NS

AXA Matrix Risk Consultants
Garfield, Michael, Lowell, ME

AZZ/WSI
Li, Bingtao, Norcross, GA
Nugent, Mike , Norcross, GA
Power, Stacy, St. Petersburg, SC

Babcock & Wilcox
Blair, Michael, Atlanta, GA
Blazer, Phil, Charlotte, NC
Coley, Lance, Calera, AL
Delagrange, Bruce, Barberton, OH
Franks, Ralph, Atlanta, GA
Wilcox, Garner, Tom, Atlanta, GA
Hedges, Meville, Atlanta, GA
Hovinga, Mark, Barberton, OH
Kornaker, Greg, Barberton, OH
Kulig, John, Barberton, OH
Laitala, Nikki, Barberton, OH
Lombardi, Randy, Barberton, OH
McDonald, Larry, Barberton, OH
Mishou, Derek, Houston, TX
Osborne, Steve, Barberton, OH
Ramkumar, Shaun, Atlanta, GA
Schwartz, Eric, Barberton, OH

Boise Inc.
Erickson, Leonard, Boise, ID
Holm, Ralf, Marietta, GA
Miller, Jason, Deridder, LA
Przybylski, Tom, Denali Park, AK

Buckman Laboratories
Wagener, Jill, Newberg, OR

Carter Holt Harvey
Gatti, Fernando, Tokoroa, New Zealand
Greenfield, Daryl, Kawerau, New Zealand

Registered for the meeting were:

Chalmers & Kubeck
Gattis, Clayton, Watkinsville, GA
Richardson, Curt, Watkinsville, GA

Charles Higginbotham, PE, LLC
Higginbotham, Charles, St.Simons Island, GA

Chemtreat
Carvalho, Luis, Richmond, VA
Graham, Jim, Collierville, TN

Chicago Tube & Iron
Morgan, Preston, Locust, NC

Clearwater Paper
Beck, Justin, Lewiston, ID

CORR System
Ruiz de Molina, Eladio, Birmingham, AL

Delta Training Partners
Lewis, Sam, Wilmington, NC

Diamond Power
Frydryk, Nick, Lancaster, OH
Phinney, Michael, Lancaster, OH

Domtar
Avery, David, Bennettsville, SC
Crouse, Ray, Bennettsville, SC
Hanna, Barry, Bennettsville, SC
Singleton, Mike, Kingsport, TN
Worsham, Jesse, Bennettsville, SC

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

Evergreen Packaging
Farley, Brian, Canton, NC

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

Fluor
Lewis, John, Greenville, SC

FM Global
Cooke, Craig, Oconomowoc, WI
Crysel, Scott, Plano, TX
Dondona, Jasbir, Vancouver, BC
Hoffman, Daryl, Kirkland, WA
Huelsbeck, Kevin, Sherwood, WI
Hume, Everett, Norwood, MA
Judge, Chris, Manchester, UK
Kopec. Edward, Virginia Beach, VA
Labonté, Guy, Montréal, Qué. Canada
Lang, David, Plano, TX
Machette, Michael, Alpharetta, GA
Moberg, Eric, Johnsburg, IL
Morgan, Rick, Plano, TX
Onstead, Jimmy, Plano, TX
Polagye, Mike, Norwood, MA

Fossil Power Systems
Donahue, Mark, Dartmouth, NS
Hackmann, Jonas, Dartmouth, NS

Foster Wheeler
Wasson, Eric, Charlotte, NC

FPInnovations
Duo, WenLi, Vancouver, BC
Singbeil, Douglas, Vancouver, BC

Fuel Tech
Schulz, Kent, Warrenville, IL
Whitehurst, Joseph , Warrenville, IL
Wolf, Dennis, Warrenville, IL

GE Water
Robinson, James, Trevose, PA

George H. Bodman, Inc.
Baxter, Rick, Kingwood, TX
Bodman, George, Kingwood, TX

Registered for the meeting were:

Georgia-Pacific
Akin, Monty, Clatskanie, OR
Flach, Don, Maricopa, AZ
Harrod, Chad, Atlanta, GA
Hill, Wes, Camas, WA
Johnston, Jennifer, Atlanta, GA
Morency, Karl, Atlanta, GA
Rose, Aaron, Atlanta, GA
Sherlock, H. Bentley, Atlanta, GA
Tavares, Alarick, Atlanta, GA

Glatfelter
Forry, Jeffrey , Spring Grove, PA
Plappert, William , Spring Grove, PA

Global Risk Consultants
Macaulay, Charlie, Issaquah, WA
Smith, Andy, Woodstock, GA

GommiTech,
Gommi, Julius, Maple Valley, WA

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

Houghton Cascade
Leary, Ray, Auburn, WA

Howe Sound Pulp & Paper
Casey, Shawn, Port Mellon, BC

HSB I&I Co.
Blank, Mike, Hartford, CT
Wally, Hinton, Warner Robins, GA

International Paper
Adams, Wayne, Clinton, NC
Blackard, Vernon, Loveland, OH
Childress, Susan, Loveland, OH
Frazier, David, Loveland, OH
Kiper, Mike, Loveland, OH
MacIntire, Wayne, Loveland, OH
Sargent, Mark, Loveland, OH

Irving Pulp & Paper
Ferris, Aaron, Saint John, NB
Mott, Dennis, Saint John, NB

Jansen
La Fond, John , Kirkland, WA
Lawton, Roger, Alpharetta, GA
Verloop, Arie, Kirkland, WA

John E. Cover Engr.
Cover, John, Birmingham, AL

Kapstone Paper
Hansford, Monte, Charleston, SC
Nusbaum, Chris, Longview, WA
Richards, Meghan, Longview, WA

KPAQ Industries
Brown, Eric, St. Francisville, LA
Terrell, Carl, St. Francisville, LA

K-Patents
Hamalainen, Arto, Naperville, IL
Rezek, Rick, Naperville, IL
Wagner, Phil, Naperville, IL

LENRO Inc.
Olavessen, Len, Humble, TX

Lincoln Paper & Tissue
Folnsbee, Scott, Lincoln, ME
LaFlamme, Alan, Lincoln, ME

Registered for the meeting were:

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

MeadWestvaco
Andrews, John, N. Charleston, SC
Clemmons, Curtis, Covington, VA

Metso Power
Borgman, Conny, Charlotte, NC
Burelle, Raymond, Charlotte, NC
Cross, Tom, Charlotte, NC
Farmer, Robert, Charlotte, NC
Geedey, Jim, Charlotte, NC
Martin, James, Charlotte, NC
Morris, Richard, Charlotte, NC
Morrison, Dan, Charlotte, NC
Nichols, Jody, Charlotte, NC
Schindler, Nathan, Charlotte, NC
Scruggs. Jeff, Lancastle, SC
Sechrist, Richard , Charlotte, NC
Ulrich, Jim, Charlotte, NC
Weikmann, John, Charlotte, NC

Nalco
Hoefs. Steve, Naperville, IL
Morgan, Mitch, Naperville, IL

National Boiler Service
Duplissey, David, Trenton, GA
Mesamore, Mike, Trenton, GA

Nautilus Loss Control
Jackson, Christopher, Fox Island, WA

NewPage Corporation
Hollern, Michael, Luke, MD

NORAM Engineering
Bucher, Wayne, Vancouver, BC

Northern Pulp Nova Scotia Corp.
Fry, Robert, New Glasgow, NS
MacLeod, Kevin, New Glasgow, NS

Packaging Corp. of America
Lykins, Michael, South Elgin, IL
Parks, Kurt, Valdosta, GA
Stelling, John, Tomahawk, WI

Phoenix Pulp & Paper
Sarat, Lewat, Khon Kawn, Bangkok

Port Townsend Paper
Reandeau, Dan, Port Townsend, WA

Power Specialists Assoc.
Bastarache, Kelli, Somers, CT
Madersky, Lee Anne, Somers, CT
Madersky, Tom, Somers, CT
Modr, Keith, Somers, CT
Zawistowski, Bob, Somers, CT

Purolite
Destefano, Frank, Bala Cynwyd, PA
Downey, Don, Canada
Shaffer, Darrell, Pittsburgh, PA

Rayonier
Carden, Mark, Jessup, GA
Dean, Sam, Jessup, GA
Gray, John, Jesup, GA
Porter, Daniel, Jesup, GA

Resolute Forest Products
Graben, Gregory, Coosa Pines, AL
Hornsby, John, Coosa Pines, AL

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

Registered for the meeting were:

RockTenn
Antes, Bett, Stevenson, AL
Branson, Shawn, Chester, Va
Bray, Chuck, Hopewell, VA
Callaway, Mykel, West Point, VA
Campbell, Bob, West Point, VA
Groome, Matt, Panama City, FL
Hagins, Hank, Fernandina Beach, FL
Hall, Heather, Panama City, FL
Johnson, Tony, Hopewell, VA
Moyer, Scott, Jacksonville, FL
Von Oepen, David, Demepolis, AL

SAPPI
Aderman, Craig, Westbrook, ME
Fredrickson, John, Cloquet, MN
Randa, Dean, Cloquet, MN

Siam Cellulose
Boonyawat, Chayoot, Wangsala, Bangkok

Simpson Tacoma Kraft
Martin, Bruce, Tacoma, WA

Sompo Japan Nipponkoa Risk Mgmt.
Funaguchi, Akira, Shinjuku-ku, Tokyo, Japan

Southern Environmental
Harris, Don, Pensacola, FL

T. M. Grace Company
Grace, Tom (Dr.), Appleton, WI

Thompson Industrial Services
Harry, Todd, Sumter, SC
Jackson, Dwayne, Sumter, SC
Rocco, Larry, Sumter, SC
Watson, Mike, Cleveland, TN

Verso Paper
Giroux, Trevor, Jay, ME
Ja'arah, Majed, Memphis, TN
Richards, Barry, Jay, ME

Weyerhaeuser
Bogart, Steven, Longview, WA
Honey, Quinton, Perry, GA
Knowlen, Bruce, Federal Way, WA
Martin, Denise, Vanceboro, NC
Rutledge, Chuck, Federal Way, WA
Singleton, Dewayne, Vanceboro, NC
Slagel, David, Port Wentworth, GA
Stewart, Dennis, Oglethorpe, GA

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

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MAIN COMMITTEE MEETING

INTRODUCTION – John Gray, Vice-Chairman, sitting in for Scott Moyer, Chairman. Welcome to the fall 2013 BLRBAC Main Committee Meeting! The meeting is now open. I am John Gray, Vice-Chair of BLRBAC and standing in for Scott Moyer this morning. Thank you for taking time away from your family and your paying jobs to travel here to Atlanta and participate in BLRBAC. Your efforts do make a difference. They help make BLRBAC successful and we appreciate them. Let's begin with Old Business this morning.

Just a reminder that all BLRBAC Meetings, including this session, are to be held in strict compliance with BLRBAC Anti-Trust Policy. Discussions involving pricing, prices, or any restraint on competition are not allowed. It hasn't been an issue at our meetings, and we want to keep it that way.

OLD BUSINESS

ACCEPTANCE OF THE SPRING 2013 MEETING MINUTES – John Gray

The Meeting Minutes from the spring 2013 meeting have been posted on the BLRBAC WEB site for some time now. Are there any corrections or modifications needed to those Minutes? Do I have a motion to approve the Minutes as posted? So moved. Do I have a Second? All in favor raise your hand? All opposed? The spring 2013 Meeting Minutes have been unanimously accepted.

NEW BUSINESS

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

NEW REGULAR MEMBERSHIP - None

NEW ASSOCIATE MEMBERSHIPS

Last night at its meeting, the Executive Committee accepted as **Associate Members:**

Combustion Components Associates (CCA), Monroe, CT -- provider of combustion and emission controls equipment in the industrial market and auxiliary and waste streams burners for recovery boilers.

Nathan Schindler is the designated Associate Representative
Allen Adriani is the designated Alternate Associate Representative

Fuel Tech, Warrenville, IL -- provider of additives for control of slagging and fouling in recovery boilers, as well as other fired equipment.

Chris Smyrniotis is the designated Associate Representative
Dennis Wolf is the designated Alternate Associate Representative

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

NEW CORRESPONDING MEMBERSHIPS – None Reported

REGULAR REPRESENTATIVE CHANGES - None Reported

ASSOCIATE REPRESENTATIVE CHANGES

FPInnovations
Douglas Singbell remains as the designated Associate Representative
Wenli Duo replaced Vic Uloth as the designated Alternate Associate Representative

CORRESPONDING MEMBERSHIP CHANGES - None Reported

MEMBERSHIP COMPANY NAME CHANGES

AZZ/WSI
Previously known as Aquilex

Resolute Forest Products
Previously known as AbitibiBowater

Sompo Japan Nipponkoa Risk Management
Previously known as NKSJ Risk Management

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

2. **EXECUTIVE COMMITTEE REPORT –** John Gray for Scott Moyer

The Executive Committee met in closed session Tuesday evening. We had six members present and one absent, but participating by phone. The committee discussed various issues that were raised during the Subcommittee meetings. Some of the specific highlights we want to touch on are:

We discussed using a portion of the Tuesday afternoon Operating Problems Session to allow membership to preview proposed Subcommittee Guideline changes or additions. The thinking here is that this would give membership the chance to digest any proposed changes and gain any clarification needed prior to officially voting on the changes during this Main Committee Meeting. The Executive Committee unanimously approved the concept and we will begin implementation as early as spring 2014.

We also discussed the need for succession planning for all subcommittees. In accordance with the By-Laws, all subcommittees have been asked to select a Vice-Chair who would serve to lead the efforts of the committee in the event of the Chairman's absence. All subcommittees are headed down that path. Some have already selected their Vice-Chairman.

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

Lastly, the Executive Committee would like to recognize and honor Mark Sargent. Mark is the Chair of the Safe Firing of Black Liquor Subcommittee, but he will soon be retiring. Mark, your leadership and your contributions to BLRBAC are greatly appreciated. You will be missed! (Applause.) Vernon Blackard has been recommended by the Safe Firing Subcommittee to succeed Mark and has been approved as the new Chair by the Executive Committee in accordance with our By-Laws.

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

The Checking Account balance as of yesterday was $82,339.68.
The Certificate of Deposit was $15,127.12

We have some outstanding checks that have not been cashed yet as well as expenses remaining to be paid. With the expenses of this meeting, plus the outstanding checks, and other projected expenses, we expect to have somewhere in the vicinity of $60,000.00 left in checking at the end of December. So we are financially exactly where we want to be. We are in good shape! We are able to cover all our bills without any problems and do not need to adjust (raise) meeting registration fees. Any questions? No.

Okay, the next item we discussed at Tuesday's Executive Committee meeting was the 2014 budget. The Executive Committee has approved the 2014 budget of $60,700.00. That's up from $56,850.00 for 2013. There were reserve for legal expenses and similar kinds of things in the 2013 budget that we didn't spend. We are continuing to keep a reserve for legal business, and we anticipate revenues in 2014 to be about $68,000 or $69,000; so with the budget of essentially $61,000, we should be just fine. Any questions about the budget?

For this meeting we had 206 Advance registrations, taking advantage of the $125.00 Advance registration fee and we had 31 At-Door registrations. We had eight Off-Shore registrations with two folks from New Zealand, two from Siam, one from Japan, one from Great Britain, one from Austria, and one individual from Colombia. So we continue to have pretty good foreign attendance here. The attendees included 30 paper companies; five boiler companies; six insurance companies, 30 Associate member companies, and three guests of member companies. So we continue to have a good span of attendees. Just from a personal note, I noted more operators coming now, which is a good thing. Any questions?

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

Although no new or revised documents will be presented today for membership vote and approval, there will be changes posted for several documents over the next few months for membership review and comment with voting anticipated at the spring meeting next year. You and everyone else in the BLRBAC database will receive an e-mail from Barbara Holich letting you know when these documents are posted. This is your chance, especially if you are not on the subcommittee responsible for them, to give those subcommittees your feedback and comments. It's very important you take the time to do this so you aren't surprised by what you see in a revision when it gets approved and published.

4. **SECRETARY'S REPORT** – (Cont.)

Revisions to two documents (*Materials & Welding* and *Waste Streams*) were approved at the April meeting earlier this year. Their posting was delayed, but should be done within the next three to four weeks.

Barbara Holich will send out an e-mail to everyone in the BLBAC database to let you know when these documents and the Meeting Minutes for this meeting are available on the BLRBAC website.

Lastly, I'd like to be copied on all Subcommittee reports sent to Barbara. This will help me get working sooner on document changes.

SECRETARIAL SERVICES REPORT – Barbara Holich

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

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

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

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

If you are a designated Representative or Alternate Representative for your organization and something happens wherein you will no longer be functioning in this capacity, such as, retirement, occupational change, downsizing, etc., please let me know (fhholich@aol.com) and supply me with the name and e-mail address of whomever will fill your vacated position within BLRBAC.

Per BLRBAC's policy, BLRBAC's Secretarial Services will verify receipt of meeting registrations and checks via e-mail when appropriate e-mail addresses are given on the registration form. Sometimes e-mails pop back as "undeliverable." This may be due to the fact that the e-mail box is full, incorrectly typed due to not being able to decipher attendee handwriting, etc. I will do my best to see that all e-mails are properly received at the posted e-mail address.

4. **SECRETARY'S REPORT** – (Cont.)

All Advance Registration attendees are recorded, given a registration number, and sent a verification e-mail on the same day checks are received. This notification is sent to the e-mail address listed on the Registration Form. If you have not received a confirmation notification from me, you are not registered for BLRBAC! I am again requesting that all Meeting Registration Forms be completed in their entirety. This form is the only way I can confirm the accuracy of the BLRBAC database and e-mail address book.
Finally, if you know from past experience that your Accounting Department takes weeks to issue a requested check for registration purposes, just send me your completed Registration Form and a personal check before the posted cut-off date. Then you can get reimbursed from your company at a later date. This will guarantee you are registered at the Advance registration fee. There are no exceptions when paying after the cut-off date, your organization will be required to pay the higher At Door fee.

5. **SUBCOMMITTEE REPORTS**

5.1 **AUXILIARY FUEL REPORT –** Bruce Knowlen

The meeting was called to order by Chairman Bruce Knowlen on October 7, 2013, at 1:04 PM. A total of seven subcommittee members and 11 guests were in attendance.

The BLRBAC antitrust statement was reviewed with all those in attendance
.
Chairmen Knowlen reviewed the meeting agenda and meeting guidelines and an attendance roster sheet was started for guest and members attending the meeting. The minutes of the last meeting were reviewed. A motion was made and seconded for acceptance of the minutes as read, was voted on, and approved.

New Business
Vice Chairman for the Aux Fuel Subcommittee was discussed and a motion was made and seconded to nominate Mr. Chad Harrod from Georgia Pacific to this position. The motion was approved.

The Aux Fuel Subcommittee chose to have an open meeting on Monday afternoon of the spring 2014 BLRBAC Meeting. This will be an additional meeting to the standing fall meeting held each year.

The subcommittee considered updating the document to correlate to similar requirements of NFPA 85 as follows per request of the ESP Subcommittee and a member of the Aux Fuel Subcommittee:

- Furnace purge of 5 minutes or 5 volume changes (whichever is greater). Currently Aux Fuel Recommended Practice is 5 minutes.

5. **SUBCOMMITTEE REPORTS** - (Cont.)
   5.1 **AUXILIARY FUEL REPORT** - (Cont.)

- Precipitator purge during start-up (prior to energizing) of 5 minutes or 5 volume changes (whichever is greater). Currently Aux Fuel Recommended Practice does not require a purge of the precipitator prior to start up.

- Precipitator Trip as part of MFT. Currently Aux Fuel Recommended Practice does not trip the precipitator as part of a MFT.

- Trip Precipitator as part of ESP (While NFA does not address ESP, a precipitator trip is required for a MFT). Currently Aux Fuel Recommended Practice is an optional trip of the precipitator as part of an ESP.

The subcommittee decided to establish a task group to review these items and report their findings to the subcommittee at the spring 2014 Auxiliary Fuel Subcommittee Meeting. The task group members are: Greg Kornaker, Chag Harrod, Ivan Semyanko, Tom DeBeer

BLRBAC Executive Committee requested the auxiliary fuel subcommittee to consider changing wording in the Aux Fuel document that requires annual testing frequency to major outage frequency. This request is being made as mills are extending major outages from 12 months to 18 months and longer.

The subcommittee discussed this topic and referred it to a second task group to report their recommendations/changes back to the Aux Fuel Subcommittee at the spring 2014 Aux Fuel Subcommittee Meeting. The task group members are: Bruce Knowlen, Chad Harrod, Tom DeBeer.

The subcommittee discussed inserting wording or logic requiring operator verification of purging of the superheater loops prior to firing black liquor or connecting to the mill steam header. Chairman Knowlen will check the Safe Firing of Black Liquor Subcommittee to their status of this in their document.

The subcommittee also discussed the need for defining “Managed System” which is used in the Auxiliary Fuel document. Chairmen Knowlen will check with Safe Firing of Black Liquor and bring their definition to the next Auxiliary Fuel Subcommittee meeting for the subcommittee review and use in the Aux Fuel document provided the wording is compatible with the requirements of the Aux Fuel document.

A guest inquired about any work the subcommittee has conducted on the reliability of flame scanners for use on auxiliary fuel in recovery boilers. The guest was advised this is an ongoing topic of review for the subcommittee.

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

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

The subcommittee postponed review of Chapter 5 Alarms and Indicators due to time constraints of the meeting. This item will be placed on the agenda of the next subcommittee meeting.

Meeting was adjourned at 3:36 pm.

5.2 **BLACK LIQUOR REPORT** – Mark Sargent

The subcommittee met during the morning and afternoon on Monday. 11 members were present in closed meeting and approximately 30 guests attended the open meeting with 11 members again present.

Reviewed the BLRBAC Anti Trust statement at both meetings.

Reviewed and approved (at the closed meeting) the Spring 2013 meeting minutes.

A question was submitted to our subcommittee as follows: "We have a recommended addition in the guidelines for the Safe firing of Black Liquor Committee to consider in Chapter 8 for "Black Liquor and Water Piping Systems" and that is: "Operations should lock/tag in the open position any manual block valves located in the liquor divert piping."

We agreed to revise wording as below and submitted for approval to the executive committee.

Manual valves in the Black Liquor Divert system piping should be secured in the open position prior to and during liquor firing. These valves should be part of a managed system.

Review the SFBL document as it relates to the once per year recommendation to replace spouts and cut open one spout: We recognize that mills may be running longer than one year between outages so we will review this section of Chapter 9 and the entire SFBL document to see if language changes are needed to reflect major outage intervals rather than an annual requirement recognizing that some mills choose to extend recovery boiler outages beyond the traditional one year outage interval.

The SFBL Subcommittee is concerned that a condition based system should be required to go beyond the traditional one year operating period. We have drafted language and are submitting as follows to the Executive Committee for their approval:

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

5. **SUBCOMMITTEE REPORTS** - (Cont.)
   5.2 **BLACK LIQUOR REPORT** - (Cont.)

A question was raised in the Open meeting regarding whether or not our document covers reviewing smelt spout design as boiler throughput is increased. This was reviewed with the document and language for the Executive Committee for the Spring 2013 meeting.

We agreed to revise wording as below and this has been submitted to the Executive Committee: Chapter 9, paragraph 9.1.2 bullet no 12:

As Recovery boilers are upgraded, a thorough review of the smelt spout(s) system capacity and smelt spout cooling water system design should be completed.

Draft a new definition for "managed system" as used in our document: This will have to be reconciled with SFAF Subcommittee. Their document has similar language. This has been submitted to the SFAF Chair for their consideration.

Old definition:
Managed System: A system using jumper tags and logs to track temporary system changes.

New definition:
Managed System: A system requiring a checklist of all operational manual valves and valves on safety interlocked device sensing lines shall be completed by the operator, documenting that the valve(s) are secured in the correct operating position prior to boiler start-up. Any deviation to the managed system should be documented through the mill jumper policy to bypass the purpose of any managed system valve.

Items brought to the Subcommittee prior to the Fall 2013 meeting:

- Question raised regarding a requirement to shut off primary and/or secondary air on a low drum level MFT condition.

  We discussed this in closed session and felt that there was no requirement to add closing combustion air on low drum level MFT. There apparently is no loss history in the industry with keeping combustion air at pre-trip levels. Insurance representative on our subcommittee confirmed no loss history to his knowledge. No operating companies present had any knowledge an internal requirement to close off combustion air on a low drum level MFT.

- Question raised by why our document does not require retracting sootblowers and shutting off steam to sootblowers on an MFT.

  We discussed in closed and open session and have included this statement in Chapter 10.1 dealing with plugged spouts
  "To help avoid a large inventory in the char bed, retract the sootblowers and stop the sootblower sequence on an MFT."

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

5.2 **BLACK LIQUOR REPORT** - (Cont.)

After further discussion at the open meeting we feel that shutting off the steam is an unnecessary step and that the Instrumentation Subcommittee may want to revisit the requirement to shut off steam to the sootblowers on an MFT. Shutting off the steam to the sootblowers likely will trap additional condensate in the downleg piping to the sootblowers and leave the operator with another system to start up. We feel that just retracting the sootblowers and putting the sequence on "hold" is adequate. The language above was submitted to the Instrumentation subcommittee chair for their consideration.

- Question raised regarding auxiliary steam shattering systems (Chapter 10.2). The current text recommends an auxiliary steam shattering system be available and ready to provide back-up in case the regular shattering system capability is exceeded.

We tabled this at the open meeting and our subcommittee will address this section prior to Spring 2014 meeting. We would like to solicit input from member companies on Chapter 10.2 Dissolving Tank Design, bullet #2.

- Question raised regarding how to perform the annual B/L dilution test.

Our document does not require a dilution test and actual divert which would be actual functional test of the black liquor divert system. We will consider adding this to the document in future Subcommittee work.

- A request by the Instrumentation Subcommittee to clarify hazard protected against in the Explanation Chart on Black Liquor Header Valve and Black Liquor Divert Valve Fail to Position.

Present hazard protected against language:
Introducing liquor to the boiler when the logic does not allow due to valve failure OR black liquor flowing to the divert location inadvertently.

Proposed new hazard protected against language: This is being submitted for the Executive Committee for approval.
Prevent re-introduction of black liquor to the furnace following an interruption due to valve failure, without proper boiler purge and/or black liquor header purge.

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

The ESP Subcommittee met in closed session on Monday October 7, 2013 with 13 of 13 members represented. The Subcommittee met in open session on Tuesday morning October 8, 2013 with 13 members represented and about 160 guests. During the closed session, Karl Morency of GP was selected to serve as Vice Chair for the Subcommittee.

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

During the open session, the Subcommittee reviewed 24 incident reports from North America. We had initially expected more that 24 incidents based on the number of incident reports that were received just prior to the last meeting, but fewer than expected additional reports were submitted. Of the 24 incidents, there were no Smelt Water Explosions, but there was a smelt spout cooling water leak that resulted in a smelt water reaction with no damage reported. Nine of the reported leaks were classified as critical incidents and 13 were non-critical incidents. Two the reported incidents were for spout failures. The spout leak that resulted in the smelt water reaction clearly had water entering the furnace and was classified as critical. One report was for an ESP that was conducted but no leak was found. An Emergency Shutdown Procedure (ESP) was performed in 8 of the incidents including 5 of the critical incidents representing 71% of the critical incidents that should have been ESP'd. There was one leak classified as critical that was found on a hydrostatic test and an ESP was not necessary.

Three International Incidents were reviewed. The international incidents are not classified or included in the BLRBAC data but are reviewed to gain any learnings from the reports.

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

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

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

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

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

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

Incident Locations

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

The leaks locations are summarized as follows:

- 7 – Economizer
- 4 – Superheater
- 5 – Upper Furnace
- 4 – Boiler Bank
- 1 – Lower Furnace
- 1 – ESP with no leak found
- 2 – Smelt Spout Failure

Leaks by Boiler Type

The leaks by the number of drums and the back end arrangement were reviewed. There were 7 leaks reported in a single drum unit and 16 leaks reported in two drum units. One leak was reported in a unit with three drums.

Five of the leaks were in boilers with Cascade Evaporators, four units had Cyclone Evaporators and 15 were from units with extended economizers. It is clear that there are still several DCE units still in operation.

Root Cause

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

- 9 – Thermal or Mechanical Fatigue
- 3 - Weld Failure
- 4 - Erosion or Corrosion Thinning
- 2 – Mechanical Damage
- 1 - Stress Assisted Corrosion or Corrosion Fatigue
- 4 – Overheat

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

How Discovered

Operator observations during boiler walkdowns continue to be the prevalent method of detecting leaks and accounted for identification of 15 of the leaks (63%) and shows that operators are continuing to be diligent in looking for leaks. Five of the leaks (21%) were identified by operators in the control room and 1 leak (4%) was initially indicated by the leak detection system installed. Three leaks (12%) were found during a hydrostatic test during an outage.

Leak detection systems were reported to be installed on units in 9 of the incidents (78%). The leak detection systems were credited with providing the initial indication of 1 leak and confirmed 3 additional leaks. The leak detection system provided the initial indication for 1 economizer leak, which have traditionally been difficult to detect with leak detection systems.

The Subcommittee has been looking at the time between the initial indication of the leak and the initiation of the ESP. Not all the incidents that reported an ESP provided sufficient information to get a good idea of the time from the first indication of a leak until the ESP was initiated. The incidents that provided enough information showed that the time between initial indication of the leak and the initiation of the ESP ranged from about 1 minute to 1:50 hours. The median time to initiate the ESP was about 15 minutes which is an improvement over recent history. The fact that an ESP was initiated without finding a leak is somewhat to be expected and indicates that operators are using reasonable diligence in determining the need for an ESP. The absence of these incidents would be an indication that operations would be overly cautious in initiating the ESP and taking too long to confirm that there is truly a leak.

Incident Review

Figure 2 shows the critical incidents reported each year. The bar for 2013 is not has high as expected since several incident reports were received prior to the last meeting that are being reported this meeting. Figure 3 shows the history of Recovery Boiler Explosions showing the smelt water explosion reported last year.

Figure 4 shows the effect of last year's smelt water explosion on the five year rolling average which is back to 0.2. Maybe in another four years we can get back down to zero!

Figure 5 shows the history of dissolving tank explosions. We broke the string of no dissolving tank explosions for the last couple of years. Following the recommendations from Section 10 of the Safe Firing of Black Liquor document would prevent many of the reported dissolving than incidents that have occurred in the past.

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

Figure 6 is a plot of explosion history per 100-boiler operating years. This is a statistical summary of the experience across the industry. The smelt water explosion experience is continuing to trend down over time and is down to 0.5 explosions per 100 boiler operating years, and the total explosions, which includes all boiler explosions and dissolving tank explosions, remained just under 0.9 explosions per 100 boiler years since a dissolving tank explosion was reported in the spring. The factor is calculated by a summation of all reported explosions since 1948 divided by a summation of the number of boilers reported in service each year during the same period. We all need to continue to keep that trending down.

Learnings

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

As we have said before, it is not recommended to expose leaks with pressure still on the boiler. There have been several incidents over the years where small leaks have turned into big leaks and it is not a good idea to have personnel exposed to that risk. There were no reports of removing casing or insulation to investigate leaks for the incidents reviewed at this meeting so maybe the word is getting out.

It is important to lock out or disconnect spout cooling water when securing a spout leak so that the water cannot be turned back on by mistake.

Several incidents indicated the need for proper procedures for clearing superheater tubes on start up. Section 15.7 in the Black Liquor Safe Firing Guideline gives an excellent discussion of how to clear superheater tubes properly.

There were some leaks reported in the economizer that resulted from binding in the slip seals where headers go through hopper walls. The freedom of movement should be checked on these seals during each inspection outage.

It is recommended to check the position of sootblower nozzles inside the wall box after replacing nozzles or lance tubes to make sure they are not protruding into the furnace when in the retracted position. Partially extended nozzles will experience high temperature corrosion on the end.

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

A high steam flow alarm on the steam to sootblowers can be useful to indicate if a nozzle has broken off or if too many sootblowers are operating at the same time.

Tube leaks at the outlet header at the top of the hot economizer may be caused by steaming in the economizer. Channeling of flue gasses due to pluggage may contribute to steaming.

One company has used stainless steel sleeves that are slipped over the tube ends when installing generating bank tubes at the mud drum to help prevent near drum corrosion of the tubes above the drum.

Oscillating sootblowers that rock back and forth rather than rotate 360 deg can be used above the mud drum to minimize the potential for near drum corrosion.

Post ESP Guidelines

The Subcommittee has published a document on Post ESP Guidelines that covers the actions that should take place after the ESP has been initiated. We have maintained it as a separate document from the ESP Recommended Good Practice document. The ESP document covers the design and functionality of the ESP system as well a when the system should be utilized; while the Post ESP Guideline covers actions that should be considered after the ESP has occurred.

That document has not been revised since 2009 so the committee will be reviewing it prior to the fall meeting.

During the closed Monday meeting, we discussed if the two documents should be combined into one. Any thoughts or comments from the general membership on revisions to either document or if there would be value in combining the two documents would be appreciated.

List of Operating Boilers

We have a list of operating boilers in the US and Canada on the BLRBAC Web site that Jules Gommi maintains. He does the best he can in trying to keep up with who owns what and what the current company name is but he could use some help keeping up with the boiler details or if there have been any significant changes to the boiler. I urge you that if you have a chance, look at your units, see if they are up to date, and if there are any corrections that need to be made, get those to Jules.

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

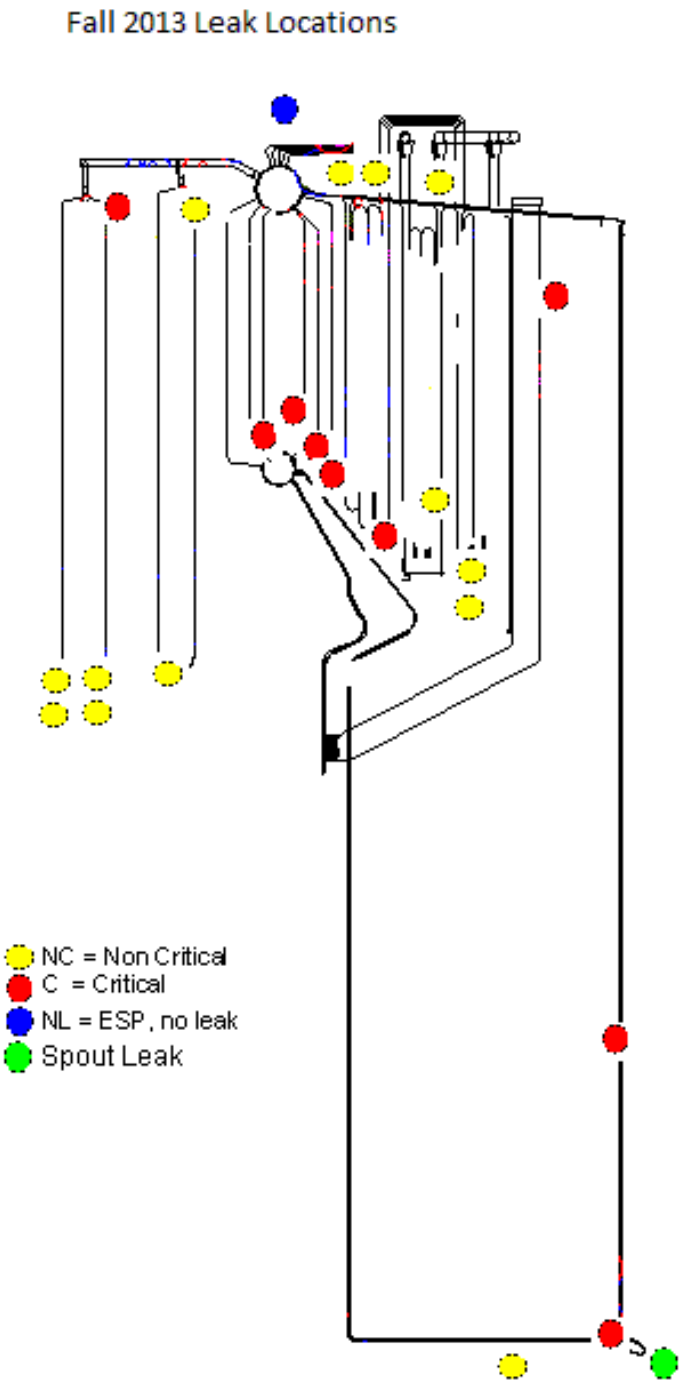
Incident Questionnaires

Finally, 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. From time to time the questionnaire is updated and there are currently some proposed changes to be made on the section covering dissolving tank explosions. Anytime you have an incident that needs to be reported, I know it is very tempting to just go back in the file and pull out the report from a couple of years ago and just fill in the new information, but we really urge you to go and get the most recent version of that off the website and use that for the report.

Again, a further reminder that especially when you're copying and pasting pictures into a Word document, it can very quickly get to a massive file size. Jules still has a 10 meg. limit on his e-mail system. When you prepare a report, look at the file size and if it is above 10 meg., cut it down into separate files. Often, the best thing would be to send the pictures in a separate e-mail as .JPG files.

Jules will send out an e-mail confirmation to the mill any time he receives a questionnaire. If the mill does not receive that confirmation within a couple of weeks of submitting the form, please contact Jules to see if there is a problem.

Figure 1


Fall 2013 Leak Locations
NC = Non Critical
C = Critical
NL = ESP, no leak
Spout Leak

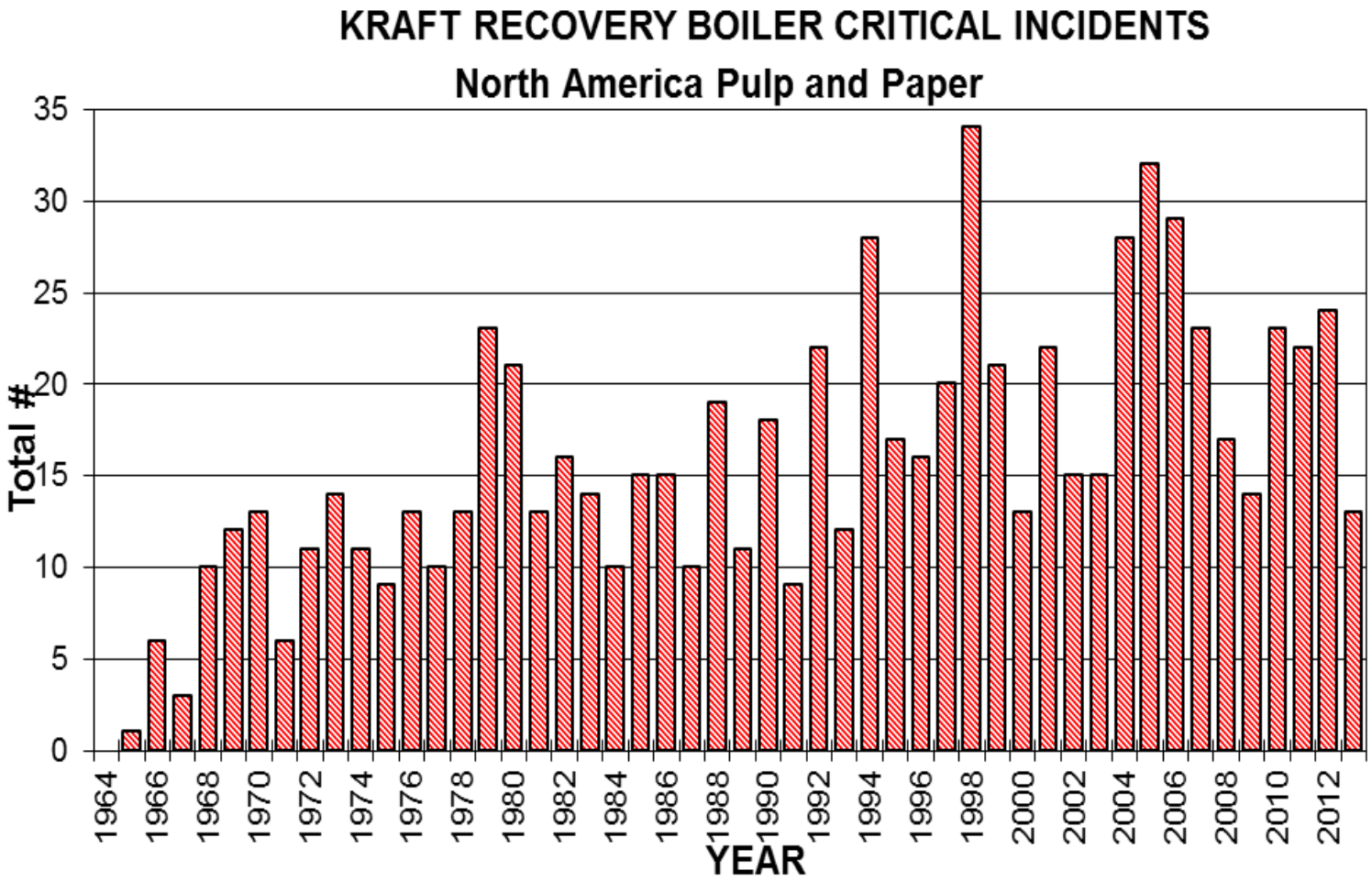


Figure 2
(Critical Exposure Classification Began in 1965, Changed to Critical Incident in 1999)

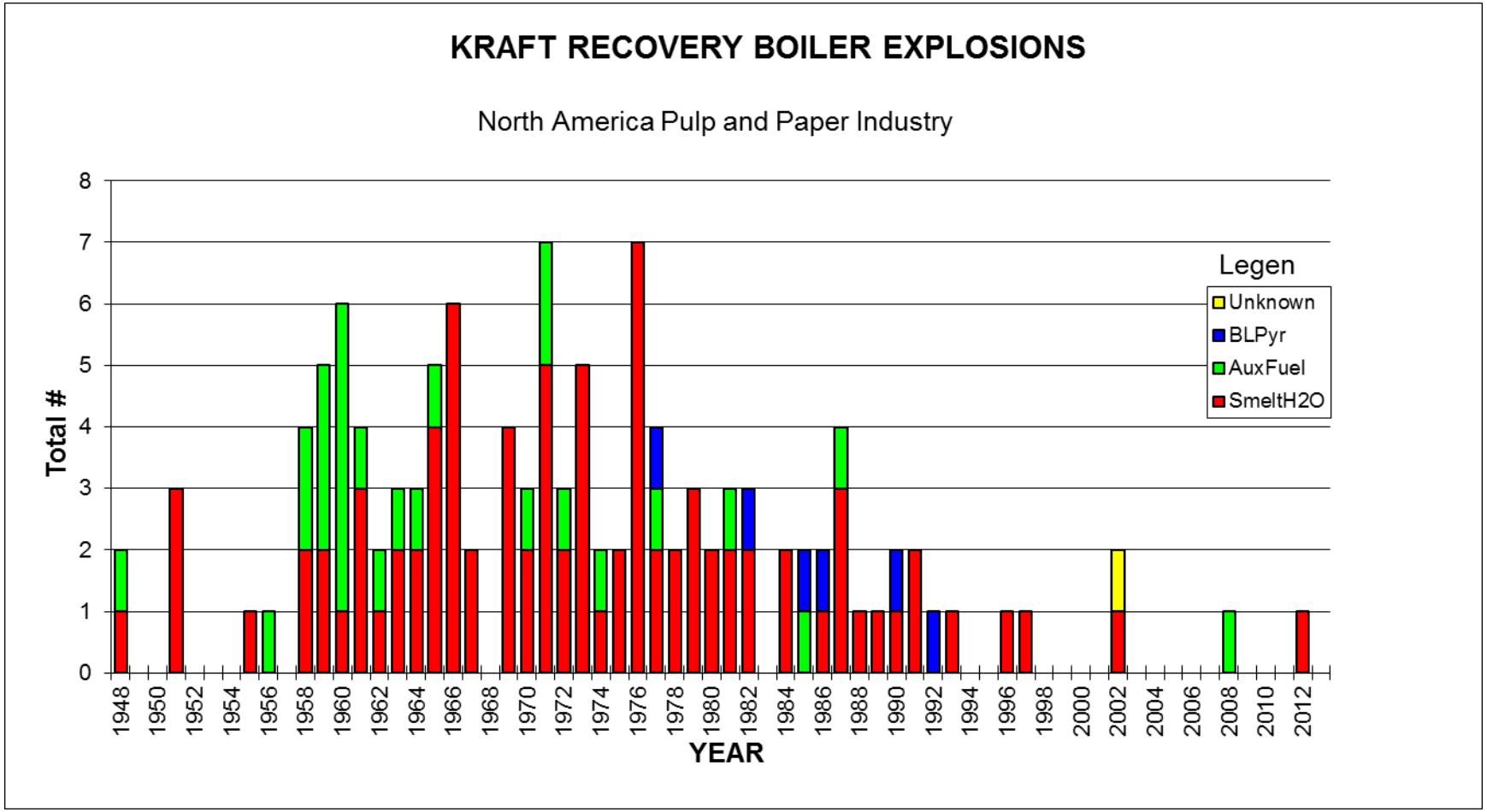
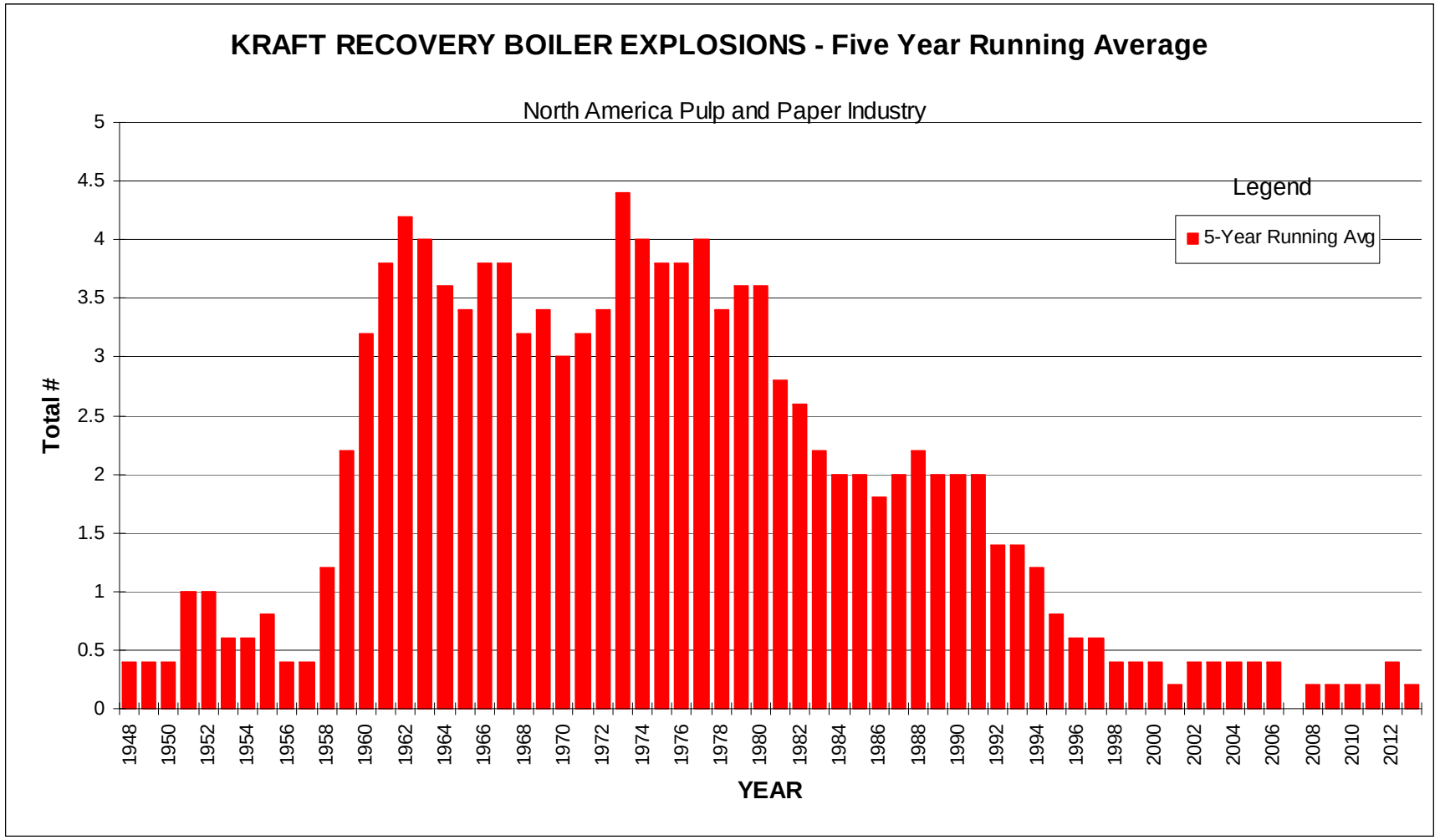

KRAFT RECOVERY BOILER EXPLOSIONS
North America Pulp and Paper Industry
Total #
YEAR
Legen
Unknown
BLPyr
AuxFuel
SmeltH2O

Figure 3


KRAFT RECOVERY BOILER EXPLOSIONS - Five Year Running Average
North America Pulp and Paper Industry
Legend
5-Year Running Avg
Total #
YEAR
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
1948
1950
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
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2004
2006
2008
2010
2012

Figure 4

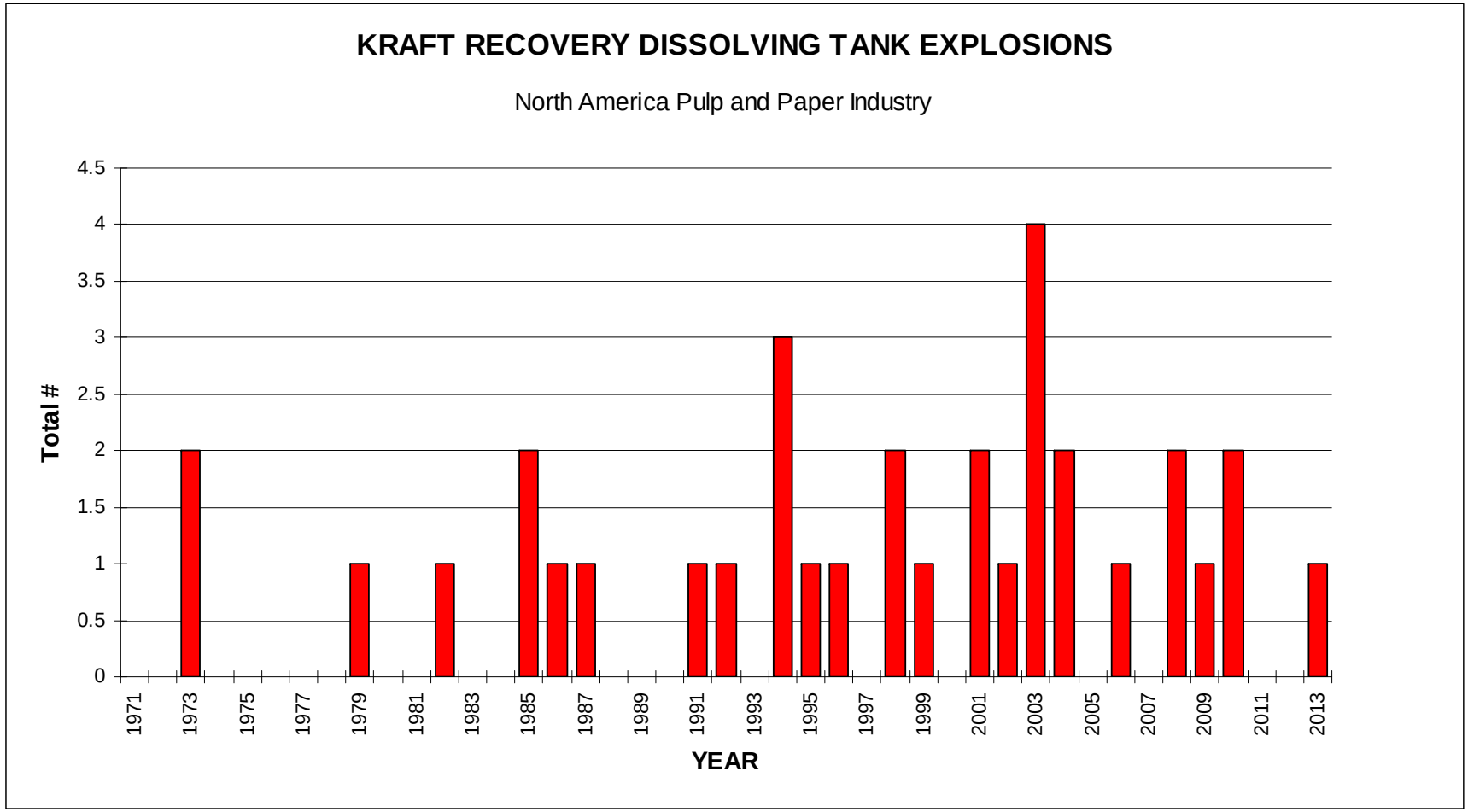
KRAFT RECOVERY DISSOLVING TANK EXPLOSIONS
North America Pulp and Paper Industry
Total #
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
YEAR

Figure 5

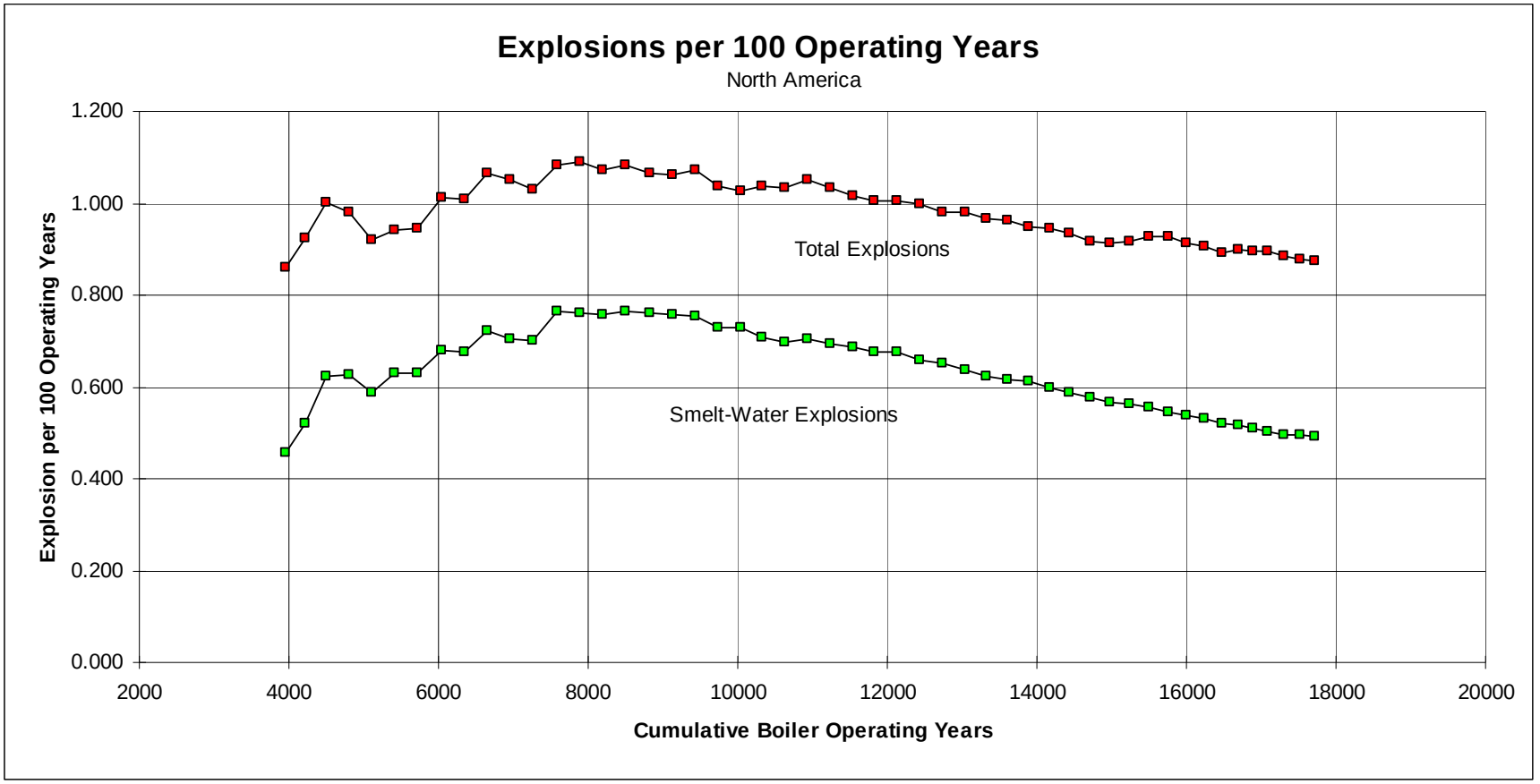
Explosions per 100 Operating Years
North America
Explosion per 100 Operating Years
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Total Explosions
Smelt-Water Explosions
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Cumulative Boiler Operating Years

Figure 6

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

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

The Fire Protection for Direct Contact Evaporators Subcommittee met Monday afternoon in open session. We had a small, but active group with six attendees (three members and three guests). John Nash B&W retired from our committee. We thank him for his many years of service.
Our group normally meets in April on an annual basis in the morning. We will be going back to that routine next April.

We read the Antitrust Statement. We reviewed and accepted the April 2013 minutes. We scheduled this meeting for two key reasons:

- First we wanted to keep moving forward on some document changes.
  - These changes expand on potential actions to consider during upset conditions to avoid fires in direct contact evaporators.
  - We worked on those changes and hope to have something to the Executive Committee within the next month for their review.
- Second reason was this meeting would be a further opportunity to review the March 2013 Cascade evaporator fire at the Kinleith Mill in New Zealand.
  - They had promptly completed the incident form and the incident was reviewed during the April 2013 meeting.
  - We had some questions and recommendations and we received a good, written response from the mill.
  - The real bonus was having Fernando Gatto from the mill attend our meeting. He was able to provide some valuable information and insights. We hope Fernando and the mill gained some insights from our discussions and review as well.
  - The key takeaways:
    - Trust your instruments and have your first reaction be to properly react to the condition they are indicating. An instrument that indicates an abnormal condition or developing emergency is often felt to be malfunctioning.

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

5.4 **FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS REPORT** - (Cont.)

- If you have an outlet ledge or other physical arrangement that accumulates black liquor residue, eventually it could catch fire (cascade evaporators often have that back ledge). Simple and properly located, permanently piped water wash nozzles, can clean those areas. This can prevent fires and might also be a supplement to fire protection.

The committee expresses sincere thanks to Fernando Gatti and Chris Beck for sharing this incident with our committee and the BLRBAC membership.

5.5 **INSTRUMENTATION REPORT** – Dave Avery

The Instrumentation subcommittee met in open sessions on Monday. The morning session began with twelve members and fourteen guests in attendance. We read the antitrust statement and then went around the room with introductions of all attendees. The spring 2013 minutes were reviewed and accepted as presented by the members. Our work began with the final reading of our revised front-end document to "Instrumentation Checklist and Classification Guide for Instruments and Control Systems Used in the Operation of Black Liquor Recovery Boilers".

The background for this revision centers on removing the contemporary wording and phases that time stamp the document to specific technologies but does not alter the original or safety intent. This will allow the front-end document to convey the Recommended Good Practice as intended without being tied to specific technology. Future changes should be minor and allow us to focus on keeping the dynamic checklist updated. The final reading began with page one and carried on to the last page. Minor grammatical corrections were noted and changes are being applied. Our subcommittee agreed at the end of the morning session that the front end document is ready for posting and membership review. The document will be forwarded to the executive committee by the end of November for posting.

The afternoon session with nine members and seven guests engaged in conversation about electing a vice-chair. The subcommittee has to have one for the viability of our group and help us manage leadership changes that naturally occur within our organization. This issue should be resolved at our spring '14 meeting.

As the need for our subcommittee to work with common documents increases we have begun looking for a solution that would allow subcommittee members to have access to working documents between meetings. It also covers a need for a place to file their work at the same location for other members to comment on or use the edited documents for further development. Several cloud solutions are being reviewed for best fit/practice for our group. Implementing a solution should reduce the time to answer question or update documents, hopefully by spring we will have several options to review.

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

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

Finally we are moving on to update the checklist itself, everyone is taking their assignment and should have their edits ready to combine in a revised checklist at the spring meeting. Thanks to the guest who have stopped by and contributed. We are listening and together we will produce an improved document.

5.6 **MATERIALS & WELDING REPORT** – Jesse Worsham for Dave Fuhrmann

The Materials and Welding Subcommittee met in Open Session on Monday morning, October 7, 2013.

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

Attendance

13 members and 15 guests attended the morning session.

Old Business

The meeting minutes from the Spring 2013 Subcommittee meeting were reviewed and accepted.

New Business

Member Resignations

Two members resigned from the subcommittee. They were Terry Parks with the National Board and Billy Walker of CAN Risk Control.

Communication

The subcommittee reviewed a request from the BLRBAC Executive Committee to review our document for commercialization. The committee members will review the document and submit their findings to either Dave Fuhrmann or Jesse Worsham prior to the next meeting in April 2014.

Document Development

The subcommittee worked on the development of Section 2.X Plugging Tubes in Drums and Headers. The subcommittee completed review of the document through Section 2.X.2.

AFTERNOON SESSION

The afternoon session of the Materials and Welding Subcommittee was open and was attended by 12 members and 12 guests.

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

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

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

David Duplissey shared information from National Boiler Service Weld Build-Up Research. *(See Appendix B)*

Len Erickson of Boise gave a presentation on Anatomy of Screen Tube Failure. *(See Appendix C)*

Next Meeting Agenda

New Members: Preston Morgan of CTI Power and Mike Singleton of Domtar have expressed interest in joining the subcommittee.

5.7 **PERSONNEL SAFETY REPORT** – Robert Zawistowski

The Personnel Safety Sub-committee met in an "open" session on Monday, October 7, 2013. There were 10 members (out of 16) plus 29 guests in attendance during the meeting.

Prior to the meeting I received a resignation from Preston Morgan as he is moving over to another Subcommittee. I want to thank Preston for his contributions and the many years he spent on the Personnel Safety Subcommittee. I learned Lynn Rawls has retired and have removed him from the Subcommittee. I also want to welcome William Plappert – Glatfelter, David Von Oepen – Rock-Tenn, and Steve Bogart – Weyerhaeuser (replacing recently retired Jim Hinman) for joining the Subcommittee as new members.

Representation at our meeting by regular members and guests included original equipment manufacturer Babcock & Wilcox and Diamond Power. Representation from insurance and insurance service companies included FM-Global and Sompo Japan. Operating company representation was present at this meeting with representatives from, Boise, Domtar, Georgia-Pacific, Glatfelter, Irving Pulp & Paper, Kapstone, KPAQ, Lonview, Lincoln Pulp & Tissue, MeadWestvaco, Northern Pulp – Nova Scotia, Packaging Corporation of America, Phoenix Pulp & Paper, Port Townsend Paper Corp., Rayonier, Rock-Tenn, Sappi, Siam Cellulose and Weyerhaeuser. Consultant representation included Fuel Tech, Inc., Power Specialists Assoc., Inc. and RSI.

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

A second edit was performed on language changes we made to our main document during the 2013 April meeting and was submitted to the Executive Committee for review.

Language was developed regarding inspection of blow down lines and incorporated into our main document. This was also submitted to the Executive Committee for review.

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

B&W is in the process of developing a Service Bulleting for inspecting supply tubes between the mud drum and screen tube inlet header where it passes through and is welded to generating bank hoppers. We have abandoned adding any language to the Personnel Safety document on this topic.

No action was taken on the development of the Common Practices section during this meeting.

We have developed a permission form for photographs and videos we wish to obtain from mills. This permission form was submitted to the Executive Committee for review and comment. If the form is approved we will start the process of obtaining permission and photographs/video.

The "Forward" for the Common Practices section was edited in April 2013 and resubmitted to the Executive Committee for additional review.

Language in our primary document was edited with reference to Explosion Corners. This new paragraph is 2.2.5 in the main Personnel Safety document and was submitted to the Executive Committee for review. It was pointed out during our meeting there may be a conflict in the recommendations section of the 2001 Grace/Clement report. I will research this information and communicate with Tom Grant – AF&PA.

A new paragraph was developed to address "Management of Change" during the 2013 April meeting. In this paragraph we are recommending mills establish a "Management of Change" policy in either hard or electronic copy. This new paragraph is 2.10.6 and has been submitted to the Executive Committee for review.

A new paragraph was added to our main document recommending mills develop a set of Recovery Boiler Safety Guidelines during the 2013 April meeting. Further editing was done on this paragraph during the 2013 October meeting and submitted to the Executive Committee for review. The intent is improving safety and establishing a more formalized guideline process. In our document we do not specify the extent of the guidelines but do provide a list of suggested topics to consider.

Photos and videos of smelt tests conducted on various garment materials and face shields was reviewed. Carbon X, a company based out of Utah, has conducted tests at one Kraft mill and one Soda mill. Carbon X will conduct additional tests at two more mills; one Kraft and one Soda. We hope to review results from these tests at the April 2014 meeting. To date, the best performing materials "shed" the smelt on initial impact and all materials will fail after multiple smelt hits in the same area. When smelt "sticks" to any material it will burn through. Though all materials eventually fail, the best product performance we have seen to date is Petrolite.

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

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

The topic of clearing plugged hoppers (generating bank, economizer and precipitator) was discussed during the April 2013 meeting. It was noted sometimes the hoppers bridge and when the ash is knocked down the hopper can go positive pushing hot ash out the access door onto the operator(s). This will be researched in greater detail and we will start developing language for initial review during the April 2014 meeting.

A video presentation was shown on the topic "Are You Aware?" This short video illustrated how much you miss in a short period of time when you are trying to pay attention with no distractions. It was used as part of a discussion to illustrate how easy it is to be distracted by a cell phone call or texting when moving about the mill. The emphasis of the discussion was if you need to take a call or text you should stop walking or whatever you were doing and ensure you are in a safe location prior to taking the call or responding to the text.

Between the April 2013 and October 2013 meetings there was one request for clarification/interpretation on the topic of escape respirators. The subcommittee reviewed and answered the question and will return a response to the originator.

Toward the end of the meeting there was a discussion about "Unsafe Acts," a theme we use to discuss near misses and accidents in mills.

In closing, we are always welcome to new committee members who can participate in any capacity even if you can only attend meetings intermittently.

5.8 **PUBLICITY & NEWS REPORT** – Everett Hume

No report given at this meeting.

5.9 **WASTE STREAMS REPORT** – Paul Seefeld
*(Refer also to **Appendix D** for slides used when this report was given.)*

On October, 2013 the Waste Streams Subcommittee met in a closed session at 9:00 AM with eight members and one alternate present. There were three excused absences.

At the start of both the morning and afternoon sessions the BLRBAC antitrust statement was reviewed. The April 2013 meeting's minutes were reviewed, with clarifications, and approved.

We decided to go ahead and make changes to Figure 6 (page 52). Even with the disclaimer, there are numerous questions from member companies attempting to model from this figure. Therefore, the proposed changes to Figure 6 will include:

- Move the shut off valve ahead of the flame arrester (double block).

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

- Remove drains shown as directly associated with vent lines. This occurs in both Figure 5 and Figure 6
- Show a rupture disk/pin instead of a second automatic vent.
- Remove the drain directly associated with the flame arrester.

There was also a question sent to the subcommittee from Weyerhaeuser in Columbus, MS. It was in regard to the valve position table, Table 5, during MFT and ESP conditions. Specifically, the valve positions for three of the valves did not match the text description in the previous paragraph. The subcommittee reviewed this request and decided that the text was correct and the valve positions in the table need to be changed and the clarification note below the table needed to be edited. Changes to Table 5 (Page 50) include:

- S5: Grey blocks are to read "Close" and "Close" during MFT and ESP
- S6: Grey blocks are to read "Open" and "Open" during MFT and ESP
- S7: Grey blocks are to read "Close" and "Close" during MFT and ESP

Note: "Grey blocks: Operation of these valves is opposite of that shown during a planned purge sequence".

The subcommittee reopened three big issues: (1) the permissive definition of stable liquor firing, (2) the mandatory use of the continuous igniter during normal boiler operation, and (3) the requirement of an operator to manually start the waste stream igniter as a permissive to burning CNCG in the recovery boiler.

Topic (1) will be addressed on the Sunday before April 2014 meeting with the Waste Streams, Safe Firing, and Auxiliary Fuels subcommittees being represented.

Topic (2) is somewhat dependent upon the definition of stable firing, but the committee is looking into the possibility of defining a condition to cease using igniter fuel when the boiler is burning liquor under normal operating conditions. We are referring to the Finnish documentation for reference. The key point will be to have temperature indication for guarantee of full destruction.

Topic (3) affects the ability of the operator to make a ventless transfer to a recovery boiler. As recovery boilers are usually the primary point of NCG destruction, this is typically not an issue. However, there are an increasing number of mills routing CNCG to the recovery boiler and some of these mills have two recovery boilers. If the primary and backup destruction devices are both recovery boilers, a recordable venting issue arises. This condition already exists within the industry. The subcommittee is going to investigate the possible use of a camera behind the port or integrated with the NCG burner. We feel that this is actually a safer and more reliable alternative than having an operator physically look into the port. We are attempting to get a technology presentation for the April 2014 afternoon meeting.

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

Again, the committee discussed the possibility of moving to an autumn only meeting schedule. It was decided that we would work through the three big recurring issues before we take the vote to transition.

The subcommittee needs to name a Vice-Chairman of record. There were no volunteers for this position, but we will resolve this issue by the end of the April 2014 meeting

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In the afternoon (open) session, there were seven members, one alternate and ten guests present. We reviewed the proposed changes to Figure 6 and Table 5 with the attendees. There were no questions regarding these two document edits, but the use of the continuous igniter was, again, raised.

The specific question was that if a recovery boiler is used as the alternate source of CNCG destruction and the continuous igniter was engaged, could the operator make a ventless transfer to that recovery boiler. As the rules are written, this is possible. This situation points out a loophole in the document. There is a recommendation to physically verify the CNCG port before lighting the igniter and routing gasses to the boiler. The intent was to eliminate the possibility of unnoticed slag build-up at the port that would divert the direction of the gasses to an unsafe location. If the continuous igniter is always engaged, then there is no specific recommendation to inspect the port before transferring CNCGs. The subcommittee will have to discuss how to address this.

The subcommittee meeting was adjourned at 3:20 PM.

MIKE POLAGYE: I'd like to make a comment, Paul. The documents that we publish are aimed at providing safe operation of the black liquor recovery boilers and nothing that we put in the document is designed to detract from that. But we also have to face the reality of the environmental limits and controls that are being imposed on the mills are and we have to be able to deal with them. I think Paul is trying to walk the tightrope of what you can introduce into a recovery boiler safely and what a mill can do so they don't get fined for spurious emissions. You have your work cut out for you!

PAUL SEEFELD: Yes, if it wasn't for environmental rules, we wouldn't do this. We wouldn't even be having this conversation. I mean the waste stream is going into the recovery boiler because in many cases it really has to. We have to adhere to time and temperature whatever we do; otherwise it is not worth doing. So it is time and temperature and then where does it go safely where we can control it and know what's happening at all times. That is the goal.

JOHN WEIKMAN: I'm just wondering, are you using the European/Finish document for looking at these changes?

PAUL SEEFELD: Just for suggestions.

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

JOHN WEIKMAN: One of the things that I think is quite different in Europe than here, is they are likely to be operating with a higher liquor solids than we do in North America and I'm wondering if that is the reason they may be allowed to do things in a little bit different ways then we do. Maybe we need to look at that a little bit and make sure that's not playing a role in how the burners operate.

PAUL SEEFELD: It's a good suggestion.

CRAIG ADERMAN: I'm sorry I'm not with your subcommittee anymore. I'm with Tom's group now. We are working on another project. But I'm a little concerned about removing the requirement for igniters, given the variability in non-condensable gas streams. I would be very careful with that.

PAUL SEEFELD: Again, that has been voiced. That is something we are looking at. We are not taking that lightly. There are many differences as well as similarities between a recovery boiler and a power boiler, but there are many power boilers burning waste streams without igniters and many without continuous igniters. So these are questions we have to weigh. And again, we're trying to walk a tightrope here. So everything has to be considered. But you are right.

JOHN GRAY: Thank you, Paul. Obviously this is a somewhat controversial subject. It is going to require a lot of thought and a lot of work. As Paul suggested, the best way for your in-put, your thoughts and your views to be voiced and heard is to come to the meeting. Sit in on the meeting with Paul and his group and help them work through this complex subject.

5.10 **WATER TREATMENT REPORT** – Tom Madersky

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

Sixteen subcommittee members and nine guests attended both sessions of the meeting. The subcommittee membership profile for those in attendance was as follows:

- One (1) OEM
- Six (6) mill representatives
- One (1) insurance representative
- Eight (8) BLRBAC Associate Members (5 of the 8 in attendance represented water treatment companies).

The fall meeting activities were as follows:

- In the morning session, the BLRBAC Antitrust Policy was reviewed; the membership lists updated and key line items from the spring 2013 subcommittee meeting were reviewed and accepted.

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

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

- The subcommittee was provided an update regarding the status of resources developed to date. For the benefit of the entire membership, that update is summarized as follows:

  - The first four sections were posted in February 2013 for BLRBAC membership review.

  - To date, we have not received any feedback from the membership regarding those four documents.

  - With that being the case, we discussed the possibility of Beta testing the documents in an actual recovery boiler audit environment. Three paper companies volunteered to include the draft documents in their auditing process. We look forward to the feedback we will receive and the subcommittee will address their respective findings in the spring 2014 session.

  - In preparation for this meeting, over the summer, we performed our own edit of those four documents in an effort to homogenize all of the content. The suggested changes were reviewed and accepted by the subcommittee.

  - One of the editing line items that was addressed by the subcommittee was the establishment of a numbering system for the guidelines and monitoring tools.

  - The subcommittee addressed, in detail, the content of the master list of guidelines and monitoring tools for all four documents and made the changes that would serve to provide clarity and consistency.

  - The **numbering system** as proposed and the changes made to the text were deemed acceptable and the subcommittee agreed that, on an interim basis, we should use that numbering for the Beta testing.

  - In conjunction with the numbering, we also discussed the possibility of changing the original **Outline of Subordination** from alpha-numeric to numeric. The subcommittee decided to put that "on hold" until such time that we received feedback from the Beta testing.

  - Again, we encourage the membership to get back to the subcommittee with your suggestions and comments regarding the resources that have already been posted. We will take any suggested changes under advisement.

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

- During the afternoon session we continued to edit the content of the recovery boiler **Drum, Tube & Header Circuitry** section.

- This section focuses upon the recovery boiler proper and is comprehensive in both breadth and scope. We will require another edit next spring to address all of the suggested changes that will be need to be made to the document.

- We adjourned at 4:10 p.m.

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

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

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

Membership

Currently, 31 companies participate in the Program. There are three other companies (Clearwater Paper [formerly Potlatch], Evergreen [Pine Bluff AR mill], and Woodland Pulp [formerly Domtar's mill] operating recovery boilers that are not in the Program. We continue to encourage these three companies to join with the current members in the cooperative efforts for the safe operation and research to improve the reliability of recovery boilers. All companies operating recovery boilers benefit directly from the Program's activities, including the research. The present Program members represent over 95% of the total production of sulphate pulp in the U. S.

Operational Safety Seminars

This year we held two Operational Safety Seminars in Atlanta and had 100 attendees from 12 companies and 23 mills. Although, last year we had a record number 136 attendees from 17 companies and 32 mills for the two seminars in Atlanta, this year's attendance was very good compared to recent prior years. A number of mills reported that they were unable to send attendees due to outages.

The Committee is discussing the possibility of holding one seminar in the spring and one in the fall. A survey of the mills is under way to determine if this would accommodate those mills that hold their outages in the spring.

The two-half day sessions have improved the format and avoids additional time away from the mill. We continue to receive excellent reviews from the attendees who get valuable information from the dialogue among the attendees and the monitors of the seminars. The committee asks that all companies seriously consider sending people to these valuable seminars.

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

Study on Smelt Dissolving Tank Explosions

Both the Operations and Maintenance Subcommittee and the Research and Development Subcommittee are looking to develop best practices around dissolving tank related issues. The O & M Subcommittee prepared a questionnaire of 68 questions that was sent to all company representatives and mill superintendents to solicit input to develop best practices in operating dissolving tanks safely. As of this date, information has been received from over 90 mills. All information will be treated in a strict confidential manner. Copies of the summary of replies will only be distributed to those mills that submitted information. Dr. Grace is summarizing the results of the questionnaires and will present a preliminary report at the October meeting of the Committee

The O & M Subcommittee also discussed input for potential new projects, including work on developing guidelines on functional trip testing procedures on recovery boilers. These will include how to conduct testing and proposed sequencing of testing interlocks. The Committee also will work on identifying best practices for clearing and preventing plugged/bridged ash hoppers.

Updating "Kraft Recovery Boilers" Blue Book

The revision of the "Kraft Recovery Boilers" blue book is nearing completion. Most chapters have been completed and reviewed. The remaining chapters are expected to be completed by June 30, 2015. The final draft will be reviewed by members of the Subcommittee

Proposal for Research of Protective Clothing and Equipment

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

Other Research Projects Under Review

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

Annual Meetings and Conference

AF&PA's annual Recovery Boiler meetings and Conference will be held in Atlanta February 11 and 12th. As usual, the Conference is open to all operating companies, insurers, vendors and manufacturers. The presentations include reports on the projects currently sponsored by the AF&PA Recovery Boiler Program and subcommittee reports on their accomplishments, reports from Sweden, Norway and Finland on their recovery boiler committees' activities, as well as other research being done outside of AF&PA related to recovery boilers. The object of the Conference is to keep not only the members advised, but also the remainder of the recovery boiler community, as well. We hope that many of you will plan to attend next year's Conference.

7. **NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS REPORT** - Terry Parks

No report given at this meeting.

8. **TAPPI REPORT** – Bentley Sherlock

No written report was submitted.
*(See **Appendix E** for slide presentation used during the meeting.)*

JOHN GRAY: Just a comment, Bentley. I notice that you are in the process of reviewing and revising Tip 41609, Burning of NCG's. Will there be an opportunity for some collaboration here between Waste Streams and what Paul is trying to accomplish with his document?

BENTLEY SHERLOCK: That is a good suggestion. I will mention that to the chairperson and coordinate that.

JOHN GRAY: At the end of the day, those two documents should be in alignment. Right? If we are doing these revisions in a vacuum I think we are making a mistake. So there needs to be some sort of collaboration there. How that is done is up to discussion, but it would seem like there needs to be some collaboration.

BENTLEY SHERLOCK: Sure. It is a good suggestion. We should try to get some consistency as part of the whole point of having interaction.

9. **WESTERN CANADA BLRBAC REPORT** – Shawn Casey

Western Canada BLRBAC continues to meet twice a year following the Atlanta BLRBAC meeting

Next month, November 5th & 6th, we will be holding our 50th anniversary meeting in Vancouver at the Coal Harbour Coast Hotel. To celebrate this historic event we will be going on a dinner cruise around the city.

Our meetings continue to be a success with at least 16 Mills having representation.

The Vendors and Suppliers also are well representative and continue to support the BLRBAC. Without them the meetings wouldn't be successful.

During the meeting the membership reviews submitted incidents and discusses other issues that impact the operation of recovery boilers.

The manufacturers present updates from their Company as well. We now have a full day of Technical papers from several presenters.

We appreciate the learning that I bring back from Atlanta and continue to utilize your in-depth web site.

Although safety is the main purpose of these meetings and we classify incidents as critical and non-critical, for our mills to compete and be successful in the world economy, we need to keep our boilers operating with high efficiency and availability, so downtime reduction is critical for financial success.

9. **WESTERN CANADA BLRBAC REPORT** - (Cont.)

So all incidents now are critical to a mill's viability, and anything we can learn from incidents, including those involving economizers, to keep boilers running is very important,t which makes this meeting very valuable. Again, I would like to thank the ESP subcommittee for the work we do in the closed session and the learnings I personally gain from their knowledge, as there is a wealth of knowledge and experience in the room.

I was also very happy to hear that the eastern Canada BLRBAC has started to meet again, as like I've said, the BLRBAC meetings are very important to help mills solve and discuss issues; and as an operator, just knowing there are people who you're able to contact when problems come up in times of pressure is a very good thing. With that I again extend an invitation to anyone who would like to venture north and attend our meetings.

10. **ACTIVITIES OUTSIDE NORTH AMERICA REPORTS**

No reports given at this meeting.

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

The Operating Problem Solving Session was held during the afternoon of Tuesday, 10/08/13. Attendance was high and a total of 32 individual problems/issues were submitted for group discussion and exploration. These included:

- Green liquor density measurement (refractometers, standpipe versus sample line, bubble pipe, and use of chemicals to control scaling)
- Drum level device failures (protocols & procedures)
- Flushing techniques for a single drum boiler following a chemical cleaning
- Impact of high char bed temperatures on floor tubes
- Leak detection systems
- Precipitator purging
- Furnace temperature measurement options
- Issues with soap burning in a recovery boiler
- Natural gas versus oil to burn out a smelt bed
- Boiler drying after a water wash (methods & time durations)
- Impact on tube failures by going 18 months (or longer) between outages

ACTING CHAIRMAN JOHN GRAY:

This concludes our Main Committee Meeting topic. Remember that immediately following this meeting we have two brief Technical Presentations:

"Maintaining Steam Purity - Best Practices"

to be presented by Luis Carvalho of Chemtreat

"Predictive Leak Detection on Recovery Boiler Economizers and Boiler Banks - Technology & Results"

to be presented by Kari Aura of Andritz

Are there any other questions or comments concerning the meeting today?

C. A. VOSSBERG: Just something brief for the Executive Committee to consider. In the Safe Firing of Black Liquor report it was mentioned about removing any references to brands of manufacturers. It may be helpful for the Executive Committee to consider reviewing the Operating Policies and procedures document and consider adding a clear statement referencing something to that effect. I briefly looked at it and there is a Conflict of Interest statement and an Anti-Trust statement, but there is nothing that clearly says that BLRBAC doesn't endorse any specific brands or manufacturers that I could find; at least not quickly. We all understand that this doesn't occur, but it might help for people who are new to BLRBAC to have a clear statement to refer back to.

MIKE POLAGYE: Yes, In fact that was talked about last night at the Executive Committee Meeting. There are some changes going to be made to that Policy and Procedures Document that will include the issue of commercialism. So, I think we will look at the updates and see if it addresses it the way people need to see it addressed. I think we are going in that direction. So, thank you.

I'd just like to make one other comment. We do get people here from outside of North America. Some come from long distances. We have an opportunity in our Main Committee Meeting for reports from outside of North America. We don't expect that everyone who comes from other countries will have reports, but we certainly would like to encourage our participants traveling all that distance that, if they would like to make a report on the activities regarding recovery boilers in their country or in their area of the world, they should let us know and we'd be very happy to have them come to the podium and share with us what they are doing.

ACTING CHARIMAN JOHN GRAY:

Any other questions or comments? If not, can I have a motion to adjourn the business portion of the meeting? Second? All in favor? Opposed? The business portion of the fall 2013 BLRBAC meeting has been concluded. Thank you for your participation. Everyone have a safe trip home!

NEXT MEETING – April 7, 8 & 9, 2014, Crowne Plaza Hotel, Atlanta, GA.

ESP ONLY – No Leak

FALL 2013-01	
Classification:	**ESP Only – No Leak**
Location:	**Domtar, Ashdown, AR**
Unit:	#2 RU, 1979 CE #27477, 2 drum, Large Econ, Decanting hearth
Unit Size:	4.2 MM lb ds/day; 600,000 lb/hr steam at 850 psig, 850°F, 1075 psig design
Incident Date:	February 23, 2013
Downtime hrs, leak/total:	124/124
ESP?	**Yes**
Leak/Incident Loc:	No Leak
How discovered:	Operator noticed an unusual disturbance in the floor camera
Wash adjacent tube:	n/a
Root cause:	unknown
Leak detection:	Yes Recovery Boiler Advisor mass balance by Alert Systems Inc
Bed cooling enhanc	Yes Sodium Bicarbonate injected with lances, Southland
Last full inspection:	Oct. 2012
Sequence of events:	**23Feb13 11:00** – Maintenance was performing work on the "B" Refractometer and tripped the boiler. **11:45** - Operator was in process of refiring the boiler when he noticed an unusual disturbance in the floor camera. In the camera, the bed was popping. The operator felt that there was a floor tube leak. The boiler was cleared and an ESP was initiated. All ESP interlock actions performed properly. All operator responsibilities around an ESP were followed. The building was entered after the minimum 12-hour wait time (per SOP). The boiler was locked out to allow boiler doors to be opened. **24Feb13 02:00** Southland Fire and Safety was rigged up and began breaking up / cooling the bed with sodium bicarbonate. **25Feb13 15:00** After approximately thirty-seven hours, the bed was probed and no spots over 800F were found. 18:00 The water wash was initiated. The cooling period from ESP to initiation of water wash was approximately 54 hours. After the water wash, the boiler was hydrostatically tested. The boiler was held at 850 psi for three hours. Scaffold was put across the top of the superheater for a visual inspection for leaks and any salt cake buildup that would prevent entry to the lower furnace. There were no leaks or build-ups identified in the upper furnace. The lower furnace was inspected for leaks and none were found. **27Feb13** The boiler was unlocked and prepped for firing. **04:00** Initiated gas fire. **14:30** Liquor was put in furnace.
Repair procedure:	n/a
Future prevention:	Although camera resolution was not a contributor, we are working with engineering to initiate a project for new cameras on 2RB

ECONOMIZER

FALL 2013-02	
Classification:	**CRITICAL INCIDENT 794**
Location:	**Irving Pulp & Paper, Saint John, New Brunswick, Canada**
Unit:	1972, Babcock & Wilcox, #745901, 2-drum, 1987 Large economizer, Rear sloped hearth
Unit Size:	4.00 MM lb ds/day; 591,000 lb/hr steam at 947 psig, 818°F, 1425 psig design
Incident Date:	June 30, 2012
Downtime hrs, leak/total:	40.7 Hours (LIQUOR TO LIQUOR)
ESP?	NO
Leak/Incident Loc:	1/8" Pinhole Leak in tube to header weld, economizer top outlet header right side
How discovered:	Walk down. Found steady stream of water coming out of ID Fan tell-tail & fan door seal
Wash adjacent tube:	NO
Root cause:	Porosity/inclusion in original manufacture weld
Leak detection:	None formal. Use Rec ID Fan Tell-tail and fan door
Bed cooling enhanc	NO
Last full inspection:	May 2011
Sequence of events:	**30June12 0800**: During walk-down, saw a continuous stream of water coming out of Rec Boiler ID Fan tell-tail and out around door seal on ID fan. **08:01**: Immediately reported findings to Shift Supervisor, Panel Operator and Senior Field Operator. **08:06**: Panel operator immediately searched for any indications of a leak [draft change, steam/feedwater change, bed condition (cameras)], using our "Recovery Boiler Pressure Part Leak Detection" SOP R309-76, and took soot blower system offline. **08:10**: After no indications of a leak were found on the panel, two senior field operators checked: Boiler Bank Hoppers (no water), Economizer Hoppers (no water), listened for leak and visually confirmed no issue with smelt bed. This visually confirmed no imminent threat of water reaching the smelt bed. No ESP required. **08:10**: While boiler was being walked down, Shift Supervisor had panel operator start controlled shutdown; adding oil to furnace, removing liquor and cooling furnace down, using our "Recovery Boiler Shutdown" SOP R309-02E. **08:15**: All non-essential personal were removed from building. A notice was sent out using the mills notification system, to stay out of boiler building due to Recovery Boiler pressure part failure. **08:20**: Shift Supervisor notified Recovery Superintendent. **10:45**: Fourth and final gun out, Boiler off Liquor. **15:30**: Bed burned out and last oil gun out. **20:30**: Boiler cool-down finished. **21:30**: Water and Gas Side lockouts applied and water wash started. **1July 0800**: Started repair. **17:30**: Repair Complete. **18:15**: Boiler Hydro complete, SOP R310-03. **19:00**: Performed "Recovery Boiler Pre-Start Checklist" SOP R310-11. **19:30**: Performed "Recovery Start Up Trip Checks" SOP R310-04. **21:00**: Checked oil system using "Recovery Boiler Oil System Pre- Start Checks" SOP R310-16, brought boiler online with oil. **2July 04:30**: Boiler on all liquor.
Repair procedure:	Ground out area, NDT, and re-welded using SMAW. B&W Weld Proceedure 1010179
Future prevention:	One previous leak, Dec 2001, in almost same area as current leak. The failure appears to be result of an existing flaw in a shop weld which over time developed into a leak path. The type of failure and random location of occurrence make prediction of subsequent failures impossible. In addition, tube spacing of subject tube to header welds make access for inspection very difficult. The tube to header welds will be monitored during operation and inspected during subsequent hydrostatic tests on unit to prevent operational exposures.

ECONOMIZER

FALL 2013-03	
Classification:	**Non-Critical**
Location:	**International Paper, Cantonment, Pensacola, FL**
Unit:	RB1, 1975, B&W, PR171A, 2-drum, Tampella economizer
Unit Size:	2.89 MM lb ds/day; 455,000 lb/hr steam at 850 psig, 850°F, 1000 psig design
Incident Date:	September 21, 2012
Downtime hrs, leak/total:	26.5
ESP?	No
Leak/Incident Loc:	Two 1/16" pinholes side by side in 4" mini header in weld to 6" main header at tube 31 from RHSW, downstream of 6" header to the 4" bend that feeds finned tubes, economizer inlet.
How discovered:	Leak Detection, panel. System displayed yellow visual alarm indicating short term disturbance
Wash adjacent tube:	No
Root cause:	Weld porosity with possible corrosion leading to surface of tube.
Leak detection:	Yes. IP 1998 mass balance. Indicated leak first.
Bed cooling enhanc	No
Last full inspection:	April 2012
Sequence of events:	**21Sep 07:45** Leak Detection system displayed yellow visual alarm. Checked hoppers. 08:30 Saw water in wet hopper just below 5th floor. Dry hoppers immediately inspected. 08:45 No evidence of any water was found. 08:55 Visibility poor due to dust. Known that leak was below the sixth floor, arch, and not in boiler. 09:05 Began orderly shut down. Liquor pulled. 10:30 Located leak. 12:42 Bed burned out and unit down. Did repairs. Hydro OK. 15:10 Unit on line. 16:07 Liquor fired.
Repair procedure:	Ground out porosity defect in shop weld.. NDT prior to repair Defect welded. NDT OK. Adjacent tubes tested OK; no washing. Hydro OK
Future prevention:	Review 2011 extensive digital X-rays of 100 % of welds in mini header. Re-X-ray any indications. Similar leaks Oct 2010 & Jun 2011. Sister #2 RB had similar leak August 2010. All failures similar with defect in bottom dead center of tube and repair is relatively easy. Note hanger rod adjustment in March 2011.

ECONOMIZER

FALL 2013-04	
Classification:	**Non-Critical**
Location:	**International Paper, Rome GA**
Unit:	#5 RB, 1989, Tampella, #254-583, 1 Drum Large econ, Decanting hearth
Unit Size:	5.44 MM lb ds/day; 655,000 lb/hr steam at 850 psig, 780°F, 1160 psig design
Incident Date:	January 22, 2013
Downtime hrs, leak/total:	40 / 60
ESP?	No
Leak/Incident Loc:	Longitudinal crack in the last 6" of the membrane bar at economizer tube at end of previous weld repair just before the bottle headers, which was made at membrane to tube weld due to hopper attachments being made directly to membrane
How discovered:	Walk down. Saw wet salt cake in hopper at discharge of hot economizer
Wash adjacent tube:	No
Root cause:	Poor design of hopper attachment weld directly to tube membrane bars, transferring load to welds
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	April 2012
Sequence of events:	20Jan: During walk down, saw water in hopper (non-critical location). Monitored and logged every hour. Run until Tuesday for mini outage for spout change and lower furnace inspection
Repair procedure:	Pad weld
Future prevention:	Review hopper design. Repairs on September 2013 outage

ECONOMIZER

FALL 2013-05	
Classification:	**Non-Critical**
Location:	**International Paper, Valliant, OK**
Unit:	#2 RU, 2006 Andritz, 400084, 1-drum, Large econ, Decanting hearth
Unit Size:	6.7 MM lb ds/day; 943,000 lb/hr steam at 1250 psig, 925°F, 1500 psig design
Incident Date:	Feb 19, 2013
Downtime hrs, leak/total:	24
ESP?	**No**
Leak/Incident Loc:	1" circumferential crack in heat-affected zone of No. 1 (cold) Economizer tube to lower header attachment weld
How discovered:	Walk down. Found water in economizer hopper
Wash adjacent tube:	No
Root cause:	Fatigue crack
Leak detection:	Yes Hercules LeakTrac mass balance; confirmed leak.
Bed cooling enhanc	No
Last full inspection:	June 2011
Sequence of events:	During rounds, operator found water in #1 economizer hopper. The boiler was taken off liquor, cooled down and locked out.
Repair procedure:	Leak indication was ground out and pad welded (SMAW).
Future prevention:	4 economizer #1 feed tube leaks on lower header. One tube has leaked twice after repairs. Will schedule inspection and modification of restraints.

ECONOMIZER

FALL 2013-06	
Classification:	**Non-Critical**
Location:	**International Paper, Cantonment, Pensacola, FL**
Unit:	RB1, 1975, B&W, PR171A, 2-drum, Tampella economizer
Unit Size:	2.89 MM lb ds/day; 455,000 lb/hr steam at 850 psig, 850°F, 1000 psig design
Incident Date:	March 5, 2013
Downtime hrs, leak/total:	20.3
ESP?	No
Leak/Incident Loc:	Circumfrential crack was on 90 degree bend of the 4" mini header #61 that feeds finned tubes, 4.5" above weld to 6" main header, economizer inlet.
How discovered:	Walk down. Saw water in wet hopper below 5th floor
Wash adjacent tube:	No
Root cause:	Cyclic stress
Leak detection:	Yes. IP mass balance
Bed cooling enhanc	No
Last full inspection:	April 2012
Sequence of events:	5Mar2013: 07:15 Walk down. Saw water in econ wet hopper. 07:30 Found no water in dry hopper nor above arch or generating bank. 07:45 Leak visible in safe lower econ omizer. Planned orderly shutdown and bed burned out. 6Mar 00:03 Unit shut down Made repairs Did hydro OK. 08:21 Unit on line. 08:33 Liquor fired.
Repair procedure:	Ground out defect. NDT prior to the repair. Weld repair. Post weld NDT.
Future prevention:	Review 2011/2012 digital X-rays of weld area of 80 platens, and re-X-ray any indications. Study header and miniheader bracing. Note hanger rod adjustment in March 2011.

ECONOMIZER

FALL 2013-07	
Classification:	**Non-Critical**
Location:	**MWV (MeadWestvaco), Covington,VA**
Unit:	RB2, 1991 Gotaverken, #61-2500, 1-drum Large Econ, Front-sloped hearth
Unit Size:	5.0 MM lb ds/day; 769,000 lb/hr steam at 1550 psig, 950°F, 1840 psig design
Incident Date:	April 29, 2013
Downtime hrs, leak/total:	29.4 / 32.1
ESP?	**No**
Leak/Incident Loc:	¼" pinhole transverse crack in toe of weld start-stop, tube 14, platen 93 at lower bottle header to riser tube attachment, bottom of cold Economizer 1
How discovered:	Walk down. Saw wet salt cake in & water running out of #1 (cold) economizer ash conveyor
Wash adjacent tube:	**No**
Root cause:	Original Manufacturer's Weld Defect
Leak detection:	Yes – Mass Balance, Chemical Balance – confirmed leak
Bed cooling enhanc	**No**
Last full inspection:	April 2013
Sequence of events:	**29Apr 08:00** During walk down, saw water running out of #1 (cold) economizer drag conveyor. Began bed burn down while monitoring steam system for changes. **11**:38 Began #6 fuel oil aux fuel firing. **11:45** Reduced load. **14:08** Bed burned out. Liquor pulled. Very small leak seen at cold econ lower bottle header. **15:45** Unit off line. Cooled for 5.5 hours. Econ tube temps down to 264F. **21:15** With forward sootblowers blocked, charged #1 econ blowers with 180F water and washed #1 econ. **22:15** Econ clean. Lock-out, entered econ, verified and marked leak. Drained water side. Repaired leak. No hydro. **30Apr** Prep'd unit for firing. **14:05** Lit off unit. **21:10** On line **22:11** Liquor fired.
Repair procedure:	The defect was ground out, liquid penetrant (LP) tested, rewelded, and LP'd
Future prevention:	9 previous similar leaks. Ran reduced load previous 4 days with all soot blowers.Do not run all economizer sootblowers when at reduced loads.

ECONOMIZER

FALL 2013-08	
Classification:	**Non-Critical**
Location:	**RockTenn, West Point, VA**
Unit:	#5, 1992, B&W, PR 219, 1 drum, Large economizer, Rear-sloped hearth
Unit Size:	3 0MM lb ds/day; 493,000 lb/hr steam at 1200 psig, 900°F, 1225 psig design
Incident Date:	May 14, 2013
Downtime hrs, leak/total:	53
ESP?	No
Leak/Incident Loc:	½-around 3.25".circumferential crack in tube, below top header weld, 2 inches below header, right below roof, outlet economizer section, 8th pendent from right wall, front
How discovered:	Walk down Saw water coming out of the front economizer ash hopper
Wash adjacent tube:	No
Root cause:	Inconclusive. Tube experienced high stress. Some vertical distortion. All vibration supports and header hangers were in place and loaded properly.
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	March 13, 2013
Sequence of events:	**14May 05:40** Unit taken down for water wash. **10:00** During walk down, saw large amount of water draining from front economizer ash hopper. Located large leak first tube on right, just below front (hot) economizer outlet header on 8th pendent from right hand wall, Did unit cool down. Did boiler bank and economizer water wash. Installed scaffolding. Made repair. Hydro good. **16May 09:00** Unit returned to service
Repair procedure:	Weld repair was completed thru a window cut in front of tube since smallest burr grinder we had would not fit behind tube to dress crack. Crack ground out to provide a full penetration weld. Repair welded from inside of tube with carbon steel filler metal using SMAW process. Performed PT testing and visual weld inspections. First hydro test after tube repair did not hold. Found an additional pin hole from another root cause 1/4" below the bottom window weld. (not caused by window welding). Pin hole was ground out and welded over. First PT test on pin hole repair revealed porosity. Ground out and re-welded. The second pin hole PT test confirmed a good weld repair.
Future prevention:	-- No similar failures.

SUPERHEATER

FALL 2013-09	
Classification:	**Non-Critical (BUT lots of unknowns: Potentially CRITICAL)**
Location:	**International Paper, Franklin, VA**
Unit:	#6 RB 1977 B&W PR-185, 2 Drums Large economizer, Rear-sloped hearth
Unit Size:	5.0 MM lb ds/day; 655,800 lb/hr steam at 1500 psig, 900°F, 1700 psig design
Incident Date:	July 9, 2012
Downtime hrs, leak/total:	94.5 / 94.5
ESP?	No
Leak/Incident Loc:	6 inch fish mouth rupture at bottom outer bend loop of primary superheater tube, side Primary SH Inlet , platen 12
How discovered:	Panel. High furnace pressure and steam feedwater split was observed on DCS..
Wash adjacent tube:	No
Root cause:	Incorrect drum level measurement allowed carry over of feedwater from steam drum to primary superheater, with rapid overheat of primary superheater bottom outer loop tube to rupture.
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	February 2012
Sequence of events:	Unit recently modified by removing screen tubes and adding tertiary superheater section. **8Jul12 22:40** Unit tripped due to west precipitator inlet gate support arm breaking. Unit was purged. 23:50 Fire back in (not on line). Difficult time controlling drum level due to feed water bypass valve leaking by. Had to keep mud drum blow downs open to prevent high drum level trip. **9Jul 00:53** Clark Reliance was reading full at +14 inches, even though 3 level transmitters only read a +9. Stopped electric feedwater pump since both mud drum blow downs were 100% open. Continued to bring unit back online. **01:36** Operator noticed high furnace pressure and a split in feedwater- steam flow differential. At west liquor gun port could hear blowing in furnace and immediately told operator to trip unit. ESP NOT performed due to lack of a bed in furnace.
Repair procedure:	Removed primary pendent out of furnace and capped each end in penthouse. Attached tertiary tube pendant was pulled back in to place and clamped to adjacent 2 pendants on each side.
Future prevention:	Drum level transmitter's compensation was found to be incorrect. Mill will verify drum level trips at pressure annually as a part of its "trip checks". Clark Reliance was added to drum level trip logic. Operators will monitor Clark Reliance and level transmitters during start-up and operation. A leaking feedwater bypass valve was replaced.

IP comment at meeting: Definitely drum carry-over. More input that it is Critical Incident.

SUPERHEATER

FALL 2013-10	
Classification:	**Non-Critical**
Location:	**International Paper, Franklin, VA**
Unit:	#6 RB 1977 B&W PR-185, 2 Drums Large economizer, Rear-sloped hearth
Unit Size:	5.0 MM lb ds/day; 655,800 lb/hr steam at 1500 psig, 900°F, 1700 psig design
Incident Date:	November 5, 2012
Downtime hrs, leak/total:	118 hr/118
ESP?	**Yes**
Leak/Incident Loc:	Split/rupture tube at bottom weld outer bend loop, side Primary SH Inlet , platen 21
How discovered:	Walk down While at liquor guns, heard loud blowing noise in furnace.
Wash adjacent tube:	No
Root cause:	Rapid overheat of primary superheater outer loop, possibly from condensation formed during trip restart and going on line. Operators failed to insert the flue gas pyrometer which could have shown over heat on the primary superheater if the tubes were not properly cleared.
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	July 2012
Sequence of events:	Unit recently modified by removing screen tubes and adding tertiary superheater section. **5Nov: 11:08** ID fan turbine tripped. Boiler tripped on high furnace pressure. ID fan turbine reset. Boiler purged. **11:36** Fire back in unit. Drum pressure down to 1350 psi and dropped to 1050 psi before enough natural gas was in unit to build pressure back up. Followed normal start-up curve. **12:19** Unit back on line. **12:38** Drum pressure started to fall (likely time of rupture). At same time, unit started to push steam to rest of mill. **12:58** Operator at gun ports heard loud blowing noise in furnace. ESP'd unit
Repair procedure:	Replaced blown loop that failed with Dutchman and replaced several other loops that were bent from tube failure
Future prevention:	Revised start-up procedure to include trending on all the superheater tube temperatures to visually see the bump of the water leaving the tube and have a supervisor sign off that the loops are cleared. Since the screen tubes have been removed from the boiler it is very important to keep the flue gas temperature below 900 degrees until all loops have cleared. Perform full NDT of the primary superheater section during 2013 outage

SUPERHEATER

FALL 2013-11	
Classification:	**Non-Critical**
Location:	**Harmac Pacific (Nanaimo Forest Products) Nanaimo, BC CAN**
Unit:	#5 CRU 1951, C E, CA – 51126, 3 drum, B&W large economizer, decanting hearth
Unit Size:	1.3 MM lb ds/day; 210,000 lb/hr steam at 600 psig, 750°F, 730 psig design
Incident Date:	April 6, 2013
Downtime hrs, leak/total:	140
ESP?	Yes
Leak/Incident Loc:	¾ -Around circumferencial fatigue crack both outlet hanger tubes, just above roof plates, 5th platen, Hi-temp SH
How discovered:	Walk down. Soot blowers off. Heard excessive noise coming from SH-Gen bank area
Wash adjacent tube:	No
Root cause:	Fatigue stress cracks due to swaying platen due to broken off missing soot blower nozzle
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	March 2013
Sequence of events:	**6Apr** During walk down with soot blowers off. Heard excessive noise coming from upper floors left side of unit. Actual leak not visible. Confirmed severe difference in the Steam/Water flows. **04:05** ESP'd unit. 24 hour cool down period. Thermo probe inserted into smelt bed to monitor bed temp. **7Apr** Water-washed unit. Began repairs.
Repair procedure:	Failed 5th platen outlet hanger tubes were removed and replaced.. Close inspection of both inlet hanger tubes of 5th platen indicated potential crack development. Both inlet hanger tubes were removed and replaced Unit was hydroed OK. Insulating refractory was re-installed on roof. Unit returned to service.
Future prevention:	

SUPERHEATER & NOSE TUBE UPPER FURNACE

FALL 2013-12	
Classification:	**Critical Incident 795** due to nose tube leak
Location:	**Evergreen Packaging Inc, Pine Bluff, AR**
Unit:	#4 RB, 1968 B&W, PR-113, 2-drum DCE cyclone, Rear-sloped hearth, 2006 boiler bank tubes
Unit Size:	3.9 MM lb ds/day; 518,000 lb/hr steam at 1250 psig, 925°F, ? psig design
Incident Date:	June 6, 2013
Downtime hrs, leak/total:	69/70
ESP?	Yes
Leak/Incident Loc:	Thinned fish-mouth rupture in primary section rear side middle of superheater bank
How discovered:	Furnace pressure trip and sound
Wash adjacent tube:	No
Root cause:	Overheat. Superheater TC's did not indicate any overheat when on line after 08:40 trip
Leak detection:	No
Bed cooling enhanc	Yes. sodium bicarbonate
Last full inspection:	Sept 2012
Sequence of events:	**6Jun** Reducing load to isolate flue gas path east side to make duct work repairs. **08:40** Unit tripped. **09:25** Fire in unit. **10:13** Liquor back in. **10:29** Unit tripped on high furnace pressure. **10:30** ESP'd unit. All ESP functions worked including evacuation system. Area barricaded for 4 hour waiting period. **14:30** Found super-heater leak in primary section rear side middle of bank. **15:30** Bed cooling procedure until temperature below 800F.**20:00** secured, washed and scaffolded unit for repair. **14Jun 08:00** Started repair. Also repaired two tubes with soot-blower rubs. Attached shields. Performed UT on primary superheater platens. No thin tubes found. **16:30** Did hydro. Found leak on nose arch tube NE corner where attached to wall tube (possible ESP stress). Cut out wall tube for access. **08:30** Nose tube repaired. **12:30** X-ray wall tubes. **14:30** Started fill..**23:40** Fire in boiler. **15Jun 07:40** On liquor.
Repair procedure:	--
Future prevention:	--

BOILER

FALL 2013-13	
Classification:	**Critical Incident 796**
Location:	**Rayonier PF, Jesup, GA**
Unit:	#6 RB, 1982 CE unit, contract #24579-, 2 drum, Large economizer, Decanting hearth
Unit Size:	6.78 MM lb ds/day; 1,000,000 lb/hr steam at 1325 psig, 900°F, 1590 psig design
Incident Date:	April 11, 2013
Downtime hrs, leak/total:	113
ESP?	Yes
Leak/Incident Loc:	Partially sheared tube #52, row 5, at mud drum of generating bank
How discovered:	Walk down.
Wash adjacent tube:	No
Root cause:	Fatigue failure. Excessive vibration due to failed vibration bars
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	March 2012
Sequence of events:	**11Apr am** Drum level trip Unit off line, but smelt bed present.. **09:35** noted water dripping down onto the 7th floor from up under the mud drum. 09:48 Boiler ESP'd. 12-hour wait period. Water wash. Found gen bank tube #52, row 5 partially sheared at the mud drum, along with many missing vibration bars on this left side of bank
Repair procedure:	Plugged gen bank tube #52, row 5. New vibration bars fabricated and replaced where missing
Future prevention:	Vibration bar reliability is an issue for some time. Numerous bars require replacement each year during annual outage. Over past year boiler has experienced increased pluggage due to elevated chlorides and an underperforming air system. This necessitated more aggressive gen bank sootblowing, which contributed to accelerated vibration bar failure rate and this subsequent fatigue failure. Complete gen bank vibration bar system scheduled for replacement with better handcuff design during May/June 2013 outage. Boiler air system also being modified to help reduce pluggage and need for aggressive sootblowing. Entire gen bank replacement scheduled for 2014.

BOILER

FALL 2013-14	
Classification:	**Critical Incident 797**
Location:	**Evergreen Packaging Inc, Pine Bluff, AR**
Unit:	**#4** RB, 1968 B&W, PR-113, 2-drum DCE cyclone, Rear-sloped hearth, 2006 boiler bank tubes
Unit Size:	3.9 MM lb ds/day; 518,000 lb/hr steam at 1250 psig, 925°F, ? psig design
Incident Date:	April 13, 2013
Downtime hrs, leak/total:	70/75
ESP?	No
Leak/Incident Loc:	Tubes 6 & 7, row 40, back side of boiler mud drum,adjacent to soot blower lane,
How discovered:	visual external leak, drop in chemical residuals
Wash adjacent tube:	Yes -2
Root cause:	Bad roll of tube into mud drum
Leak detection:	No
Bed cooling enhanc	Yes
Last full inspection:	Sept 2012
Sequence of events:	**12Apr 18:00** Saw wet spot on outside of hopper. Shut blowers. Opened doors. Nothing found or heard. **13Apr 02:00** Phosphate residuals dropping. Saw water dripping on outide of hopper. Burned out bed to inspect. **05:25** Off liquor. Burning out bed. No water visible entering furnace. 08:50 Gas out. Unit cooling. No noise. Opened doors. Nothing visible. Decided to wash, inspect and make any necessary repairs, and do other work on unit. **15:00** Start water wash. **14Apr 04:00** Water wash complete. Filled for hydro. **10:00** Found 2 leaking tubes, 1 washed from original leak. Did repairs. **15Apr 08:30** Hydro. Found third leak tube 7 row 39. Did repair. Did other work. **21:45** Second hydro OK. **23:30** Fire in unit. **16Apr 07:05** Unit on Liquor
Repair procedure:	Punctured tubes and plugged in each drum.
Future prevention:	Gen bank has 10% audit annually for near drum corrosion. Gen bank replaced in 2006, This incident probably caused by a bad roll but entire Gen bank will be inspected for near drum corrosion in Sept 2013

BOILER

FALL 2013-15	
Classification:	**Critical Incident 798**
Location:	**Evergreen Packaging Inc, Pine Bluff, AR**
Unit:	**#2** RB, 1958 B&W, PR-37, 2-drum DCE cyclone, Rear-sloped hearth
Unit Size:	1.17 MM lb ds/day; 202,000 lb/hr steam at 1250 psig, 825°F, ? psig design
Incident Date:	May 21, 2013
Downtime hrs, leak/total:	64
ESP?	**Yes**
Leak/Incident Loc:	Tubes 18 & 19, row 31, near mud drum, 55' above hearth
How discovered:	Boiler tripped on high furnace pressure.
Wash adjacent tube:	No (maybe one)
Root cause:	Near drum corrosion, mud drum. Tube not examined.
Leak detection:	No
Bed cooling enhanc	Yes. Sodium bicarbonate/nitrogen injected
Last full inspection:	May 2012
Sequence of events:	**21May 05:30** Unit tripped onhigh furnace pressure. Saw water coming out of boiler hoppers. **06:15** ESP'd unit. All ESP functions worked including evacuation system. Area barricaded for 4 hour waiting period. **10:15** Small bed still evident on north side. Continued cooling. **16:00** started bed cooling procedure. **18:00** Bed temps below 800F, released to water wash. **22May 05:30** Leaks located in boiler bank. Began cooling drums for internal inspection. **13:00** Began internal mud drum inspection. ID'd 7 tubes below .135 flag. Plugged tubes in steam drum as testing continued in mud drum. **23:00** Tested 44 tubes. Plugged 9 tubes, 1 extra tube due to impingement and one cut wrong tube. **23May 06:50** Start unit fill. **10:25** Hydro OK. Unlocked. Prep'd to fire. **13:25** Fire in unit. **20:20** Unit on liquor.
Repair procedure:	9 tubes plugged, 2 due to leaks, 7 were surrounding leak and below flag of .135. 1 extra each for impingement and cut wrong tube NDT performed area surrounding leak, plus 8 tubes on cold side in soot-blower lane .
Future prevention:	Detailed NDT scheduled for Sept 2013 Gen bank has 10% audit annually for near drum corrosion. Gen bank replaced in 2006. Entire Gen bank will be inspected for near drum corrosion in Sept 2013

BOILER & LOWER FURNACE

FALL 2013-16	
Classification:	**Critical Incident 799**
Location:	**International Paper, Bogalusa, LA**
Unit:	#20 RB, PR-66 (rebuilt as PR-202 in 1980), 1964, B&W, 2010 2 drum boiler by Alstom, DCE cyclone, Front-sloped hearth, 2008 spout & openings by Alstom
Unit Size:	2.8 MM lb ds/day; 388,000 lb/hr steam at 850 psig, 825°F, 1050 psig design
Incident Date:	February 7, 2013
Downtime hrs, leak/total:	170.5
ESP?	Yes
Leak/Incident Loc:	1. Pinhole leak in 2"od swage at boiler mud drum, row 6 tube 18, thinning nearby tubes 2. Leak on #1 (south) spout opening (tube 64 from LHSW) spraying into the furnace
How discovered:	1. Unit tripped due to low drum level and high furnace pressure when the generating tube ruptured. 2. During Hydro after boiler tube repair
Wash adjacent tube:	1. Yes. The pinhole leak impinged on boiler tube row 6 tube 17 thinning it to rupture at mud drum. Other tubes affected. 2. No
Root cause:	1. Rolling defect just above stub of row 6 tube 18. leaked and washed a thin area on ruptured tube 2. Leak on spout opening bent tube possibly occurred during this ESP due to primary fan damper not closing. Area greatly thinned due to long-burning bed pile following July 2012 ESP (broken soot blower nozzle.)
Leak detection:	No
Bed cooling enhanc	Yes NaHCO3/N2 injection Southland
Last full inspection:	March 2012

(Continues on Next Page)

Sequence of events:	**7Feb13** # 20 RB operating normal. (Tertiary air fan out of service for foundation replacement.) **19:05** Unit tripped off line due to low drum level and high furnace pressure. **19:**20 Operators initiated an ESP of the boiler. **23:30** Boiler building entered by supervision and **operators**. Inspection of upper furnace and generating bank revealed first 6 rows of the generating bank from the LHSW were clean from mud drum to steam drum. **23:00** Southland Fire was on site at to cool bed. Bed cooled using sodium bicarbonate blown by compressed nitrogen. 30 bottles of N2 used and 1550 lbs of sodium bicarbonate. **8Feb 04:00** Bed cooling work was complete. **07:00** Temperatures of bed using a T/C inserted in the bed were all below 500 F . **12:00** Steam and mud drum doors opened and maintenance entered furnace at generating bank to identify leak. **15:**00 The leak was identified as a sheared tube (later determined to be a thin wall rupture). **18:00** Maintenance started tube plugging activity. They were able to identify the adjacent tube with the pinhole that washed the ruptured tube to failure. Two tubes were plugged (Row 6, tube 17 and row 6, tube 18). **9Feb 04:00** Boiler was filled to hydro pressure. Boiler walkdown revealed another generating tube leak (row 2 , tube 8) and a leak on the #1 (south) spout opening (tube 64 from LHSW) which was spraying into the furnace. **09:30** Boiler water wash was started. **10Feb 05:00** Wash complete. Scaffolding was installed to gain access to the floor. **13:00** Fans and steam coil air heaters on. **17:00** Fans & SCAH off. **11Feb 00:00** Furnace entered. Spout opening tube was severely washed and had thinned to a pin hole leak. Replacement work begun. Inspection of other two spout openings found no similar damage requiring replacement. During spout opening replacement all generating bank tubes were inspected from the mud drum using **Genisys** to characterize the rolled areas and inspect for near drum corrosion. This inspection revealed two additional tubes in the same location of the failure (row 5, tube 17 and row 5, tube 18) that were also thinned and these were plugged also. **13Feb 04:35** Spout replacement complete. **08:15** Hydro dry OK. **21:30** Boiler on line. **14Feb** Returned to liquor service.
Repair procedure:	1. Plugged 5 gen section tubes (others thinned from nearby pinhole leak) 2. Replaced South Spout Opening 8-pack
Future prevention:	1. Performed 100% coverage Near drum UT for generating section. 2. The primary air damper did not close with ID fans trying to balance draft is considered a potential cause for the spout opening leak.. Revised wiring connections in the primary air fan Beck drive and tested for correct operation during ESP

PENTHOUSE

FALL 2013-17	
Classification:	**Non-Critical**
Location:	**Georgia Pacific, Leaf River Cellulose, New Agusta, MS**
Unit:	4142, 1983, Gotaverken, CN 551-992 One Drum, Rear-sloped hearth, 5 spouts, Large econ
Unit Size:	6.435 MM lb ds/day; 983,900 lb/hr steam at 1250 psig, 900°F, 1491 psig design
Incident Date:	April 14, 2012
Downtime hrs, leak/total:	0 / ?10?
ESP?	No
Leak/Incident Loc:	Small crack on second bent tube in from **RIGHT**-hand (**NORTH**) sidewall near membrane termination where the membrane attaches the tube to a tube panel in penthouse. (Tubes are fed from common header and go on to form roof and front wall of unit. By design, corner tubes are bent to accommodate sidewall headers.)
How discovered:	Walk down during water wash. Saw water running down right-hand sidewall from penthouse.
Wash adjacent tube:	No
Root cause:	Undetermined, but related to stress from membrane that tied two bent tubes on side to primary tube panel.
Leak detection:	Yes. Recovery Boiler Advisor – Mass Balance
Bed cooling enhanc	No
Last full inspection:	April 2012
Sequence of events:	**7Nov2011** First indication of issue. Saw some condensate around some of hangers on RB cold roof . Raised suspicions. Heat seemed to emanate from middle of steam drum but no audible sound of a leak (not even with ultrasound) and no shifts on mass balance that confirmed a leak. Since no indications of leak in furnace, unit was given an orderly shutdown. Removed insulation and decking above riser pipes near middle of drum to NDT risers around drum and hydrostatically tested unit. Following hydro, saw no leaks into furnace. No entry into penthouse during hydro due to heat inside space. No access to area where leak was eventually discovered. Unaware of existence of these tubes or would have tried to expose them during this event. Since no positive confirm of leak, started back up and ran until April 2012 outage. **14Apr2012** Water washing unit during annual outage. During walk down, looking through a door on boiler saw water running down right-hand sidewall from penthouse. The insulation was removed from exterior of unit. Leak was discovered. Leak ground out to completely remove crack. Weld repaired by boiler contractor (Madison) with oversight by OEM inspector (Metso-Robert Sandin). PT/MT tested by NDT contractor (Team). Hydrostatically tested before return to service. **April2013** Planned to replace these tubes during outage but couldn't. Materials received were not an exact match for installation. Materials were specified by OEM and ordered off old version of assembly drawing. Metso sent someone with Hargrove Engineering to verify exact dimension of tubes during 2013 outage. This year performed NDT tests on repaired areas and hydrostatically tested the boiler before returning to service. No indications found.
Repair procedure:	Ground out to clear indication and weld repaired
Future prevention:	Will replace repaired tube and others during May 2014 outage. Will follow up with root cause analysis later. Will redesign how corner tubes are connected to tube panel. Unit has been rapid drained ~ 20 times in its history. As a result there are multiple issues with bent tube openings and membrane terminations. Presently on year 6 of a multi-year venture to replace bent tube openings on furnace due to leaks.

PENTHOUSE

FALL 2013-18	
Classification:	**Non-Critical**
Location:	**Georgia Pacific, Leaf River Cellulose, New Agusta, MS**
Unit:	4142, 1983, Gotaverken, CN 551-992 One Drum, Rear-sloped hearth, 5 spouts, Large econ
Unit Size:	6.435 MM lb ds/day; 983,900 lb/hr steam at 1250 psig, 900°F, 1491 psig design
Incident Date:	April 24, 2012
Downtime hrs, leak/total:	0 / 8
ESP?	No
Leak/Incident Loc:	Small crack on second bent tube in from **LEFT**-hand (**SOUTH**) sidewall near membrane termination where the membrane attaches the tube to a tube panel in penthouse. (Tubes are fed from common header and go on to form roof and front wall of unit. By design, corner tubes are bent to accommodate sidewall headers.)
How discovered:	Walk down during hydro following acid clean. Through penthouse door, saw water leak.
Wash adjacent tube:	No
Root cause:	Undetermined, but related to stress from membrane that tied two bent tubes on side to primary tube panel.
Leak detection:	Yes. Recovery Boiler Advisor – Mass Balance
Bed cooling enhanc	No
Last full inspection:	April 20**13** – just completed.
Sequence of events:	**24Apr2012** Performing hydrostatic test following acid clean of unit. **19:00** During walk down, looking through penthouse door, saw water leak. Did weld repair. Did hydrostatic test. Returned to service. **April2013** Had planned to replace penthouse tubes during outage but couldn't. Materials received were not an exact match for installation. Materials were specified by OEM and ordered off old version of assembly drawing. Metso sent someone with Hargrove Engineering to verify exact dimension of tubes during this outage.
Repair procedure:	Ground out to clear indication and weld repaired. Leak ground out to completely remove crack. Weld repaired by boiler contractor (Madison) with oversight by OEM inspector (Metso-Robert Sandin). PT/MT tested by NDT contractor (Team). Did hydrostatic test.
Future prevention:	Will replace repaired tube and others during May 2014 outage. Will follow up with root cause analysis later. Unit has been rapid drained ~ 20 times in its history. As a result there are multiple issues with bent tube openings and membrane terminations. Presently on year 6 of a multi-year venture to replace bent tube openings on furnace due to leaks. Will redesign how corner tubes are connected to tube panel. Considering slightly different method of tying two tubes on either end to main panel that forms roof and front wall. Rather than taking membrane all way up bend of tube as done originally, Planning to build a mud box that attaches to membrane of main panel. This will allow membrane to stop much lower in bend to add some flexibility to connection while still sealing corners with refractory box. This design has been done on other Gotaverken boilers.

UPPER FURNACE Front Wall

FALL 2013-19	
Classification:	**Non-Critical**
Location:	**Georgia Pacific, Leaf River Cellulose, New Agusta, MS**
Unit:	4142, 1983, Gotaverken, CN 551-992 One Drum, Rear-sloped hearth, 5 spouts, Large econ
Unit Size:	6.435 MM lb ds/day; 983,900 lb/hr steam at 1250 psig, 900°F, 1491 psig design
Incident Date:	April 24, 2012
Downtime hrs, leak/total:	0 / 8
ESP?	No
Leak/Incident Loc:	Pinhole leak at membrane weld between two compositetubes, FRONT wall on 5th floor, 67 ft above floor, half-way between tertiary air and start of arch.
How discovered:	Walk down during hydro following acid clean. Saw water running out underneath some lagging and over top of a buck-stay on 5th floor.
Wash adjacent tube:	No
Root cause:	Undetermined, but related to membrane weld defect from construction. No interior excessive pitting or corrosion. Removed tubes were discarded before formal failure analysis.
Leak detection:	Yes. Recovery Boiler Advisor – Mass Balance
Bed cooling enhanc	No
Last full inspection:	April 20**13** – just completed.
Sequence of events:	**24Apr2012** Performing hydrostatic test following acid clean of unit. 19:00 During walk down, saw Saw water running out underneath some lagging and over top of a buck-stay on 5th floor. Pressure taken off unit. Removed lagging. Saw pinhole leak on sidewall of one tube on edge of membrane. Cold side leak sprayed outside of unit. Replaced two tube sections with Dutchmen.. Did hydrostatic test. Returned to service.
Repair procedure:	Removed damaged tube and adjacent tube Installed two same material Dutchman. NDT contractor (TEAM) verified repair. Did hydrostatical test.. Returned unit to service.
Future prevention:	? ?

UPPER FURNACE

FALL 2013-20	
Classification:	**Critical Incident 800** since tangent tube construction
Location:	**RockTenn La Tuque, Quebec, CAN**
Unit:	#4RU, 1966, CESL, CA64134, 2 drum, 1996 tubes?, Decanting Hearth, DCE Cascade
Unit Size:	1.16 MM lb ds/day; 178,000 lb/hr steam at 320 psig, 850°F, 725 psig design
Incident Date:	Jan 8, 2013
Downtime hrs, leak/total:	326 hrs
ESP?	Yes
Leak/Incident Loc:	1/8" hole & adjacent pin hole, right side wall ~59 FT from floor, third-way up arch, close to arch.
How discovered:	Walk down. Saw small stream of water leaking out of observation door
Wash adjacent tube:	No
Root cause:	Furnace (out of walls) cold side corrosion
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	October 2012
Sequence of events:	**08Jan2013 14:30** During walk down, saw small stream of water leaking out of observation door 3A level floor. No abnormal sounds coming from unit . Went to control room to notify recovery operator and team leader. Operator checked the DCS tube leak indicators and verified there were no indications of water entering furnace.Team leader and assistant superintendant went to investigate origin of water running from door. Following rapid survey of adjacent area water source was confirmed to be coming from unit. Since this is a tangent tube design it was impossible to eliminate all doubts as to whether or not water was entering hearth. **14:50** ESP procedure initiated. **09Jan 07:50** Reset ESP **11:30 B**ed probed 450°F **13:50** Start boiler water wash **23:30** End of water wash, followed by lockout procedure **10Jan-19Jan** Made repairs. **19Jan 18:42** Unsuccessful hydro test **21Jan 09:15** Successful hydro test **22Jan 14:50** Boiler on line burning liquor
Repair procedure:	Extensive cold side corrosion. NDT inspection at one foot intervals on each tube of surrounding area. Replaced 150 tubes of varying lengths affected by cold side corrosion, using local jurisdiction approved welding process
Future prevention:	Will continue cold side corrosion investigation at future outages

UPPER FURNACE

FALL 2013-21	
Classification:	**Critical Incident 801**
Location:	**International Paper, Augusta, GA**
Unit:	RB2, 1965 B&W PR-89, 2-Drum, DCE Cyclone, Sloped hearth
Unit Size:	(1.2 dsgn) Op at 1.79 MM lb ds/day; 185,000 lb/hr steam at 850 psig, 900°F, 875 psig design
Incident Date:	January 15, 2013
Downtime hrs, leak/total:	No lot time
ESP?	**No**
Leak/Incident Loc:	1/16" pinhole developed in IK wall box attachment weld on the crown of the tube, 8th floor front-most IK opening
How discovered:	Hydro. Prep for start-up after market down time
Wash adjacent tube:	No
Root cause:	Corrosion fatigue
Leak detection:	Yes. IP steam/feedwater differential
Bed cooling enhanc	No
Last full inspection:	April 2012
Sequence of events:	Unit had been down for market slow down. (washed & layed up for fifteen days.) Prior to start up, performed hydro. Leak found. Weld repair made. Area ground out to remove any defect and PT prior to and after the repair. There was no extended down time as a result of this leak.
Repair procedure:	**Spot Weld. Area was ground out to remove any defect and PT prior to and after repair**
Future prevention:	**Plan to replace both tubes in the IK opening during the annual outage. Subsequently, unit retired, removed from service.**

SPOUT

FALL 2013-22	
Classification:	**Non-Critical**
Location:	**KapStone Paper & Packaging, North Charleston, SC**
Unit:	#9 RB, 1966 CE #564, 2 drum DCE Cascade, Decanting hearth
Unit Size:	3.45 MM lb ds/day; 471,000 lb/hr steam at 600 psig, 715°F, 700 psig design
Incident Date:	June 28, 2012
Downtime hrs, leak/total:	0
ESP?	**No**
Leak/Incident Loc:	Small leak in tip of #1 smelt spout (NW corner)
How discovered:	Walk down. Saw water spewing from tip of spout
Wash adjacent tube:	No
Root cause:	Punctured with spout rod
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	2010 (partial in 2012)
Sequence of events:	28Jun12.12:06. Unit loss of flame (flame-out). Refired unit During walk down after, saw water spewing from tip of spout.
Repair procedure:	Plugged spout with refractory and insulation. Will replace June 2013
Future prevention:	Retrained operators on spout rodding procedures.

SPOUT with Smelt-Water Reaction

FALL 2013-23	
Classification:	**Critical Incident 802 with Smelt-Water Reaction**
Location:	**KapStone Paper & Packaging, North Charleston, SC**
Unit:	#9 RB, 1966 CE #564, 2 drum DCE Cascade, Decanting hearth
Unit Size:	3.45 MM lb ds/day; 471,000 lb/hr steam at 600 psig, 715°F, 700 psig design
Incident Date:	February 21, 2013
Downtime hrs, leak/total:	19
ESP?	**No**
Leak/Incident Loc:	Leak in rear (smelt-side) of #1 smelt spout (NW corner)
How discovered:	Bed Camera/Control room: Saw a flash on the smelt bed camera. Heard a loud noise Later, saw water flowing from spout openings. Minor smelt-water reaction, no damage.
Wash adjacent tube:	No
Root cause:	Cooling water mistakenly turned on (not locked out) to an out-of-service spout, allowing tube rupture at smelt interface.
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	2010 (partial in 2012)
Sequence of events:	**21Feb13**. **02:00** Unit was returning to service after sootblower wash; on start-up curve; no liquor yet fired. **06:25**, operations saw a flash on the smelt bed camera display and heard loud noise that was thought to be a left over piece of salt cake falling from the upper furnace. **06:33** operators saw similar event that extinguished start up oil burner #4 (the only auxiliary fuel in service at that time). Burner #4 is located near #1 smelt spout. **06:52** Start-up oil refired**. 08:40**, During walk down saw water flowing from the in service smelt spouts. Operations began searching for water source. EMS Operator instructed to refrain from introducing black liquor into the boiler. **09:15** Management instructed EMS Operator to pull fire from RB9. **10:15** Operations confirmed smelt spout cooling water rupture on back side of #1 spout and near #4 start up oil burner. The cooling water supply to #1 spout was locked out and disconnected downstream of the supply valve.
Repair procedure:	#1 spout to remain out of service with water supply locked out. Will replace June 2013
Future prevention:	Updated smelt spout leak checklist: Disconnect and lock cooling water to out of service smelt spout, Retrained operators by.management coaching each shift on importance of following checklists and procedures.

BELOW FLOOR

FALL 2013-24	
Classification:	**Non-Critical**
Location:	**RockTenn, West Point, VA** (was Chesapeake)
Unit:	#4, 1975, CE, 21975, 2 drum, DCE Cascade, Decanting hearth
Unit Size:	2.7 MM lb ds/day; 427,000 lb/hr steam at 1225 psig, 900°F, 1360 psig design
Incident Date:	August 9, 2013
Downtime hrs, leak/total:	32.5 / 32.5
ESP?	No
Leak/Incident Loc:	1/8th" Pin hole below floor in 4 ½ inch supply tube to the left water wall supply header
How discovered:	Walk down
Wash adjacent tube:	No
Root cause:	Localized corrosion caused by high pH wall wash water splashing coming through crack in casing.
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	March, 2013
Sequence of events:	**9Aug 18:30** During walk down, saw steam rising from below west spout on left side wall. Operator activated emergency lights. Started investigation. 1st checked steam-out supply pipe. Turned off, but steam continued. Then saw steam escaping horizontally from crack in casing of lower vestibule (dead air space) 3' below floor. **19:00** Started orderly shut down to pull liquor and burn bed down. **19:15** Watching for water inside furnace (would ESP unit). No bed disturbance. No fan change. Recalled previous header leak 2005. **20:00** Visible steam changed. Stopped burn-out and shut unit down. **20:15** Unit off line. Did repairs.
Repair procedure:	Cleaned leak site. Took thickness measurements. Low reading 0.107". Used color contrast dye penetrant for crack-like indications. None found. Pre-weld heat treated weld land area and surrounding corroded area to 250 F. First and final weld passes examined by visual inspection and color contrast dye penetrant. All OK. Final weld repair overlay: 3"x1.5" Thickness readings 0.317" - 0.327" range.
Future prevention:	Repair vestibule casing at next annual outage. Include routine vestibule casing inspections in future annual outages.

INTERNATIONAL
FLOOR

FALL 2013-Intl 1133	
Classification:	**(Critical)**
Location:	**International Paper, Kwidzyn, Poland**
Unit:	1982 B&W Contract 10-551/6-6202, 2 drums, Large Econ, 2004 Rear-Sloped Floor by Metso,
Unit Size:	4.74 MM ds/day; 672,400 lb/hr steam at 940 psig, 842 °F, 1125 psig design
Incident Date:	December 22, 2012
Downtime hrs, leak/total:	108.3 / 108.3
ESP?	Yes
Leak/Incident Loc:	4.7" rupture in crown of studded floor tube, 2nd tube from right wall,. 70 inches from rear wall. 2004 Metso tube
How discovered:	Control room. Negative pressure increased in rear of unit. Steam-feedwater differential
Wash adjacent tube:	Yes. Three thinned. Adjacent floor tube & 2 right sidewall tubes.
Root cause:	Overheat found in both Tubes 1 and 2. Pearlite structure decomposed to spheroidized carbides throughout top portion (studded side
Leak detection:	Yes. Mill's Mass Balance system showed leak about 20T/hr steam-feedwater differential. Since September 2012 there were number of system dysfunctions (ex: shows higher steam generation than feed water consumption). Leak detection system showed this leak but operators did not trust system because of inappropriate operation of system. Instrumentation services tried to adjust system number of times.
Bed cooling enhanc	Yes. Mill personnel cooled bed with mill-made lances, then injecting char bed with nitrogen and carbon dioxide
Last full inspection:	Sept 2012
Sequence of events:	**22Dec** Unit running normal. **15:25** Panel indicated negative pressure dropped in rear of unit, and steam-feedwater differential. Cut fuels out and shut fans down to hear and check sounds of any leakage. First checked in economizer region because of leak there in November 2012. No water visible in hoppers.Heard unusual noise. **16:30** Water visible in furnace chamber and tertiary air duct. ESP activated. Floor leak spraying vertically 29 ft above floor into tertiary air ducts. Started unit cool down. **19:30** Limited person entry to check unit. Saw water flow through spouts. Since this was a floor tube leak we believe all l boiler water below the 8 foot rapid drain level drained down, out of the ruptured floor tube. Extended wait period 8 hours more. **23Dec 04:00** Used lances to break up char bed. **06:00** Start char bed temperature monitor. Started N2-CO2 bed cooling. **17:00** Bed temp below 510F. Prep sootblowers to do unit water wash. **19:00** All temps below ~850F. Started water wash. 2**4Dec 06:20** Water wash complete. Started fans to dry unit. **10:00** Furnace chamber dry. Started scaffolding. **10:40** Scaffold ready. **10:50** Located leak. Did inspection and tube measurement. Did repair.
Repair procedure:	Leak tube, adjacent tube and two thinned right wall tubes were cut out and replaced with 2-tube Dutchman panels with studs and membrane. Welded per requirements. Dye penetrant tests done. X-ray test done. UT thickness measurement of adjacent areas on this and opposite side of floor. Pressure test done per UDT (government authority) requirements.
Future prevention:	Will do inspection during March 2013 outage specifically looking in suspect areas for any signs of thinning or tube overheating. UT readings and close visual inspection. Circulation measurements considered for March 2013. Will develop procedures to prevent failure based on results of investigation. One ESP valves did not open automatically because it had a torque switch on the motor. It was removed from this valve drive during outage.

INTERNATIONAL
ECONOMIZER

FALL 2013-Intl 1134	
Classification:	**(Critical)**
Location:	**Mondi Swiecie, Swiecie, POLAND**
Unit:	# N2103000585, 1991 Ahlstrom (Finland) # 5516, 2-drum, 2002 Alstom large econ, Decanting hearth,
Unit Size:	4.45 MM lb ds/day; 631,680 lb/hr steam at 840 psig, 825°F, 900 psig design
Incident Date:	May 2, 2013
Downtime hrs, leak/total:	
ESP?	**No**
Leak/Incident Loc:	#1: Tube 3 from front, 3rd from left of center bank by upper hot front header of hot front econ bank, #2: Left side hot econ, #3:
How discovered:	Walk down. Saw minor water leak, left side flue duct, hot econ next to upper soot blower
Wash adjacent tube:	No
Root cause:	Fillet weld crack: porosity and stress from temperature changes during unit shut downs.
Leak detection:	No
Bed cooling enhanc	No
Last full inspection:	July 2012
Sequence of events:	**2May: 13:00**: During walk down, saw minor water leak, left side flue duct, hot econ next to soot blower 67. Removed insulation. No leak ID'd. **3May**: Suspect leaking safety valve drain left side of drum on roof, so removed top insulation. Found water was leaking from econ. **4May 11:45**: Began oderly shut down.. **13:40**: Unit down. **5May**: Did water wash **03:55**: Cool downecon. **10:00**: ID'd leak at upper hot header of hot econ Repaired leak. 2nd shift: Filled econ. Saw 2nd leak. **22:50** Found 3d leak, both about mid way down from leak #1,. Repaired. **6May 06:00** Repairs done. Filled unit. Did hydro. **14:00** Hydro OK.
Repair procedure:	To gain access, cut off 8 tubes and install 15 blind plugs in the header stub/ connection pipes and 1 piece directly on the header. Blind plugs are made of 16 Mo3 fi 30x8,0 from forged bar , certification no. 748/KG/12. Fillet butt welds were made using welding wire fi 2,4x1000, DMO-IG material. Header blind plug - 30x25 16 Mo3, DMO-IG filler metal. Repair: installed blind plugs in 2nd & 3d connection pipes in 3d row of 2nd header; 1st & 3d pipes in 1st row of 2nd header; & 2nd & 3d pipe of 3d row of header from front of unit & left-hand side of economizer of second stage.
Future prevention:	Similar failures in past. 1 April 2009, fillet weld connecting header to economizer pipe cracked.

INTERNATIONAL
ECONOMIZER

FALL 2013-Intl 1135	
Classification:	**(Non-Critical)**
Location:	**International Paper, Svetgorsk, Russia**
Unit:	RB#1, 1974 Tampella Contract 10\13555-133, 2-drum, decanting hearth, with 1996 Ahlstom (Andritz) large econ
Unit Size:	1.4 MM lb ds/day; 264,000 lb/hr steam at 550 psig, 824°F, 711 psig design
Incident Date:	January 24, 2013
Downtime hrs, leak/total:	41
ESP?	No
Leak/Incident Loc:	Pinhole leak from ID of economizer tube, 6th from front, 4" above lower miniheader, platen 3.
How discovered:	Walk down. Saw wet salt cake in economizer hopper.
Wash adjacent tube:	No
Root cause:	Dissolved oxygen pitting. Fireside corrosion pitting also a factor.
Leak detection:	Yes. IP in-house, mass balance: feed water-steam differential. Did not detect nor confirm leak.
Bed cooling enhanc	No
Last full inspection:	June 2012
Sequence of events:	**Thursday, 24Jan 00:30**: Operator making rounds. Saw wet saltcake in the rear (cold) economizer hopper. Confirmed leak was low in rear (cold) economizer module so no possibility of water getting into the furnace. Believed leak was not impinging upon adjacent tubes. Continued to run boiler to support the mill. **27Jan 06:30** Orderly shut down (1 day earlier than planned). Unit cooled. (Made separate repair to feedwater line.) Unit was hydro'd. Leak located. Economizer drained. Smelt bed cooled. Did whole unit waterwash. Leak repaired. **28Jan 17:30** Start-up. **23:30**. Liquor firing.
Repair procedure:	Platen removed from service by plugging inlet and outlet tubes to & from the miniheader.
Future prevention:	A new economizer (both modules) will be installed in 2013. The deaerator is operating within specification and oxygen scavenger is in use. Plan to control dissolved oxygen to 0.0. The economizer was installed in 1996 because of oxygen pitting problems. Deaerator replaced in 2000. .

NATIONAL BOILER SERVICE, INC.

Weld Build Up Research

This report contains the results of *Weld Build Ups* that were performed on the outside diameter of boiler tubes (approx.180 thick) that were turned down (milled) on a lathe to a thickness of .120", .100", .090", .080", .070" thick to simulate boiler tube thinning for this research.

Weld Build Up of Wasted Area is the correct term for this type of repair in the Boiler and Pressure Vessel industry. Other jargon or terms used to describe this type of repair are Pad Welding (which is most frequently used) and Weld Overlay.

The objective of this research is to identify and/or determine what the welding process is doing to the inside of the tubes after weld build up was performed and at what wall thicknesses the tubes were adversely affected.

The Following Welding Processes were used:

- GTAW (TIG) - 3/32" Filler Metal
- SMAW (Stick) - 3/32" Filler Metal
- GMAW (MIG) (Hard Wire) - .035" Bare Wire Filler Metal

Note: The tubes must be cleaned thoroughly before welding.

The Tube positions when the weld build up was performed was about 45° and Vertical positions to simulate different configurations in a boiler such as vertical (Water-wall Tubes), Flat (Floor or Roof Tubes) and approximately 45° (Arch or Sloped Floor Tubes etc.).

The following photos are of weld build up that were performed on tube specimens that were cut in half to view and inspect the inside of the tubes. A description of our findings is under each photo.

Welding Terms:

- Burn-thru – A hole is burned through the base metal.
- Melt-thru – The welding filler metal is melted through to the inside of the base metal (push-thru).
- Sugaring - Oxidation of the weld or base metal.

Base Metal Designations and Terms:

* P1 - Carbon Steel Tubes ,"SA 178, 210 etc."
* P3 - Carbon/Moly Steel Tubes, "SA 209 T1"
* P4 - 1.25% Chrom, Alloy Steel Tubes, "SA 213 T11"
* P5 - 2.25% Chrom, Alloy Steel Tubes , "SA 213 T22
* P8 – Stainless Steel Tubes, "SA 213 TP 304,308,316 etc."

Conclusion

From this research, It is our opinion, the GTAW (TIG) process, is not recommended to perform Weld Build Up on P1, P3, P4 or P5 base metals that are below .100" thick. Burn-thru and melt-thru is virtually inevitable.

The GMAW (MIG) process (downhill progression with .035 Wire Size) can be used to Perform Weld Build Up on Tubes as thin as .080" thick, with minimal melt-thru or burn thru.

For stainless base metals (P8), it is not good practice or recommended to perform Weld Build Up on base metals that are below .120" thick. Extreme oxidization (Sugaring) virtually cannot be avoided on the Inside diameter of the tube where no backing or shielding gas is utilized.

Steve Harville
Corporate Quality Control Manager

176 North Industrial Blvd. PO Box 279, Trenton, GA 30752 P:(706) 657-6200 F: (706) 657-4875
www.nationalboiler.com

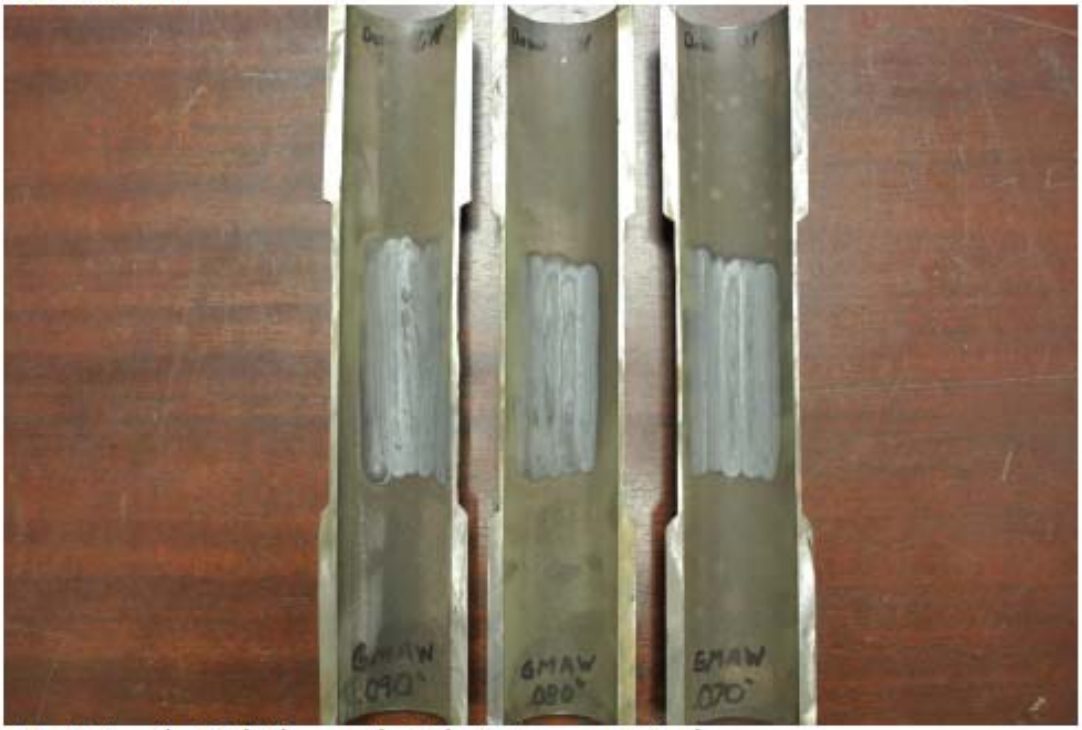
OD: Carbon Steel (P1) ***SMAW (Stick) process with E 7018 - 3/32"*** was used on these samples. The Weld Progression was Uphill. On all 4 of these samples the Welder Burned-thru the base metal, as the samples got thinner, the Burn-thru was more frequent.

ID: Carbon Steel (P1) The Burn-thru that you see here is not "Melt-thru" it is "Burn-thru." Holes were actually burned in the base metal and filled back up with the SMAW process as the Welder was welding. Note: .070" sample was too thin to Weld.

OD: Carbon Steel (P1), ***GTAW (TIG) process with E 70 S2 - 3/32"*** was used on these samples. The Weld Progression was Uphill. On all 4 of these samples the Welder Melted-thru the base metal, as the samples got thinner, the Melt-thru was more frequent and excessive.

ID: The Melt-thru here is very excessive on the .090", .080" and .070" Samples

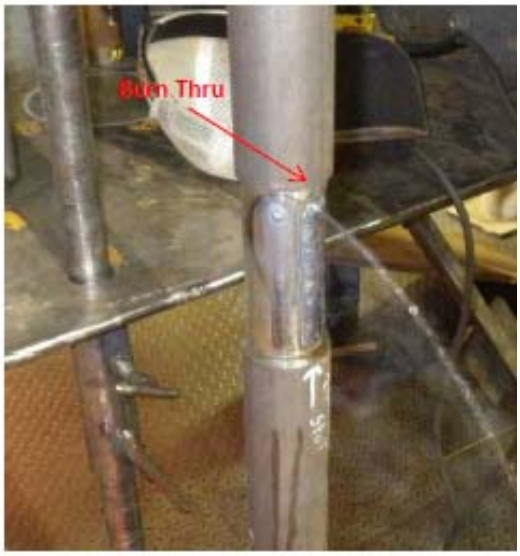
OD: Carbon Steel (P1), ***GMAW (MIG) process with E 70 S2 - .035"*** Wire was used on these samples. The Weld Progression was Downhill. Uphill is **not** recommended. On all of these samples the Welder had very minimal Melt-thru on all thicknesses of the base metal. The GMAW Process requires the base metal to be very clean. When applying Weld Build Up on Tubes of approximatly .120" and below, **GMAW (MIG) is the preferred method for Weld Build UP.**



ID: Notice the Melt-thru on the Tube ID is very minimal.

OD: Stainless: *GTAW (TIG) process with E 316L* - 3/32" was used on these samples. The Weld Progression was Uphill. On all 3 of these samples the Welder Melted-thru the base metal, as the samples got thinner, the Melt-thru was more frequent and excessive.

ID: Stainless: The Melt-thru on the .100" & .080" thick samples was excessive and "Sugared" (oxidized) the ID of the Tube. This is because the ID of the Tube is not accessible to use a Backing Gas such as Argon to shield the base metal or weld area.



OD: 1-1/4 Chrome (P4), SA 213 T11: ***Superheat Tube Simulation*** (with Water in the Tube). ***GTAW (TIG) process with ER 80S B3***- 3/32" was used. The Weld Progression was Uphill. Welder Burned-thru the base metal once on the .090" sample and multiple times on the .070" sample.

ID: 1-1/4 Chrome (P4), SA 213 T11 ***Superheat Tube Simulation*** (with Water in the Tube). With water in the Tube, there is little to no indication it is about to burn though the base metal. With the .070" Tube we had to let it cool 3 to 5 minutes between weld passes or between half a weld pass.

Two CE V2R Recovery Boilers

Disclaimers

- **Not a Metallurgist---**
- **Not a Welder----**
- **Not a welding engineer ----**

1

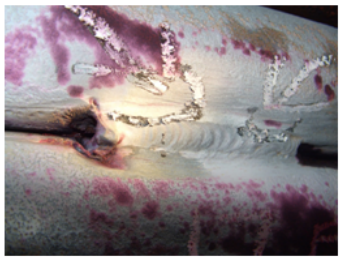
Boiler "J"

- CE# 21487 Fab, 9/4/73, Erected 3/7/74
- DCE unit MAWP 750
- Screen section
  - 22 Platens
  - 13 tubes / platen
  - 10 weld elevations
  - 2640 Welds inspected with MT / RT

2

History

- History of Screen leaks dating to 2008/2009
- All @ stitch welds



3

Inconclusive metallurgy report in 2010

- **"The recovery boiler screen tube sample did not definitively reveal the mechanism that caused the recent screen tube failures".**

4

CONCLUSIONS:

The most significant damage found was a void area that had penetrated 20% of the tube thickness from the OD at the top toe of the tube-to-tube attachment weld. The following are potential causes of this condition:

- Cracking, but if cracking was the cause, the blunt, rounded tips show the cracking has not been active for a long time.
- Localized corrosion in the HAZ
- Original weld undercut; however, most of the weld exhibited minimal undercut
- A combination of some or all of the above

5

- Some minor damage was also found along the ID surface. This damage, rounded voids with scale, can be associated with stress assisted corrosion (SAC) cracking. These rounded voids could also just be oxygen pits. In this tube sample, the corrosion damage had penetrated only about 3% of the tube wall thickness and there was no evidence of cracking.
- Corrosion is the dominant process in SAC cracking. Typically, the stresses in the tube metal come from external welded attachments. Oxygen and/or pH excursions are believed to be the primary factors that cause SAC. In some cases, SAC cracks only propagate during start-up after an outage when oxygen has entered the waterside.
- SAC cracking was not a significant problem around the two attachment welds in the sample provided.

6

2011 Failure & ESP

- October 12th, 2011 leak and ESP
- BLRBAC incident 2012-18
- Two leaks, platens 15 & 21

7

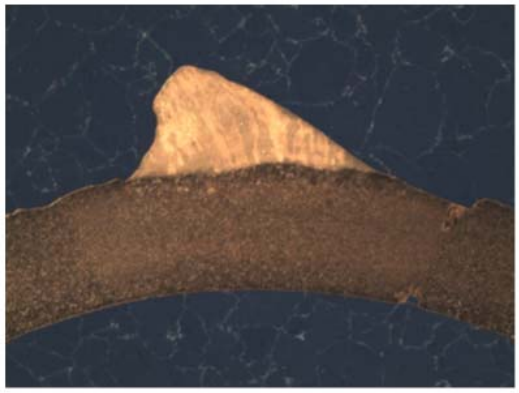
Failure analysis

From the results of the analyses, it was determined that the cause of the pinhole leak observed in tube #8 was the result of a through wall crack in tube #7 that occurred at the root of the stitch weld attachment. The through wall crack resulted in boiler water impinging on tube #8, causing localized erosion until the pinhole leak developed. ***The cause of the through wall crack at the root of the stitch weld was a combination of corrosion fatigue and SAC.*** The corrosion fatigue initiated on the fireside surface and propagated towards the waterside surface, while the SAC initiated on the waterside surface and propagated towards the fireside surface. At some point during the propagation cycle both cracks coalesced, resulting in a leak in the tube. The source of the cyclic stress that aided in the crack propagation was from boiler operation (start-up and shutdown) and the restraint created by the hard stitch weld.

8

Figure shows a montage of the stitch weld cross-section between tubes #7 and #8. Tube #7 is the sample section on the left with the through wall crack. The yellow arrows point to the indications at the cap of the stitch weld that would be detected during an inspection of the screen tube section using typical inspection methods (visual, PT, MT). The failure would not have been detected by any of these methods. Magnification 6.7x.

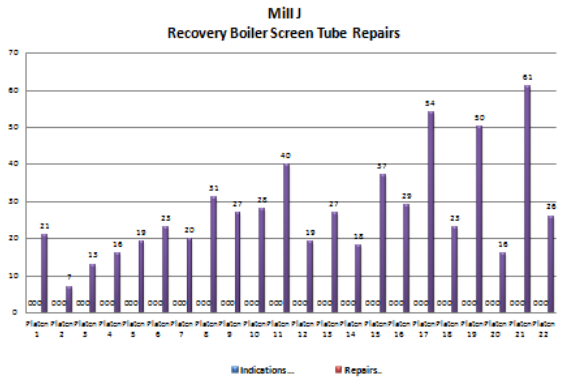
9



10

Figure shows the cross-section of tube #7 cut through the stitch weld that attached tubes #6 and #7. A portion of the stitch weld was removed during the tube removal process, however, it is still observed that the cracking is occurring at the fireside and waterside surfaces at the root of the stitch weld. There is also evidence of cracking at the toe of the weld cap, however, this is minor compared to the cracking that is taking place at the stitch weld root. Magnification 6.7x.

11



12

Recovery Boiler Screen Stitch Weld Inspection

BOISE

Repairs Remaining by Elevation		
Elevation	1	0
Elevation	2	0
Elevation	3	0
Elevation	4	0
Elevation	5	0
Elevation	6	0
Elevation	7	0
Elevation	8	0
Elevation	9	0
Elevation	10	0

Total NA Remaining
0

Total Welds
2640

Percent with Indications / Repairs Remaining
0.00%

	Indications Pending	Repairs Identified	Total Remaining	Total Completed	%Repairs Completed	Total Indications
Platen 1	0	0	0	21	100.00%	21
Platen 2	0	0	0	7	100.00%	7
Platen 3	0	0	0	13	100.00%	13
Platen 4	0	0	0	16	100.00%	16
Platen 5	0	0	0	19	100.00%	19
Platen 6	0	0	0	23	100.00%	23
Platen 7	0	0	0	20	100.00%	20
Platen 8	0	0	0	31	100.00%	31
Platen 9	0	0	0	27	100.00%	27
Platen 10	0	0	0	28	100.00%	28
Platen 11	0	0	0	40	100.00%	40
Platen 12	0	0	0	19	100.00%	19
Platen 13	0	0	0	27	100.00%	27
Platen 14	0	0	0	18	100.00%	18
Platen 15	0	0	0	37	100.00%	37
Platen 16	0	0	0	29	100.00%	29
Platen 17	0	0	0	54	100.00%	54
Platen 18	0	0	0	23	100.00%	23
Platen 19	0	0	0	50	100.00%	50
Platen 20	0	0	0	16	100.00%	16
Platen 21	0	0	0	61	100.00%	61
Platen 22	0	0	0	26	100.00%	26
Grand Totals	0	0	0	605	100.00%	605

13

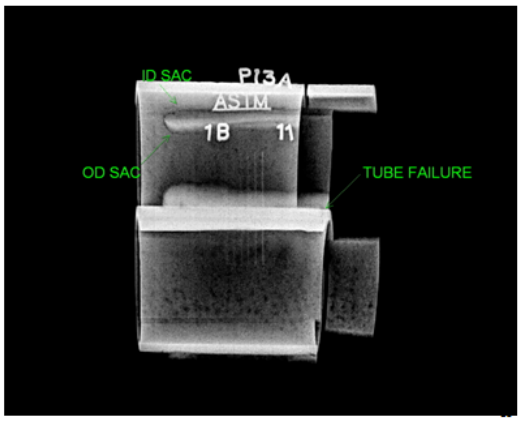
Weld Repair Types Remaining

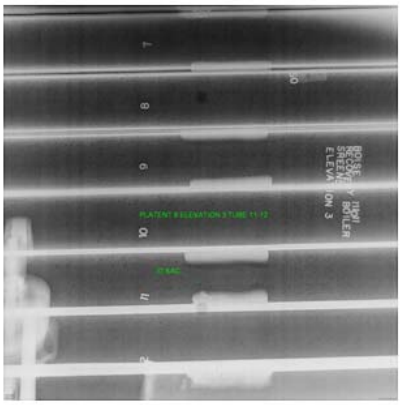
Pending	G/PT	W MB/T/PT	WMB/PT	G/W MB/PT	T/PT	G/T/PT	G/W MB/T/PT	Dutchman	PT
0	0	0	0	0	0	0	0	0	0

	12-Nov	13-Nov	14-Nov	15-Nov	16-Nov
Total Elevations with RT Complete to Date	42	58	69	71	80
Total Elevations with RT Complete by Date	ND	16	11	2	9
Total Welds with RT Complete to Date	504	696	828	852	960
Total Welds with RT Complete by Date	ND	192	132	24	108

Total MT / RT Indications	MT Only	RT Only	MT & RT	MT Total	RT Total
610	265	232	113	378	345
% of Total	43.44%	38.03%	18.52%		

14





16

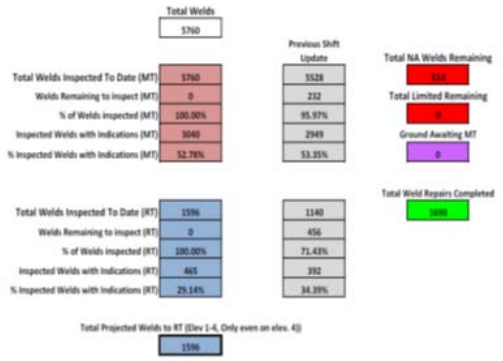
August 2012 Platen 5 tubes 3-4
2011 testing RT, IAT on the OD repaired

17

Boiler W

- CE # 21489 Fab,11/12/73, Erected 4/10/74
- LAH unit MAWP 710
- Screen section
  - 24 Platens
  - 19 tubes / platen
  - 13 weld elevations
  - 5760/1596 Welds inspected with MT / RT

18



19

RT and MT Testing Scope and Summary

- The original test scope was to perform RT on all lower elevation platen stitch welds and perform MT on all elevation stitch welds (24 platens, 13 elevations, 19 welds for a total of 5760 welds)
- MT testing showed 3040number of indications which majority required grind out and re-inspect
- RT testing showed 465 (1596 tested) number of crack indications
- RT and MT testing revealed "W" does not have the stitch weld inverse cracking issue detected at Jackson
- **RT testing did reveal inside diameter pitting**
- Boroscope testing was performed on screen tubes and boiler tubes and confirmed the screen tube pitting
- Some OD to ID cracking was found, but none were active.

20

So What's different?

- **Similar Age**
- **Similar life Cycles**
- **Same Shop**
- **Same basic design**

21

Boiler "W"

- In the late 1970's a labor interruption in the northwest caused a lot of paper mills to shut for 6 to 8 months. Many were not laid up or laid up improperly. Most of these boilers have oxygen pitting on the ID of the tubes
- The stitch welds on this boiler were welded using GTAW welding from the end to the center of each stitch weld.

22

Boiler "J"

- This boiler has a Cascade DCE and is cycled every 6 to 8 weeks for a Cascade boil.
- The stitch welds on this boiler were welded using SMAW welding from one end of the stitch weld to the other.

23

Conclusions

- **It was decided to replace the screen section on boiler "J" in the Fall of 2012.**
- **The welds on Boiler "W" are being tested on a scheduled basis.**

24

FIGURE 6 (FLOWSHEET) – PAGE 52

- Move the shut off valve ahead of the flame arrester.
- Remove drains shown as directly associated with vent lines on both figure 5 and figure 6.
- Show a rupture disk/pin instead of a second automatic vent.
- Remove the drain directly associated with the flame arrester.

1

TABLE 5 CORRECTIONS – PAGE 50

- S5: Grey blocks are to read "Close" and "Close" during MFT and ESP
- S6: Grey blocks are to read "Open" and "Open" during MFT and ESP
- S7: Grey blocks are to read "Close" and "Close" during MFT and ESP

Note: "Grey blocks: Operation of these valves is opposite of that shown during a planned purge sequence".

2

NEW DEFINITION: PERMISSIVE TO ADD CNCG TO RB

Existing: Liquor firing stably or steam flow greater than 50% of the steam flow at MCR

Proposed: Stable liquor firing (per safe firing guidelines) and sufficient temperature to fully combust CNCG*.

*Suggestion: Measure temperature at nose.

3

CNCG IGNITER RULES

Existing: Use is required at all times when burning CNCG or SOG.

Loss of igniter will result in diverting the gasses.

Proposed: The igniter will be engaged during start-up. Once "stable liquor firing" is established and the temperature in the furnace is above 1650F, the igniter may be disengaged.

Liquor divert will result in diverting the gasses.

4

ALTERNATIVE TO OPERATOR-ATTENDED IGNITER ENGAGEMENT

Manual engagement of the igniter is currently recommended. The intent of this permissive is to ensure that the burner port is not blocked or partially blocked by slag when adding the waste stream .

Possible Alternative:

Independent or burner integrated camera to preclude the need to be physically present…viable technology to be investigated.

New recommendation to be submitted in April 14'

5

WASTE STREAM APPLICATIONS

CNCG in the recovery boiler
World: 48 mills North America: 18 mills

DNCG in the recovery boiler
World: 67 mills North America: 25 mills

SOG (gas) in the recovery boiler
World: 7 mills North America: 4 mills

USA also has four mills with liquefied SOG routed to the recovery boiler, mixed with heavy liquor

6

Objectives:

To develop & disseminate information, and provide best practice guidelines related to:

- Design & operation of recovery boilers, evaporators, NCG systems & related equipment
- Steam generation from solid fuels, such as coal, bark, wood refuse and MSW
- Thermal and electric power cycle design, operating performance and energy policy considerations
- Design requirements for boiler feedwater systems, monitoring requirements for boiler feedwater and condensate systems and response to feedwater contamination.
- Design, application and operation of gasification technologies for biomass and black liquor.

Activities:

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

1

Recovery Boiler – Released TIP's

- TIP 0416-22; Guidelines for Operating and Maintenance Practices Impacting an Economizer on a Recovery Boiler (2009)
- TIP 0416-21; Specification for Procurement of an Economizer for a Recovery Boiler (2009)
  - Developed from AF&PA Economizer Study
- TIP 0416-19 & 20; Recovery Boiler Sootblowers (2009)
  - Two TIP's – "The Basics" and "Practical Guidelines"

2

Recovery Boiler – TIP's Under Review

- TIP 0416-09; Collection and Burning of Concentrated NCG's: Regulations, Design and Operation (2008)
- TIP 0416-10; Stripping of Kraft Pulping Process Condensates: Regulations, Design and Operation (2008)
- TIP 0416-11; Recommended Test Procedure for Black Liquor Evaporators (2008)

3

Recovery Boiler – TIP's Coming Up for Review

- TIP 0416-08; Guidelines for Replacement of Generating Bank Tubes with Expanded Joints in Two-Drum Boilers (2009)
- TIP 0416-15; Chloride and Potassium Measurement and Control in the Pulping and Chemical Recovery Cycle (2005)

4

Recovery Boiler – Possible TIP's Proposed or Under Development

- Indications of Possible Leaks in Recovery Boilers
- Recovery Boiler Inspection Procedures
- Steam Blow Procedures
- Wet ESP Considerations
- Recovery Boiler Fouling

5

Meetings:

- Meetings are held twice per year
  - Next Meeting
  - Spring, Following BLRBAC; Wednesday April 9, 2014; 1:00 pm – 4:00 pm
  - PEERS Conference September 15, 2014 Tacoma, WA

6