BLACK LIQUOR RECOVERY BOILER
ADVISORY COMMITTEE

MINUTES OF MEETING
Crowne Plaza Hotel/Atlanta Airport
Atlanta, Georgia
October 6, 7 & 8, 2008

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:	Len Erickson Boise. Inc. P. O. Box 50 Boise, ID 83728-0001	Tel: 208-384-7933 Fax: 208-384-7637 Cell: 208-841-4246 **lenerickson@boiseinc.com**
Vice-Chairman:	Scott Moyer Georgia-Pacific Corporation Florida County Road 216-S (shipping) P. O. Box 919 (mail) Palatka, FL 32178-0919	Tel: 386-329-5609 Cell: 386-227-8991 **Scott.Moyer@GAPAC.com**
Secretary:	**Mike Polagye** FM Global P. O. Box 9102 Norwood, MA 02062	Tel: 781-255-4730 Fax: 781-762-9375 **michael.polagye@fmglobal.com**
Treasurer:	**Ron Hess** HSB Forest Products Group 110 Cedar Cove Court Buckhead, GA 30625-3300	Tel: 706-484-1723 Fax: 706-485-5267 **ronald_hess@hsb.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

Len Erickson
BLRBAC Chairman
Boise Inc.
P. O. Box 50
Boise, ID 83728-0001
Tel: 208-384-7933
Fax: 208-384-7637
lenerickson@boiseinc.com

Scott Moyer
BLRBAC Vice-Chairman
Georgia Pacific Corporation
P. O. Box 919
Palatka, FL 32178-0919
Tel: 386-329-5609
Cell: 386-227-8991
Scott.Moyer@GAPAC.com

Mike Polagye
BLRBAC Secretary
FM Global
P. O. Box 9102
Norwood. MA 02062
Tel: 781-255-4730
Fax: 781-762-9375
michael.polagye@fmglobal.com

Ron Hess
BLRBAC Treasurer
HSB Forest Products Group
110 Cedar Cove Court
Buckhead, GA 30625
Tel: 706-484-1723
Fax: 706-485-5267
ronald_hess@hsb.com

Dave Fuhrmann
Operator Representative
International Paper
6285 TriRidge Blvd.
Loveland, OH 45140
Tel: 513-248-6954
Fax: 513-248-6679
dave.fuhrmann@ipaper.com

Jim Dickinson
Manufacturing Representative
Babcock & Wilcox Company
20 S. Van Buren Avenue
Barberton, OH 44203-0351
Tel: 330-860-1229
Fax: 330-860-9319
jadickinson@babcock.com

Jimmy Onstead
Insurance Representative
FM Global
Granite Park One
5800 Granite Parkway, Ste. 600
Plano, TX 75024
Tel: 972-731-1656
Fax: 972-731-1820
jimmy.onstead@fmglobal.com

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Secretarial Services
Barbara Holich
1005 59th Street
Lisle, IL 60532
Tel: (630) 512-0144
Fax: (630) 512-0155
E-Mail: **fhholich@aol.com**

****

BLRBAC SUBCOMMITTEES

AUXILIARY FUEL **Dave Streit, Chairman** Buckeye Florida One Buckeye Drive Perry, FL 32348 Tel: 850-584-1402 Fax: 850-584-1717 **dave_streit@bkitech.com**	**BLACK LIQUOR** **Mark Sargent, Chairman** International Paper 6285 Tri-Ridge Boulevard Loveland, OH 45140-7910 Tel: 513-248-6086 Fax: 901-214-0894 **mark.sergeant@ipaper.com**
EMERGENCY SHUTDOWN PROCEDURES **John Andrews, Chairman** MeadWestvaco Corporation P. O. Box 118006 Charleston, SC 29423-8006 Tel: 843-746-8214 Fax: 843-743-3229 **john.andrews@mwv.com**	**FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS** **Chris Jackson, Chairman** Global Risk Consultants Corp. 12848 SW Thunderhead Way Beaverton, OR 97008 Tel/Fax: 503-671-9829 **chris.jackson@globalriskconsuiltants.com**
INSTRUMENTATION **David Avery, Chairman** Domtar Paper Company P.O. Box 678 Bennettsville, SC 29512 Tel: 843-479-0200, Ext. 458 Fax: 843-479-9481 **dave.avery@domtar.com**	**MATERIALS & WELDING** **Dave Fuhrmann, Chairman** International Paper 6285 TriRidge Blvd. Loveland, OH 45140 Tel: 513-248-6954 Fax: 513-248-6679 **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 Fax: 860-763-3608 **bob.zawistowski@psaengineering.com**	**PUBLICITY & NEWS RELEASE** **Craig Cooke, Chairman** FM Global 815 Byron Drive Oconomowoc, WI 53066 Tel: 262-567-7370 Fax: 972-731-1820 **craig.cooke@fmglobal.com**
WASTE STREAMS **John Rickard -- Chairman** Jacobs Engineering P. O. Box 5456 Greenville, SC 29606 Tel: 864-676-6393 Fax: 864-676-6005 **john.rickard@jacobs.com**	**WATER TREATMENT (NEW)** **Tom Madersky, Chairman** Power Specialists Assoc. Inc. 531 Main Street Somers, CT 06071 Tel: 860-763-3241 Fax: 860-763-3608 **tom.madersky@psaengineering.com**

BLRBAC MEETING SCHEDULE

Spring	**April**	**6, 7 & 8**	**2009**
Fall	**October**	**5, 6 & 7**	**2009**
Spring	**April**	**12, 13 & 14**	**2010**
Fall	**October**	**4, 5 & 6**	**2010**
Spring	**April**	**4, 5 & 6**	**2011**

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

■ Past Chairman Lon Schroeder

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BLRBAC has established its own WEB Site which is:

www.blrbac.org

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

BLRBAC MEETING NOTICE

COVER LETTER General Information

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

CROWNE PLAZA HOTEL Blocked room dates, pricing, address, hotel phone numbers, alternate hotel information, etc.

SCHEDULE List of Subcommittee activities on Monday & Tuesday

AGENDA Reports given to Main 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
1005 59th Street
Lisle, IL 60532

Phone: 630-512-0144
Fax: 630-512-0155
fhholich@aol.com

Below is the current status of the BLRBAC publications. These are available at the **BLRBAC INTERNET ADDRESS**: **www.blrbac.org**

Recommended Practices by BLRBAC

Fire Protection in Direct Contact Evaporators and Associated Equipment
(Dated: April 2008)

Safe Firing of Black Liquor in Black Liquor Recovery Boilers
(Dated: April 2008)

Waste Stream Incineration
(Dated: October 2008)

Personnel Safety & Training
(Dated: October 2007)

Safe Firing of Auxiliary Fuel in Black Liquor Recovery Boilers
(Dated: April 2007)

Emergency Shutdown Procedure (ESP)
(Dated: October 2006)

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: October 2004)

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
Fax: 781-762-9375
michael.polagye@fmglobal.com

AUXILIARY FUEL SUBCOMMITTEE

Dave Streit – Chairman
Buckeye Florida
One Buckeye Drive
Perry, FL 32348
Tel: 850-584-1402
Fax: 850-584-1717
dave_streit@bkitech.com

Allen L. Ray – Sec. Barron Industries, Inc. 105 19th Street South Birmingham, AL 35210 Tel: 205-956-3441 Fax: 205-956-2265 allen_ray@barronind.com	**Robert DeCarrera** Georgia-Pacific Corp. 133 Peachtree Street N.E. Atlanta, GA 30303 Tel: 404-652-4686 Fax: 404-654-4746 rdecarre@gapac.com	**Lino DiLeonardo** Zurich 400 University Ave., 16th Floor Toronto, ON M5G 1S7 Tel: 519-824-4548 Fax: 519-824-0916 lino.di.Leonardo@zurich.com
Bruce Knowlen Weyerhaeuser Company WTC 1B22 P. O. Box 9777 Federal Way, WA 98063 Tel: 253-924-6434 Fax: 253-924-4380 bruce.knowlen@weyerhaeuser.com	**Greg Kornaker** Babcock & Wilcox Company P. O. Box 351 Barberton, OH 44203-0315 Tel: (330) 860-2009 Fax: (330) 860-1105 gjkornaker@babcock.com	**Guy Labonte** FM Global 600 De La Gauchetiere St W. 14th Floor Montreal, Quebec Canada H3B 4L8 Tel: 514-876-7412 Fax: 514-876-7495 guy.labonte@fmglobal.com
Nick Merriman Sappi Forest Products sappi Management Services (Pty) Ltd. P. O. Box 31560 2017 Braamfontein South Africa Tel: +27 (0)32 456 1433 Fax: +27 (0)32 456 1484 nick.merriman@sappi.com	**Jim Quandt (Alt.)** Weyerhaeuser Company P. O. Box 275 Springfield, OR 97477 Tel: 541-741-5428 Fax: 541-741-5895 jim.quandt@weyerhaeuser.com	**Ivan Semyanko, PE** ABB Alstom Power, Inc. CEP Code 1017-2406 200 Day Hill Road Windsor, CT 06095 Tel: 860-285-3953 Fax: 860-285-4020 ivan.semyanko@us.abb.com

NOTE: Auxiliary Fuel Subcommittee did not meet in the fall of 2008. Their next meeting is scheduled for the spring of 2009 starting at 1:00 PM as an "open" meeting.

EMERGENCY SHUTDOWN PROCEDURES SUBCOMMITTEE

‡ **John Andrews – Chairman**
MeadWestvaco Corporation
P.O. Box 118006
Charleston, SC 29423-8005
Tel: 843-746-8214; Fax: 843-745-3229
john.andrews@mwv.com

‡**Shawn Casey** Howe Sound Pulp & Paper 3838 Port Mellon Highway Port Mellon, BC V0N 2SO Tel: 604-884-2172 Fax: 604-884-2178 **shawn.casey@hspp.ca**	‡**Dean Clay** International Paper 6285 Tri-Ridge Blvd Loveland, OH 45140-7910 Tel: 513-248-6564 Fax: 513-248-6683 **dean.clay@ipaper.com**	‡**Jack Clement** Clement Consulting, Inc. 4161 Meadowcreek Lane Copley, OH 44321-3088 Tel: 330-666-7647 Fax: 330-666-7647 **jack@clementconsulting.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**	**Chris Gore** Domtar Paper Company P.O. Box 678 Bennettsville, SC 29512 Tel: 843-479-0200, Ext.430 Fax: 843-479-9481 **chris.gore@n.domtar.com**
‡**John A. Kulig** Babcock & Wilcox Companies P. O. Box 351, BVS02B Barberton, OH 44203-0351 Tel: 330-860-6438 Fax: 330-860-9427 **jakulig@babcock.com**	‡**Mark LeBel** Alstom Power P. O. Box 500, 1112-2406 Windsor, CT 06095-0500 Tel: 860-285-2238 Fax: 860-285-5078 **mark.lebel@power.alstom.com**	‡**Karl Morency** Georgia-Pacific P. O. Box 105605 Atlanta, GA 30348-5605 Tel: 404-652-4629 Fax: 404-654-4748 **ktmorenc@gapac.com**

EMERGENCY SHUTDOWN PROCEDURES SUBCOMMITTEE (Cont.)

‡**David Parrish** FM Global P. O. Box 9102 Norwood, MA 02062 Tel: 781-255-4734 Fax: 781-762-9375 david.parrish@fmglobal.com	‡**John Phillips** Andritz Inc. 1115 Northmeadow Parkway Roswell, GA 30076 Tel: 770-640-2434 Fax: 770-640-2521 john.phillips@andritz.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 in October of 2008

FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS AND ASSOCIATED EQUIPMENT SUBCOMMITTEE

‡**Chris Jackson – Chairman**
Global Risk Consultants Corporation
12848 SW Thunderhead Way
Beaverton, OR 97008
Tel/Fax: 503-671-9829
chris.jackson@globalriskconsultants.com

Randy Baker Buckeye Technologies One Buckeye Drive Perry, FL 32348 Tel: 850-584-1380 Fax: 850-584-1738 **randy_baker@bkitech.com**	‡**Craig Cooke**-Vice Chairman FM Global 815 Byron Drive Oconomowoc, WI 53066 Tel: 262-567-7370 Fax: 972-731-1820 **craig.cooke@fmglobal.com**	**Joe Goss** Delta Natural Kraft P. O. Box 20700 1701 Jefferson Parkway Pine Bluff, AR 71612 Tel: 870-541-5052 Fax: 870-541-5089 **jgoss@pbmill.com**
Joseph Lynch XL Group 1105 Lakewood Parkway, Suite 200 Alpharetta, GA 30004-4741 Tel: 770-569-7091 Fax: 770-569-7090 **joe_lynch@xlgroup.com**	‡**Nick Merriman** Austrian Energy & Environment Graz, Austria Tel: +43 316 501-2810 Fax: +43 676 89 501-2810 **nicholas.merriman@aee-austria.at**	‡**John Yash** Babcock & Wilcox Company 2302 Parklake Drive, NE Suite 300 Atlanta, GA 30345 Tel: 770-621-3920 Fax: 770-621-3922 **jlyash@babcock.com**

‡ = Denotes attendance at meeting in October of 2008

INSTRUMENTATION SUBCOMMITTEE

‡**David Avery – Chairman**
Domtar Paper Company
P. O. Box 678; Bennettsville, SC 29512
Tel: 843-479-0200, Ext. 458
Fax: 843-479-9481
david.avery@domtar.com

‡**Richard Pothier – Sec.** RiNan, Inc. 44 Glen Drive Peabody, MA 01960 Tel: 978-535-2520 Fax: 978-535-3502 rinan-44@aol.com	‡**J. C. Browning, Jr. - Vice Chair** Alabama River Pulp Co., Inc. P. O. Box 100 Perdue Hill, AL 36470 Tel: 334-743-8336 Fax: 334-743-8332 johnb@ariver.com	‡**David T. Boudreau** SAPPI (S.D. Warren Company) 1329 Waterville Road Skowhegan, ME 04976 Tel: 207-238-3219 Fax: 207-238-3479 david.boudreau@na.sappi.com
‡**John Cover** John E. Cover Engr., Inc. P. O. Box 35010 5425 Caldwell Mill Road Birmingham, AL 35236-6010 Tel: 205-991-7106 Fax: 205-991-6109 coverj@asme.org	**Michael Fay** Simpson Tacoma Kraft Co. P. O. Box 2133 Tacoma, WA 98421 Tel: 253-596-0250 Fax: 253-596-0160 mfay@simpson.com	‡**Alan Laflamme** Lincoln Paper & Tissue LLC 50 Katahdin Avenue P. O. Box 490 Lincoln, ME 04457 Tel: 207-794-0685 Fax: 207-794-3964 alaflamme@lpandt.com
‡**Gail Lance** Babcock & Wilcox P. O. Box 351 Barberton, OH 44203 Tel: 330-860-2628 Fax: 330-860-2220 gjlance@babcock.com	‡**Rick Matarrese** FM Global 655 Engineering Dr. #300 Norcross, GA 30092 Tel: 770-777-3684 Fax: 770-777-0414 rick.matarrese@fmglobal.com	**Dan Mott** Irving Pulp & Paper Ltd. P. O. Box 3007, Station B Saint John, NB, E2M 3H1 Canada Tel: 506-632-4149 Fax: 506-633-5598 mott.dan@irvingpulp.com

‡ = Denotes attendance at meeting in October of 2008

INSTRUMENTATION SUBCOMMITTEE (Cont.)

‡**Roger Smith** Georgia-Pacific Corp. P. O. Box 105605 Atlanta, GA 30303 Tel: 404-915-0141 Fax: 404-584-1466 **resmith@gapac.com**	‡**Jari Sopanen** Andritz Brasil Ltda. Rua Presidente Faria, 248-10ˆandra 80020-290 Cuitiba – PR Brazil Tel: +55 41 304-7682 Fax: +55 41 224-0014 **jari-sopanen@andritz.com**	‡**Michael Kiper** International Paper Co. 6285 Tri-Ridge Blvd. Loveland, Ohio 45140 Tel: 513-248-6517 Fax: 513-248-6679 **michael.kiper@ipaper.com**
‡**Bruce Knowlen** Weyerhaeuser Co. P. O. Box 9777 Federal Way, WA 98063-8777 Tel: 253-924-6434 Fax: 253-924-4380 **bruce.knowlen@weyerhaeuser.com**	‡**Andy Smith** Global Risk Consultants 2971 Flowers Road. South Atlanta, GA 30341 Tel: 770-451-8056, Ext. 308 Fax: 770-451-3330 **andysmith@globalriskconsultants.com**	

‡ = Denotes attendance at meeting in October of 2008

PUBLICITY & NEWS RELEASE SUBCOMMITTEE

‡**Craig Cooke – Chairman**
FM Global
815 Byron Drive
Oconomowoc, WI 53066
Tel: 262-567-7370; Fax: 972-731-1820
craig.cooke@fmglobal.com

‡ = Denotes attendance at meeting in October of 2008

.

MATERIALS & WELDING SUBCOMMITTEE

‡**Dave Fuhrmann – Chairman**
International Paper
6285 TriRidge Blvd.
Loveland, OH 45140
Tel: 513-248-6954
Fax: 513-248-6679
dave.fuhrmann@ipaper.com

‡**Jesse Worsham - Co Chair** Weyerhaeuser Company Marlboro Mill P. O. Box 678 Bennettsville, SC 29512 Tel: 843-479-0200, Ext. 380 Fax: 843-479-6603 **jesse.worsham @n.domtar.com**	‡**Lynn Barrett** Zampell Refractories 6801 Parke East Blvd. Tampa, FL 33610 Tel: N/A Fax: N/A **lbarrett@zampell.com**	‡**George Bodman** 13 Kingwood Villas Court Kingwood. TX 77339 Tel: 800-286-6069 or 281-359-4006 Fax: 281-359-4225 Cell: 713-557-2118 **blrclgdr@aol.com**
Dave Crowe David N French Metallurgists 2681 Coral Ridge Road Brooks, KY 40109-5207 Tel: 502-955-9847 Cell: 502-262-8968 Fax: N/A **dcrowe@davidnfrench.com**	**John Hefferman** Zampell Refractories 262 Titus Avenue Warrington, PA 18976 Tel: 215-491-9300 Fax: 215-491-9931 **jheffernan@zampell.com**	‡**Fabian Henriques** PSA Inc. 531 Main Street Somers, CT 06071 Tel: 614-440-4284 Fax: 860-760-3608 **fabian.henriques** **@psaengineering.com**
Dennis Hollenbach Alstom Power 2000 Day Hill Road Windsor, CT 06095 Tel: 860-285-9140 Fax: 860-285-5078 **dennis.hollenbach** **@power.alstom.com**	‡**Dave Lang** FM Global Box 1567 Little Elm, TX 75068 Tel: 972-731-1882 Fax: 973-402-1070 **david.lang@fmglobal.com**	**Michael Lykins** Smurfit-Stone 450 E. North Avenue Carol Stream, IL 60188 Tel: 630-384-5272 Cell: 630-414-0145 Fax: 630-384-5283 **mlykins@ssmurfit.com**

‡ = Denotes attendance at meeting in October of 2008

MATERIAL & WELDING SUBCOMMITTEE (Cont.)

‡**Max Moskal** M&M Engineering 11020 W. 72nd Street Indiana Head Park, IL 60525 Tel: 708-784-3564 Fax: 708-784-3612 **max_moskal @mmengineering.com**	‡**Steve Osborne** Babcock & Wilcox 20 S. VanBuren Avenue Barberton, OH 44203-0351 Tel: 330-860-1686 Fax: 330-860-9023 **slosborne@babcock.com**	**Dan Phillips** Industra Service Corporation Portland, Oregon Tel: 503-624-9100 Fax: 503-624-9994 **dphillips @industrainc.com**
‡**Bob Roy** RMR Mechanical PO Box 170 Cumming, GA 30028 Tel: 770-205-9646 Fax: 770-205-9580 **bob.roy@rmrmechanical.com**	**Jimmy Sherouse** Southeastern Mechanical Services 1615 118th Ave St. Petersburg, FL 33716 Tel: 850-492-9175 **jsherouse@semsi.com**	‡**Douglas Singbeil** FPInnovatons - Paprican 3800 Westbrook Mall Vancouver, BC V6S 2L9 Tel: 604-222-3254 Dell: 604-839-3254 Fax: 604-222-3207 **douglas.singbeil@fpinnovaions.ca**
‡**Henry Tessier Jr.** Hartford Steam Boiler One State Street P. O. Box 5024 Hartford, CT 06102-5024 Tel: n/a Fax: n/a **henry_tessier@hsb.com**	‡**Billy Walker** CNA Risk Control 4701 Porchaven Lane Apex, NC 27539 Tel: 919-773-8001 Fax: n/a **billy.walker@cna.com**	**Luis Yepez** WSI 2225 Skyland Court Norcross, GA 30071 Tel: 678-728-9279 Fax: N/A **lyepez@wsi.aquilex.com**

‡ = Denotes attendance at meeting in October of 2008

PERSONNEL SAFETY SUBCOMMITTEE

‡**Robert E. Zawistowski – Chairman**
Power Specialists Associates, Inc.
531 Main Street
Somers, CT 06071
Tel: 860-763-3241, Ext. 135
Fax: 860-763-3608
bob.zawistowski@psaengineering.com

‡**Fred Abel** AXA Corporate Solutions Assurance Rhone-Alpes 235, cours Lafayette 69006 Lyons France Tel: +33 4 72 83 29 41 Fax: +33 4 72 83 29 40 **frederic.abel @axa-corporatesolutions.com**	**Ken Baker** Smurfit-Stone Container Corporation P. O. Box 100544 Florence, SC 29501-0544 Tel: 843-269-0179 Fax: 843-269-0167 **kbaker@smurfit.com**	‡**Jim Dickinson** Babcock & Wilcox Company 20 S. Van Buren Avenue Barberton, OH 44203-0351 Tel: 330-860-1229 Fax: 330-860-9319 **jadickinson@babcock.com**
‡**Robert Fry** Northern Pulp P.O. Box 549, Station Main 260 Albercrombie Branch Road New Glasgow, NS B2H 5E8 Tel: 902-752-8461, Ext. 206 Fax: 902-752-9173 **robert.fry@northernpulp.com**	**Lory Hammer** (on Leave of Absence) MeadWestvaco 104 East Riverside Street Covington, VA 24426-1238 Tel: 540-969-5410 Fax: 540-969-5756 **lyhl@meadwestvaco.com**	**Ronald Hess** HSB Forest Products Group 110 Cedar Cove Court Buckhead, GA 30625 Tel: 706-484-1723 Fax: 706-485-5267 **ronald_hess@hsb.com**
Wes Hill Boise, Inc. 1300 Kaster Road St. Helens, OR 97051 Tel: 503-397-9447 Fax: 503-397-9351 **weshill@boisepaper.com**	‡**Jim Hinman** Weyerhaeuser CH 3D29 33663 Weyerhaeuser Way S. Federal Way, WA 98003 Tel: 253-924-6757 Fax: 253-942-0806 **jim.hinman@weyerhaeuser.com**	‡**Daryl Hoffman** FM Global Granite Park Two 5700 Granite Parkway, Ste. 700 Plano, TX 75024 Tel: 972-731-1978 Fax: 972-731-1820 **daryl.hoffman@fmglobal.com**

‡ = Denotes attendance at meeting in October of 2008

PERSONNEL SAFETY SUBCOMMITTEE (Cont.)

‡**Wayne MacIntire** International Paper Company 6285 Tri-Ridge Road Loveland, OH 45140-7910 Tel: 513-248-6834 Fax: 513-248-6679 **wayne.macintire@ipaper.com**	**Jamie Manion** MeadWestvaco 11013 West Broad Street Glen Ellen, VA 2306-5937 Tel: 804-327-6497 Fax: 804-327-8159 **JJM11@meadwestvaco.com**	‡**Preston Morgan** Metso Power 3430 Toringdon Drive, Suite 201 Charlotte, NC 28277 Tel: 704-414-3402 Fax: 704-541-3683 **preston.morgan@metso.com**
Frank Navojosky Verso Paper. Riley Street Jay, ME 04239 Tel: 207-931-8684 Fax: 207-897-6360 **frank.navojosky@versopaper.com**	‡**Len Olavessen** LENRO, Inc. P. O. Box 397 Millington, TN 38083-0397 Tel: 901-573-8343 Fax: n/a **len@lenro.com**	**Lynn Rawls** XL Group 206 Rawls Road Perkinston, MS 39573 Tel: 601-928-9420 Fax: 601-928-9420 **lynn.rawls@xlgroup.com**
‡**John Stelling** Packaging Corp. of America N. 9090 County Road E. Tomahawk, WI 54487 Tel: 715-453-2131, Ext. 309 Fax: 715-453-0470 **jstelling@packagingcorp.com**	**Arthur Thomson** Domtar Pulp & Paper Products, Inc. P.O. Box 800 2005 Mission Flats Road Kamloops, BC V2C 5M7 Tel: 250-828-7372 Fax: 250-828-7745 **art.thomson@n.domtar.com**	

‡ = Denotes attendance at meeting in October of 2008

SAFE FIRING OF BLACK LIQUOR SUBCOMMITTEE

‡**Mark Sargent – Chairman**
International Paper
6285 Tri-Ridge Blvd.
Loveland, OH 45140-7910
Tel: 513-248-6086
Fax: 901-214-0894
mark.sargent@ipaper.com

‡**Clif Barreca** Weyerhaeuser P. O. Box 1391 New Bern, NC 28563 Tel: 252-633-7696 Fax: 252-633-7657 **clif.barreca@weyerhaeuser.com**	‡**Scott Crysel** FM Global Granite Park Two 5700 Granite Pkwy, Ste. 700 Plano, TX 75024 Tel: 972-731-1658 Fax: 972-731-1820 **scott.crysel@fmglobal.com**	‡**Len Erickson** Boise Inc. P. O. Box 50 Boise, ID 83728-0001 Tel: 208-384-4933 Fax: 208-384-7637 **lenerickson@boiseinc.com**
‡**Larry Hiner** Babcock & Wilcox P. O. Box 351 Barberton, OH 44203-0351 Tel: 330-860-6525 Fax: 330-860-9295 **lahiner@babcock.com**	**Scott Moyer** Georgia Pacific Corporation P. O. Box 919 Palatka, FL 32178-0919 Tel: 386-329-5609 Mobile: 386-227-8991 **scott.moyer@gapac.com**	‡**Doug Murch** MeadWestvaco 11013 West Broad Street Glen Allen, VA 23060-5937 Tel: 804-327-5245 Cell: 513-288-5750 Fax: 804-201-2192 **douglas.murch@meadwestvaco.com**
‡**Sandi Sims** Alabama River Pulp. P. O. Box 100 Perdue Hill, AL 36470 Tel: 251-743-8552 Fax: n/a **sandis@ariver.com**	‡**Rick Young** Alstom Power Inc. 1119 Riverfront Parkway Chattanooga, TN 37402 Tel: 423-752-2603 Fax: 423-752-2660 **frederick.young@power.alstom.com**	

‡ = Denotes attendance at meeting in October of 2008

WASTE STREAMS SUBCOMMITTEE

‡John Rickard – Chairman
Jacobs Engineering
P. O. Box 5456
Greenville, SC 29606
Tel: 864-676-6393
Fax: 864-676-6005
john.rickard@jacobs.com

‡Henry Beder Weyerhaeuser WTC 2G25 P. O. Box 9777 Federal Way, WA 98003 Tel: 253-924-4242 Fax: 253-924-5920 **hank.beder@weyerhaeuser.com**	**‡Chris Cahoon** Domtar P. O. Box 747 Highway 149 North Plymouth, NC 27962 Tel: 252-793-8301 Fax: 252-793-8262 **chris.cahoon@n.domtar.com**	**Mark E. Cooper** FM Global Key Center 601 108th Avenue, NE, Ste.1400 Bellevue, WA 98004 Tel: 425-709-5084 Fax: 425-454-7847 **mark.cooper@fmglobal.com**
‡Wendy Coyle Weyerhaeuser Postal Bag 1020 Grande Prairie, Alberta Canada T8V 3A9 Tel: 780-539-8183 Fax: 780-539-8344 **wendy.coyle@weyerhaeuser.com**	**Arnie Iwanick** Harris Group, Inc. 1750 NW Naito Parkway Portland, OR 97209-2530 Tel: 503-345-4516 Fax: 503-228-0422 **arnie.iwanick@harrisgroup.com**	**Olie Kujanpaa** Andritz 10745 Westside Parkway Alpharetta, GA 30004 Tel: 770-640-2571 Fax: 770-640-2455 **olli.kujanpaa@andritz.com**
‡John Lewis Fluor Daniel Forest Products 100 Fluor Daniel Drive Greenville, SC 29607-2762 Tel: 864-517-1683 Fax: 864-517-1322 **john.lewis@fluor.com**	**‡Mathias Lindstrom** MeadWestvaco 1021 Main Campus Drive Tel: 919-334-3998 Fax: 919-334-3312 **mathias.lindstrom @meadwestvaco.com**	**Winston “Jerry” Pate** Georgia Pacific P. O. Box 709 Brewton, AL 36427 Tel: 251-867-8371 Fax: 251-867-1153 **winston.pate@gapac.com**

‡ = Denotes attendance at meeting in October of 2008

WASTE STREAMS SUBCOMMITTEE (Cont.)

‡**Ann Schlegel** A.H. Lundberg Associates Inc. P. O. Box 597 Bellevue, WA 98009 Tel: 425-283-5070 Fax: 425-283-5081 **ann.schlegel @lundbergassociates.com**	‡**H. Bentley Sherlock** Babcock & Wilcox 2302 Parklake Drive. N.E. Ste. 300 Atlanta, GA 30345 Tel: 770-621-3947 Fax: 770-621-3922 **hbsherlock@babcock.com**	‡**Michael D. Sides** GE GAP Services 1360 Olympia Park Circle Ocoee, FL 34761 Tel: 407-656-4275 Mobile: 407-462-4622 Fax: 888-964-7348 **michael.sides@xlgroup.com**
‡**Arie Verloop** Jansen Combustion and Boiler Technologies 12025 115th Avenue N.E., Suite 250 Kirkland, WA 98034-6935 Tel: 425-952-2825 Fax: 425-825-1131 **arie.verloop@ansenboiler.com**	‡**Marla Weinberg** International Paper Corporate Technology Center 6285 Tri-Ridge Blvd. Loveland, OH 45140 Tel: 513-248-6789 Fax: 901-214-0894 **marla.weinberg@ipaper.com**	

‡ = Denotes attendance at meeting in October of 2008

WATER TREATMENT SUBCOMMITTEE (NEW)

‡**Tom Madersky**
Power Specialists Assoc. Inc.
531 Main Street
Somers, CT 06071
Tel: 860-763-3241; Fax: 860-763-3608
tom.madersky@psaengineering.com

Craig Aderman Sappi 1329 Waterville Road Skowhegan, ME Tel: 207-238-3000 Fax: N/A **craig.aderman@sappi.com**	**Kari Cahoon*** Domtar Paper Company Plymouth, NC Tel: 252-793-8059 Fax: N/A **kari.cahoon@n.domtar.com**	**Clark Conley** Metso 2900 Courtyards Drive Norcorss, GA 30071 Tel: 770-263-7863 Fax: N/A **clark.conley@metso.com**
‡**Buck Dunton** ChemTreat 4301 Dominion Blvd. Glen Allen, VA 23060 Tel: 804-935-2000 Fax: N/A **buckd@chemtreat.com**	**Frank Gabrielli** Alstom Power 2000 Day Hill Road Windsor, CT 06095 Tel: 860-688-1911 Fax: N/A **frank.gabrielli @power.alstom.com**	**James Graham** Buckman 1256 N. McClean Boulevard Memphis, TN 38108-1241 Tel: 901-278-0330 Fax: N/A **jngraham@buckman.com**
‡**John Gray** Rayonier 4470 Savannah Highway Jesup, GA Tel: 912-427-5221 Fax: N/A **john.p.gray@rayonier.com**	‡**Ken Hansen** Babcock 20 South Van Buren Avenue Barberton, OH 44203 Tel: 330-860-1186 Fax: N/A **kehansen @babcock.com**	‡**Norris Johnston** Hercules 1180 Avenue of Americas 14th Floor New York, NY Tel: N/A Fax: N/A **njohnston@herc.com**

‡ = Denotes attendance at meeting October 6, 2008
* =Denotes new subcommittee member

WATER TREATMENT SUBCOMMITTEE (Cont.)

‡**Sam Lewis** Delta Training 4020 Oleander Drive Wilmington, NC Tel: 910-790-1988 Fax: N/A **slewis@deltatraining.com**	‡**Mitch Morgan** Nalco 1601 W. Diehl Road Naperville, IL 60563-1198 Tel: 630-305-1000 Fax: N/A **jmorgan@nalco.com**	‡**Rick Morgan** FM Global Granite Parkway Plano, TX 75024 Tel: 972-731-1656 Fax: N/A **rick.morgan@fmglobal.com**
‡**Kurt Parks*** Sappi Cloquet.MN Tel: 218-878-4378 Fax: N/A **kurt.parks@sappi.com**	‡**Tom Przbylski** Boise Int'l. Falls, MN 56649-2327 Tel: 218-285-5011 Fax: N/A **tomprzybylski@boisepaper.com**	**Jim Robinson** GE (infra, water) 4636 Somerton Road Trevose, PA 19053 Tel: 215-355-3300 Fax: N/A **james.robinson@ge.com**
‡**Alarick Tavares** Georgia Pacific 133 Peachtree Street Atlanta, GA 30303 Tel: 404-652-4000 Fax: N/A **ajtavare@gapac.com**	‡**Alvaro Timotheo** Andritz 1115 N. Meadow Parkway Roswell, GA 30076-3857 Tel: 770-640-2500 Fax: N/A **alvaro.timotheo@andritz.com**	

‡ = Denotes attendance at meeting October 6, 2008
* =Denotes new subcommittee member

Registered for the meeting were:

A.H. LUNGBERG ASSOCIATES
Schlegel, Ann, Bellevue, WA

ABB LIMITED KINLEITH
Jones, Michael, Tokoroa, NZ

ABB MAINTENANCE SERVICES
Kant, Shree, Tokoloa, NZ

ABITIBIBOWATER
Williams, Mark, Calhoun, TN

AHR METALS
Hutto, Randy, Bessemer, AL
Ramanauskas, Brian, Bessemer, AL
Rettig, Mark, Bessemer, AL
Sullivan, Mike, Bessemer, AL
Wallace, Steven, Bessemer, AL

AIRTEK CONSTRUCTION
Bringman, Lewis, Linthicum, MD

ALABAMA RIVER PULP
Browning, John, Perdue Hill, AL
Chastain, Ryan, Perdue Hill, AL
Norris, Mitchell, Perdue Hill, AL
Richardson, Patrick, Perdue Hill, AL
Sims, Sandi, Perdue Hill, AL
Standridge, Tim, Perdue Hill, AL

ALSTOM POWER
Harbach, Paul, Suwanee, GA
LeBel, Mark, Windsor, CT
Rushing, Michael, St. Rose, LA
Young, Frederick, Chattanooga, TN

AMERICAN FOREST & PAPER ASSOC.
Grant, Thomas, Yonkers, NY

ANDRITZ
Collins, Peter, Roswell, GA
Corvalan, Pablo, Roswell, GA
Davis, Joe, Roswell, GA
Martin, Jim, Roswell, GA
Phillips, John, Roswell, GA
Rose, Aaron, Roswell, GA
Silva, Ageu, Roswell, GA
Sopanen, Jari, Roswell, GA
Timotheo, Alvaro, Roswell, GA

AUSTIN FIRE EQUIPMENT
Tourres, Jack, Prairieville, LA

AUSTRIAN ENERGY AND ENVIRONMENT
Merriman, Nick, Graz, Austria, Syria

AXA CORPORATE SOLUTIONS
Abel, Fred, Lyon, France

BABCOCK & WILCOX
Dickinson, Jim, Barberton, OH
Hansen, Ken, Atlanta, GA
Hicks, Tim, Barberton, OH
Hiner, Larry, Barberton, OH
Kittel, David, Atlanta, GA
Kulig, John, Barberton, OH
Lance, Gail, Barberton, OH
Lombardi, Randy, Barberton, OH
Osborne, Steve, Barberton, OH
Sherlock, Bentley, Atlanta, GA
Yash, John, Atlanta, GA

BE&K CONSTRUCTION
Darnall, Bill, Birmingham, AL
Dean, Jerry, Birmingham, AL

BE&K ENGINEERING
Cotten, Kelly, Birmingham, AL
Darnall, Glenn, Birmingham, AL
Keane, Jim, Birmingham, AL
Mathias, Doug, Birmingham, AL

Registered for the meeting were:

BOISE , INC.
Erickson, Leonard, Boise, ID
Przybylski, Tom, International Falls, MN

BUCKEYE TECHNOLOGIES
Das, Raul, Perry, FL

BUCKMAN LABORATORIES
Borsje, Henk, Alexandria, VA
McCool, Craig, Brandon, MS.

CNA RISK CONTROL
Walker, Billy, Apex, NC

CARTER HOLT HARVEY
Beck, Chris, Tokoroa, NZ

CHEMTREAT
Dunton, Buck, Richmond Hill, GA

CHH PULP & PAPER
MacFarlane, Andrew, Kawerau, NZ

CLEMENT CONSULTING
Clement, Jack, Copley, OH

CLYDE BERGEMANN
Adams, Wayne, Clinton, NC
Shanahan, Dennis, Hanover, MD

DELTA TRAINING
Lewis, Sam, Wilmington, NC

DIAMOND POWER
Carlson, Tim, Lancaster, OH
McAllister, Phil, Lancaster, OH
Myers, Fred, Sequim, WA
Youssef, Simon, Lancaster, OH

DOMTAR PAPER COMPANY
Avery, David, Bennettsville, SC
Cahoon, Chris, Plymouth, NC
Cahoon, Kari, Plymouth, NC
Jach, Paul, Bennettsville, SC
Worsham, Jesse, Bennettsville, SC

ENERFAB
Shull, Tom, Cartersville, GA

ENERTECHNIX
Suplicki, David, Maple Valley, WA

EVERGREEN PACKAGING
Holland, Brook, Canton, NC
Jensen, Terrance, Pine Bluff, AR
Yarbrough, Kyle, Canton, NC

EXTRA HAND PLANT SUPPORT SERVICES
Phelps, Robert, Chester, VA

FLUOR DANIEL FOREST PRODUCTS
Lewis, John, Greenville, SC

FM GLOBAL
Cooke, Craig, Plano, TX
Cooper, Mark, Stockholm, Sweden
Hoffman, Daryl, Prosper, TX
Judge, Chris, Manchester, UK
Lang, Dave, Little Elm, TX
Matarrese, Rick, Alpharetta, GA
Moberg, Eric, Johnsburg, IL
Morgan, Rick, Plano, TX
Onstead, Jimmy, Plano, TX
Parrish, David, Norwood, MA
Polagye, Mike, Norwood, MA
Stuver, Greg, Plano, TX
Terkosky, Robert, Jacksonville, FL

FOSSIL POWER SYSTEMS
Donahue, Mark, Dartmouth, NS, Canada

Registered for the meeting were:

GEORGE H. BODMAN, INC.
Bayse, Michael, Kingwood, TX
Bodman, George, Kingwood, TX
Gaus, Jeff, Kingwood, TX

GEORGIA-PACIFIC
Jackson, Robert, Brunswick, GA
Lane, Terry, Brunswick, GA
Morency, Karl, Atlanta, GA
Moyer, Scott, Palatka, FL
Purser, Keith, Brunswick, GA
Smith, Roger, Snellville, GA
Tavares, Alarick, Atlanta, GA

GLATFELTER
Gentzler, William, Spring Grove, PA

GLOBAL RISK CONSULTANTS
Jackson, Christopher, Beaverton, OR
Macaulay, Charlie, Issaquah, WA
Smith, Andy, Atlanta, GA

GOMMITECH
Gommi, Julius, Maple Valley, WA
Graphic Packaging International
Pressley, Dale, Macon, GA
Weyand, Andrew, Macon, GA

HARRIS GROUP
Saunders, Jerry, Portland, OR
Worley, Matt, Atlanta, GA

HARTFORD STEAM BOILER
Griffith, Matthew, Guilford, ME
Grubb, Ronald, Atlanta, GA

HERCULES
Durham, Virginia, Philadelphia, PA
Johnston, Norris, Lacey's Spring, AL

HOWE SOUND PULP & PAPER
Casey, Shawn, Port Mellon, BC

HSB GROUP
Hess, Ron, Buckhead, GA

INTERNATIONAL PAPER
Clay, Dean, Loveland, OH
Cox, Don, Pine Hill, AL
Coyle, Wendy, Springfield, OR
Fuhrmann, Dave, Loveland, OH
Kiper, Mike, Loveland, OH
Loper, Ricky, Pine Hill, AL
MacIntire, Wayne, Loveland, OH
Sargent, Mark, Loveland, OH
Weinberg, Marla, Loveland, OH

INTERSTATE PAPER
Lanser, Jerry, Riceboro, GA

JACOBS ENGINEERING
Rickard, John, Greenville, SC

JANSEN COMBUSTION
Dye, Ned, Kirkland, WA
Verloop, Arie, Kirkland, WA

JOHN E. COVER ENGINEERING
Cover, John, Birmingham, AL

KAPSTONE
Ramsey, Phil, Charleston, SC

K-PATENTS
Hamalainen, Arto, Naperville, IL
Pyorala, Keijo, Naperville, IL

LENRO INC.
Olavessen, Len, Millington, TN

LINCOLN PAPER & TISSUE
LaFlamme, Alan, Lincoln, ME
MacEachern, Patrick, Lincoln, ME

LIQUID SOLIDS CONTROL
Sweeney, Michael, Upton, MA

Registered for the meeting were:

LONGVIEW FIBRE
Andrews, Mark, Longview, WA
Berg, Greg, Longview, WA

LUMBERMEN'S UNDERWRITING ALLIANCE
Correa, Antonio, Boca Raton, FL

MARSH RISK CONSULTING
Hyche, Dwight, Meridian, MS

MATRIX RISK CONSULTANT
Garfield, Michael, Lowell, ME

MEADWESTVACO
Andrews, John, Charleston, SC
Lindstrom, Mathias, Raleigh, NC
Murch, Douglas, Glen Allen, VA

MECHANICAL & MATERIALS ENGRG.
Moskal, Max, Indian Head Pk., IL

METSO POWER
Abrams, Larry, Charlotte, NC
Conley, Clark, Charlotte, NC
Johnson, Dewey, Charlotte, NC
Langstine, Bob, Charlotte, NC
Monahon, Jack, Charlotte, NC
Morgan, Preston, Charlotte, NC
Morris, Richard, Charlotte, NC
Morrison, Dan, Charlotte, NC
Nichols, Jody, Charlotte, NC
Skoog, Mikael, Charlotte, NC
Tanguay, Eric, Charlotte, NC
Wasson, Eric, Charlotte, NC
Weikmann, John, Charlotte, NC

MONDI SWIECIE S.A
Grabowski, Sebastian, Swiecie, Poland
Pieniazek, Dariusz, Swiecie, Poland

NALCO
Brulotte, Richard, Naperville, IL
Morgan, Mitch, Orange Park, FL

NEWPAGE CORP.
Hollern, Michael, Luke, MD

NORAM ENGINEERING
Bucher, Wayne, Birmingham, AL

NORTHERN PULP NOVA SCOTIA CORP.
Fry, Robert, New Glasgow, Nova Scotia

PACKAGING CORP. OF AMERICA
Knob, Rick, Valdosta, GA
Pope, Charles, Valdosta, GA
Stelling, John, Tomahawk, WI
Vallier, Greg, Tomahawk, WI

PHOENIX PULP AND PAPER PUBLIC
Wonglakorn, Apinya, Thailand

POTLATCH
Bliss, Dave, McGehee, AR

POWER SPECIALISTS ASSOCIATES
Haraga, Rudy, Somers, CT
Henriques, Fabian, Somers, CT
Madersky, Tom, Somers, CT
Zawistowski, Bob, Somers, CT

PROCESS EQUIP/BARRON INDUSTRIES
Nolen, Ken, Pelham, AL
Ray, Allen, Pelham, AL

PROPAL S.A.
Carcedo, Leonardo, Cali, Valle, Colombia
Gomez, Luis, Cali, Colombia

PROTERRA-POWER
Proterra, Joe, Gainesville, GA

Registered for the meeting were:

RAYONIER
Daniels, Richard, Jesup, GA
Gray, John, Jesup, GA
Kicklighter, Thomas, Jessup, GA

RICK SPANGLER, INC.
Spangler, Rick, St. Simons Island, GA

RINAN
Pothier, Richard, Peabody, MA

RMR MECHANICAL
Roy, Bob, Cumming, GA

ROCK-TENN COMPANY
Chambless, Tony, Demepolis, AL
McCurdy, Demepolis, AL

SAPPI
Aderman, Craig, Westbrook, ME
Dorko, Bob, Skowhegan, ME
Parks, Kurt, Cloquet, MN

SIAM CELLULOSE
Kamalanon, Pornthep, Thailand

SMURFIT KAPPA CARTON DE COLOMBIA
Cubillos, Jairo, Cali, Colombia
Franco, Daniel, Cali, Colombia

SMURFIT-STONE CONTAINER
Dunn, Jonathan, Florence, SC
Jones, Robert, Stevenson, AL
Paasch, Tim, Florence, SC
Smith, Dan, Hodge, LA
Trampler, Kurt, Fernandina Beach, FL
Walker, Sayed, Fernandina Beach, FL

SOMPO JAPAN RISK MANAGEMENT
Funaguchi, Akira, Shinjuku-ku, Tokyo
Muramatsu, Kenichi, Shinjuku-ku, Tokyo

SOUTHERN ENVIRONMENTAL
Harris, Don, Pensacola, FL

TRIPLE 5 INDUSTRIES
Soden, Ed, Trenton, NJ

VESUVIUS
Bishop, Dave, Goodlettsville, TN
Omara, Mike, Goodlettsville, TN

VOTORANTIM CELULOSE (VCP)
Castro, Luis Augusto, Sao Paulo, Brazil
Friggi, Renato, Sao Paulo, Brazil
Zutautas, Estanislau, Sao Paulo, Brazil

WEYERHAEUSER
Ashley, John, Vanceboro, NC
Barreca, Cliff, New Bern, NC
Bogart, Steve, Longview, WA
Hamilton, Bob, Port Wentworth, GA
Hinman, James, Federal Way, WA
Knowlen, Bruce, Federal Way, WA
Phillips, David, Grande Prairie, AB Canada
Roberts, Steve, Columbus, MS
Slagel, David, Port Wentworth, GA
Vandermeer, Bert, Granne Prairie, AB
Walker, Kent, Columbus, MS

XL GAPS
Sides, Michael, Ocoee, FL
Franks, James, Somerville, TN
Goddard, Rob, Tupelo, MS

ZAMPELL REFRACTORIES
Barrett, Lynn, Tampa, FL

INTRODUCTION

BLRBAC's Chairman, Len Erickson, called the meeting to order at 8:00 a.m. on Wednesday, October 8, 2008.

CHAIRMAN: Good morning. I'd like to welcome everyone to the fall business meeting of the Black Liquor Recovery Advisory Committee. This meeting, as with all BLRBAC events and meetings, will be held in accordance with our Anti-Trust Policy. I do request, out of courtesy to others, that you please take a second to make sure your cell phones are turned off. I checked mine first!

OLD BUSINESS

ACCEPTANCE OF THE SPRING 2008 MEETING MINUTES – Len Erickson

The Meeting Minutes for the spring 2008 were published on the WEB site. I assume the members have read those minutes. Do we have any comments or proposed changes?

DAVE AVERY: I have a minor one. In the Instrumentation Report I put March down instead of April, so I just want to change it to March.

CHAIRMAN: Okay, we will take care of that. Any other? Do we have a motion to accept the Meeting Minutes as amended? Moved. Seconded? In favor? The spring 2008 Meeting Minutes are accepted and approved as amended.

NEW BUSINESS

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

NEW REGULAR MEMBERSHIP

Howe Sound Pulp and Paper
Shawn Casey is the designated Associate Representative
The designated Alternate Associate Representative is to be determined

NEW ASSOCIATE MEMBERSHIPS

AHR Metals – a mechanical contractor providing recovery boiler repair and maintenance.
Mark Rettig is the designated Associate Representative
Randy Hutto is the designated Alternate Associate Representative

Delta Training Partners – web-based recovery boiler training
Sam Lewis is the designated Associate Representative
Kevin Coughlin is the designated Alternate Associate Representative

ITT Corporation - valves
Geary Kent is the designated Associate Representative
Brent Murphy is the designated Alternate Associate Representative

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

LENRO Inc. – water treatment consulting services
Len Olavessen is the designed Associate Representative
Anders Olavessen is the designated Alternate Associate Representative

Starr Technical Risks Agency, Inc. – provider of loss prevention services
Phil Jacobsen is the designated Associate Representative
Peter Anderson is the designated Alternate Associate Representative

NEW CORRESPONDING MEMBERSHIPS – None Reported

REGULAR REPRESENTATIVE CHANGES

A.H. Lundberg Associates
Ann Schiegel replaced Paul Seefeld as the designated Representative.
Paul Seefeld replaced Jean-Claude Patel as the designated Alternate Representative.

Alabama River Companies
John Browning replaced Tim Standridge as the designated Representative.
Tim Standridge replaced Sandi Simms as the designated Alternate Representative.

Boise, Inc.
Tommy Blaylock replaced Perry Eide as the designated Alternate Representative.

International Paper
Dean Clay remains the Representative
Dave Fuhrmann replaced Loyd Moore III as Alternate Representative.

Longview Fibre
Greg Berg replaced Jay Gregory as the designated Representative.

Northern Pulp Nova Scotia Corporation
Robert Fry remains the designated Representative.
Bruce Chapman replaced Rick Sitko as the designated Alternate Representative.

Rayonier
Thomas Kicklighter replaced Wayman Thompson as the designated Representative.
John Gray replaced Ken Ellis as the designated Alternate Representative.

Smurfit-Stone
Bob Jones replaced Phil English as the designated Representative.
Michael Lykins replaced Hank Hagins as the designated Alternate Representative.

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

ASSOCIATE REPRESENTATIVE CHANGES – None Reported

CORRESPONDING MEMBERSHIP CHANGES

Carter Holt Harvey
Chris Beck replaced Steve Dunn as designated Corresponding Alternate Representative.

MEMBERSHIP COMPANY NAME CHANGES

AbitibiBowater - Previously d/b/a Bowater
Larry Gustafson remains the designated Representative
Denis Berube remains the designated Alternate Representative

Andritz Automation Ltd. - Previously d/b/a Universal Dynamics Limited
Ralf Holm remains the designated Representative
John Phillips remains the designated Alternate Representative

Evergreen Packaging - Previously d/b/a Blue Ridge Paper
Doug Cherry remains the designated Representative
Brook Holland remains the designated Alternate Representative

Mondi Swiecie S.A. - Previously d/b/a Mondi Packaging Paper Swiecie
Sebastian Grabowski remains the designated Corresponding Representative
Maciej Kunda remains the designated Corresponding Alternate Representative

Northern Pulp Nova Scotia Corporation - Previously d/b/a Neenah Paper
Robert Fry remains the designated Representative
Bruce Chapman remains the designated Alternate Representative

*{**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.}*

2. **EXECUTIVE COMMITTEE REPORT –** Len Erickson

The Executive Committee met in a closed meeting yesterday afternoon. In attendance was the full Executive Committee; Mike Polagye, Secretary; Ron Hess, Treasurer; Jimmy Onstead, as the insurance representative; Jim Dickinson, Boiler Manufacturers representative; Dave Fuhrmann, Owners representative; Scott Moyer, as Vice Chairman and myself, Len Erickson, as Chairman.

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

We covered a number of topics. During the last couple of meetings we have discussed whether or not BLRBAC recommended practices were being held as a statutory requirements in the Western Canadian provinces. BLRBAC has contacted member companies and insurers in Western Canada and no reference can be found regarding any statutory reference or codification of BLRBAC's Recommended Practices in Canadian law. I do not know if it's a issue or not, but it is something that has been brought up for a number of years in the Meeting Minutes. BLRBAC Recommended Practices and any of our other publications have not been written with the intent of them being codified (adopted into law) and we are pleased that this is not being done.

The Materials and Welding draft was approved by the Executive Committee and will be posted on the BLRBAC WEB site for membership review and comment. Dave will be talking about that in a few minutes. The document will be voted on at the spring 2009 meeting. The document will be entitled "Materials and Welding Guidelines for Black Liquor Recovery Boilers."

The Waste Stream Subcommittee has two sections that were approved for a vote that will occur this morning. Chapters 4 and 8 will be voted on. Chapter 5 will be voted on separately.

Your BLRBAC Executive Committee has over the years, including, the time I've been on the Executive Committee, drafted and approved Operating Procedures. These operating procedures include, but are not limited to, open meeting guidelines, hospitality suite operation during meetings, records retention policy, dissemination of materials not available to the general public, fees for searching and copying old records, and an anti-trust statement. Most recently we worked on a Conflict of Interest Statement. Under consideration are guidelines for the use of cameras, video recording or taping of proceedings by members or guests. Our intent is to pull these all into one document under the Operating Guidelines. We will also perform a search to find any other guidelines that have been adopted by BLRBAC. We will then update the Operating Procedures.

The fall business meeting is considered the regular BLRBAC annual meeting and is when we elect new officers. The By-laws require the chairman to appoint a committee to nominate new officers and I have appointed Dave Fuhrmann to lead that committee. Dave has the nominating committee report.

DAVE FUHRMANN: The 2008 BLRBAC Nominating Committee was comprised of Jim Dickinson from Babcock & Wilcox, Rick Morgan from FM Global and myself from International Paper. We considered candidates, discussed our position, developed a list of candidates and then a short list to then come to an eventual list for officer election in the fall. Each candidate was contacted to ensure willingness to appear and to accept the position that will take active participation on the Executive Committee as the position designates. The Nominating Committee set stability of process as a high priority, especially with the Materials and Welding document approaching the approval stage, the Waste Streams document modifications, and the ESP logic proposals being considered. We also looked at changes likely to occur at the next election. We have to replace the Chairman after two terms per the By-laws requirements. Also, the Vice-Chairman may remain on, but in a different position, and possible new officers and any turnovers into the future.

2. **EXECUTIVE COMMITTEE REPORT** (Cont.)
DAVE FUHRMANN (Cont.)**:**

The slate of officers that we have nominated for election is:

CHAIRMAN:	Len Erickson	Boise Cascade
VICE-CHAIRMAN:	Scott Moyer	Georgia-Pacific
OPERATING REPRESENTATIVE:	Dave Fuhrmann	International Paper
INSURANCE REPRESENTATIVE:	Jimmy Onstead	FM Global
MANUFACTURERS REPRESENTATIVE:	Mark LeBel	Alstom Power

CHAIRMAN: At this time I would like to open the floor. Do we have any nominations from the membership at large or any comments? As there are no comments or nominations from the membership at large, I would like to bring the proposed slate of officers for BLRBAC to a vote. As a reminder, those allowed to vote are regular membership companies (organizations operating, manufacturing, or insuring chemical recovery boilers). Their designated voting representatives have red ribbons on their nametags. Only one vote per regular member company is allowed. I would ask one representative from each member company to stand at this time. Those in favor of the proposed slate of officers please raise your hand. Those opposed? The Slate of Officers as proposed has been approved unanimously. Their term starts at the end of this meeting. This concludes the Executive Committee report.

3. **TREASURER'S REPORT** – Ron Hess

Good morning everyone. Thanks for coming and thanks for participating. At this particular meeting we had 176 Advance Registrations and 43 At-Door Registrations. So we continue to have very good attendance. Represented in the attendees are 30 operating companies; 5 boiler manufacturing companies; 8 insurance companies or risk management firms; 25 Associate Member companies; and 5 guests of member companies. As always, we thank the individuals who traveled long distances to make this particular meeting. This year we have overseas attendees from Colombia, Brazil, Great Britain, France, Austria, Poland, New Zealand, Japan, Thailand, and Singapore. So, we appreciate your attendance and thank you for making that effort.

The hotel contract here runs through the fall meeting of next year. So over the next six months if anyone has recommendations on what happens here, suggestions, complaints, comments, or alternate sites to consider, please let me or anyone else on the Executive Committee know because we will be going through the process of finalizing the upcoming contract.

Paid parking is something new that was started here a couple of months ago. Parking arrangements for the next two meetings will be the same as we have at this meeting and we will continue to have those little stickers for your parking ticket so you don't have to pay. If you drive here and have a guest room in the hotel, there is no additional parking fee added to the guest room rate and your room key will be your parking pass for the duration of your stay.

3. **TREASURER'S REPORT** (Cont.)

On the financial side, BLRBAC has two accounts. We have a checking account and a Certificate of Deposit. At the close of business yesterday, our account balances were as follows:

CHECKING ACCOUNT:	$41,406.11
CERTIFICATE OF DEPOSIT:	$13,905.43

So we have money to pay our bills. We are in good shape. The revenues from our meetings have been tracking pretty evenly with our expenses. The 2009 Operating Budget was submitted to the Executive Committee at its meeting yesterday and was approved. So the budget for 2009 is in place and we are ready to go.

On the registration side, we just want to remind you that everyone will get an e-mail confirmation once their registration has been logged in to the BLRBAC database. So, even if you have a large company that may be registering several individuals under one check, try to make sure that the names appear somehow in that transaction so that Barbara will be sure to get you that e-mail confirmation. We have had some individuals that came in who thought they were registered, but were not. If you think you are registered, but have not received an e-mail confirmation, you should check with Barbara Holich to check on your status and avoid the "surprise" when you arrive here.

Lastly, when we publish the Minutes of this meeting on the BLRBAC website, the company representatives and their alternates for each of the Regular Member companies will also be posted. We are asking you to look at that list and help us update it. There are probably companies on the list that no longer exist and there are people who now either work for different companies or have left the industry completely. So we would appreciate you looking at that list for your company and let us know if anything needs to be changed. That will help us clean it up and it will help the communications process. Does anyone have any questions? Thanks very much!

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

I have a brief report this morning. Just as a reminder that BLRBAC communicates with its participants by e-mail, so keeping BLRBAC up-to-date with any e-mail address changes is important. Changes should be sent to Barbara Holich as fhholich@aol.com. Does anybody have any questions?

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

4. **SECRETARY'S REPORT** (Cont.)

Anyone who wishes to be added to 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 best case scenario, this should be the designated 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 (letter, fax, or e-mail are acceptable) notification is received. I keep a file folder for each member company that includes correspondence naming the Representative and Alternate for each organization. These letters usually contain the e-mail addresses I must have in order to maintain the BLRBAC database.

Therefore, be sure that I have your current working e-mail address. BLRBAC notice of meetings and meeting minutes are only 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. This second attempt is made in case someone's mailbox is full or there was a system problem at the time of the first mailing.

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. Be advised that faxed registration forms are of no use to me until the appropriate fees are paid. Therefore, please **DO NOT FAX REGISTRATION FORMS**!! -- unless it's to advise me that a check for the individual(s) listed should be arriving soon and may not be accompanied by the original registration form.

5. **SUBCOMMITTEE REPORTS**

5.1 **AUXILIARY FUEL REPORT –** Dave Streit

This subcommittee did not meet; therefore, there is no written report to submit. The next meeting of the subcommittee will be in the spring of 2009.

5.2 **BLACK LIQUOR REPORT** – Mark Sargent
Closed Meeting, October 6, 2008 at 8:30 AM Crawford Room and Open meeting, 1:00 PM Crawford Room

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

Morning meeting – closed w/ 9 of 10 members present

1. Reviewed BLRBAC Antitrust statement
2. Welcomed a new member to the Subcommittee, Sandi Sims from Alabama River Pulp
3. Reviewed and accepted the Spring 2008 meeting minutes
4. We discussed submitting sudden large leak indication language to the Executive committee for review and vote at the Spring 2009 meeting. This will be inserted into the document in Chapter 3 and reads as follows:

3.5 Sudden, Large Tube Leak Indication:

For recovery boilers, add control logic to drive the feedwater control valve closed and switch the valve control to manual when both a high furnace pressure MFT (Master Fuel Trip) and a low drum level MFT occur within 45 seconds of each other. For this logic:

- The high furnace pressure MFT (+ FD fan trip) set point shall be reviewed with the OEM and insurance carrier and also reviewed if any time delays are installed.
- Drum level drops below the low drum level MFT set point (consult boiler OEM on low drum level trip setting). This should also be reviewed with the insurance carrier if any time delays are installed.
- Both trips occur within 45 seconds of each other.
- An alert/alarm message shall appear to the operator indicating both trip conditions have occurred and that this may be the sign of a large tube leak. Additional data (leak detection system, other boiler specific parameters) should be evaluated before allowing feedwater back into the recovery boiler.

The operator is not prevented by the control system from opening the feedwater control valve, or from putting the control valve back into automatic.

It should be understood that when this control logic is implemented additional boiler specific training should be given to all operators to understand the implications and symptoms of potential sudden large tube leak indications.

We discussed and are proposing to add proof of spout cooling water flow not low and dissolving tank level not low as requirements for boiler purge. As we have learned from the IPST study of dissolving tank explosions, the majority of dissolving tank explosions have occurred when firing auxiliary fuel only. Our Subcommittee feels that these permissives are prudent to protect the spouts and dissolving tank areas from damage if smelting were to occur prior to black liquor firing. These permissives are already requirements for permissive starting logic for black liquor firing. This proposal is being submitted to the Safe Firing of Auxiliary Fuel Subcommittee and the Executive Committee for review and comment prior to the Spring 2009 meeting. We are requesting the logic drawings changes be included in the meeting minutes for member comment and review and be voted on at the Spring 2009 meeting.

{BLRBAC Secretary's Note: These are included in the draft revision to the Safe Firing of Black Liquor as posted on the BLRBAC website.}

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

5. We discussed and are proposing adding language to the document supporting the definition of stable firing as a black liquor firing starting permissive. These language changes will be included in our revision of the SFBL document, included in our minutes and be posted for membership review and comment and be voted on at the Spring 2009 meeting.

6. We discussed and agreed to proposed changes to Chapter 9 – smelt spouts. Changes to the document including description of non water cooled spouts and clearly defining between non water cooled spouts and water cooled spouts. These changes will be included in the revised document and posted for membership review and comment and be voted on at the Spring 2009 meeting.

7. We discussed and agreed to proposed changes to Chapter 10 – dissolving tanks. These changes to the document will be included in the revised document and posted for membership review and comment and will be voted on at the Spring 2009 meeting:
   - Ensure that there is adequate language to provide operating personnel with guidelines to avoid smelt run-ff and dissolving tank explosions
   - Added a section regarding dissolving tank explosion relief
   - Added language describing mechanical flow restrictors
   - Proposal to add dissolving tank dilution low flow alarm and indication

8. Several other proposed language changes that will be included in the revised document to be posted for membership review and comment and to be voted on at the Spring 2009 meeting include:
   - Proposing adding an operator function to figure 1 to check that sufficient spouts are open after boiler purge and prior to moving on to auxiliary fuel firing starting logic.
   - Proposing adding an operator function to Figure 5 to trip black liquor if operator observes all spouts plugged while firing black liquor
   - Proposing adding to Tables 4 and 5 an explanation clearly noting for SFBL purposes when logic drawings or explanations refer to burners that this includes only main hearth burners and not igniters. For the purpose of our document igniters are not an acceptable substitute for burners

Afternoon meeting – open meeting w/ 9 of 10 members present and approx. 40 guests

- Reviewed BLRBAC Antitrust statement

- Reviewed the above changes with Subcommittee members and guests

- Reviewed ESP incidents #22 and #23 – dissolving tank explosions

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

- Additional discussion on Figure 5, black liquor header and divert valve failure to be carried over to the Spring 2009 meeting

- Additional discussion for the Spring 2009 meeting on the Figures that include reference to the number of hearth burners in service for either permissive starting logic or protective tripping logic. It is requested that each Subcommittee member review the drawings and draw conclusions as to how they perceive the logic to be implemented at their locations and be prepared to discuss at the Spring 2009 meeting.

- Addition review of Chapter 10 – dissolving tanks, by all Subcommittee members to determine if there is sufficient guidance to member companies to reverse the trend that is seen on dissolving tank explosions.

Spring 2009 work items:

- Further discussion regarding Figure 5 – Failure of black liquor header valve and divert valve

- Further discussion on Figures 2 and 5 – Definition of "Sufficient Auxiliary Fuel Hearth Burners in Service" and "Insufficient Auxiliary Fuel Hearth Burners in Service" respectively.

Please discuss with your respective companies' and be prepared to bring views to the spring meeting for further discussion and clarification.

For any comments or questions please contact Mark Sargent at mark.sargent@ipaper.com or by phone at (513) 248-6086.

QUESTION FROM FLOOR: Is it the intent not to require the large leak interlock to function if drum level goes low 15 seconds after the high furnace trip?

MARK SARGENT: No, we are not saying that. As you heard yesterday, the time is going to vary from boiler to boiler. I'm not sure how you would test it. I guess one way to test it is that any time you have a boiler trip, whether it is a high furnace pressure or a high drum level trip or a black liquor trip, try to note how long it takes before you reach that low drum trip level because they are going to occur at approximately the same time for every boiler. Realize that we are not sure what to do with the 30- to 60-second time variable. You might want to contact Karl Morency at Georgia Pacific because they have had some experience with it. I also believe that Len Erickson at Boise has had some experience with it. So we are not sure of the specific time interval you should have. We are just suggesting 30- to 60-seconds.

5. **SUBCOMMITTEE REPORTS**

5.3 **ESP SUBCOMMITTEE REPORT** – John Andrews

(See Appendix A for the Summary of Incidents and Appendix B for the slide report presentation)

The ESP Subcommittee met in closed session on Monday, October 6th, with 12 members represented. Shawn Casey of Howe Sound Pulp and Paper is the new representative for Western Canada BLRBAC on the Subcommittee. The Subcommittee met in open session on Tuesday morning, October 7th, with 12 members represented and about 180 guests. During the open session, the Subcommittee reviewed 25 incident reports from North America. There were no international incidents. Of the 25 incidents, there were four explosions reported at this meeting. The IP Vicksburg, MS explosion was reported and determined to be due to Aux Fuel. The Durango St. Marys, GA explosion information from the OSHA and State of GA incident reports was reviewed. This incident remains "not classified/unknown" because the cause of the explosion was not identified in those reports and no report has been received from the mill owner. Two dissolving tank explosions were reported. Four (4) of the leaks were classified as critical incidents and 15 were non-critical incidents. Two reports were classified as an ESP with no leak. An ESP was performed in 7 of the incidents including all 4 of critical incidents (100%). This is encouraging and represents an improvement above the recent history of 60 – 67%.

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.

Some explosions reported before 1999 occurred with no discernable damage or injury, but were reported to be an explosion. Before 1999, the term Critical Exposure was used rather than Critical Incident. A Critical Exposure required the presence of smelt that could be contacted by the water. If there was a leak found and there was a clean furnace, it was considered a Non-critical Exposure. The 1999 change had the effect of increasing the cases classified as Critical Incidents from this standpoint.

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

It should be noted that there was one smelt water reaction reported from an incident with a screen tube leak but no discernable damage was reported. We are continuing to have some very close calls.

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

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, the red were listed as critical incidents and the blue mark indicates an ESP with no leak. The leaks locations are summarized as follows:

- 11 – Economizer
- 2 – Superheater
- 2 – Furnace Screen
- 3 – Wall Tubes
- 1 – Leak in Feedwater Coil Air Heater
- 2 – ESP w/ no leak
- 1 – Aux Fuel Explosion

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:

- 3 – Fatigue
- 6 – Thermal Fatigue
- 3 – Thinning
- 4 – Weld Failure
- 3 – Stress Assisted Corrosion or Corrosion Fatigue.

How Discovered

Operator observations during boiler walkdowns continue to be the prevalent method of detecting leaks and accounted for identification of 12 of the leaks (57%). Two (2) of the leaks were identified by the control room and six (6) leaks were initially indicated by the leak detections system installed. One of the leaks was discovered by a hydrostatic test during an outage.

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

Leak detection systems were installed on units in 12 of the incidents (50%), which is on par from past meetings. The fact that in six of the incidents, the leak detection systems were credited with providing the initial indication of the leak is encouraging. Six of the economizer leaks were on boilers that had leak detection systems installed and one of the economizer leaks was initially indicated by the leak detection system. Mills should consider dedicating maintenance personnel to the calibration and repair of the systems.

The Subcommittee has been looking at the time between the initial indication of the leak and the initiation of the ESP. The incidents reviewed showed that for those incidents that provided detailed information on timing, the time between initial indication of the leak and the initiation of the ESP ranged from about one minute to 6.4 hours. The median time between the first indication of a leak and the initiation of the ESP for the incidents that provided a time line ESP was 33 minutes which indicates there still is room for improvement in making the decision to ESP. There were two reports where the ESP was initiated from information available in the control room and the operators did delay the ESP while taking the time to visually verify that a leak was present. Those operators should be commended for their prompt action.

Two reports covered an ESP with no leak present. This should not be considered unusual. The fact that there are usually so few reports of an ESP with no leak probably shows that operators are generally requiring too much confirmation that a leak is actually present before initiating an ESP. Looking for leaks after low drum level trips with high furnace pressure should continue to be emphasized in training.

Incident Review

We are receiving most of the reports electronically and the Subcommittee has initiated a procedure to acknowledge the receipt of all Incident Reports that are received in order to make sure no reports are lost in “cyberspace”. Often the reports become large files when pictures and diagrams are attached so there have been some issues with getting through the e-mail system. Whenever you submit an Incident Report, you should receive a confirmation within a week. If not, please contact the ESP Secretary, Jules Gommi, to see what happened to the report. We are aware of at least two reports that had problems getting through to Jules e-mail. If you submitted a report for the Fall Meeting that is not reported here, please contact Jules to see what might have happened.

Figure 2 shows the critical incidents reported each year. The 17 Critical incidents reported for the year appear to be below where we have been running in the recent past. The increasing trend may be a result of changes in the definition of Critical or could result from better reporting by the mills. Figure 3 shows that the string of years without an explosion has been broken with the Aux Fuel explosion at Vicksburg.

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

The Durango incident in 2002 remains listed as "Unknown" under the explosion type. No formal report has been submitted by the unit owners, and based on the information contained in reports available in the public domain, the Subcommittee has determined there is insufficient information for it to identify the cause.

Figure 4, the five-year rolling average of reported boiler explosions, is now up to 0.2 after having finally gotten to zero. It will be several years to get back down to zero – assuming we don't have another boiler explosion during that time.

Figure 5 shows the history of dissolving tank explosions and there were two reported this meeting. There were no incident reports for dissolving tank explosions submitted prior to 1973 and the incident rate appears to be increasing since that time although it may be that more dissolving tank incident reports are being submitted now where they may not have been reported previously. AF&PA has released their report of Dissolving Tank Explosions and several recommendations from that report are being considered by the Safe Firing of Black Liquor Subcommittee to be added into their document.

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 just above 0.5 explosions per 100 boiler operating years, but the total explosions, which includes all boiler explosions and dissolving tank explosions, jumped up to just under 0.9 explosions per 100 boiler years because of the aux fuel and two dissolving tank explosions reported this meeting. 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 making the efforts necessary to try to keep the trend moving in the down dirction. Effort should be focused in developing better procedures to handle heavy smelt runs and plugged spouts.

Learnings

There were several items from the discussions of the incidents that may be of benefit to other recovery operations.

The report from one of the two dissolving tank explosions highlighted that it is difficult to determine the amount of smelt that accumulates behind the smelt spouts when they are all plugged. It is suggested to take a look at the boiler during the outage and establish a benchmark level from references inside the boiler that can be used during operation to better indicate to the operator when a critical level of molten smelt has accumulated so they can stop attempting to open a spout and start to shut down the boiler. References such as some level below the primary air port elevations could be useful for this.

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

We have been mentioning the possibility of installing an interlock in the control system that will close the automatic feedwater control valve and set it on "Manual" if a high furnace pressure and low drum level trip occur at the same time. This will prevent putting excessive amounts of feedwater into the drum if a leak is present and the operator can put the control back on "Auto" when he has determined that conditions are safe to do that. It was reported that a time interval needs to be included because sometimes the high furnace pressure trip and low drum level trip conditions may occur at slightly different times; but you need to make sure that the logic does not "latch in" so that a low drum level trip one day will not close the valve if a high furnace pressure trip occurs the next day. The Safe Firing of Black Liquor Subcommittee is developing some language for their document that contains a recommended time range.

There were two reports where the operators initiated the ESP from indications in the control room, including the leak detection systems, and did not have to visually confirm the leak. This action is to be commended.

Several of the economizer leaks show that handhole repair procedures continue to be a problem. Section 2.1 of the draft "Recommended Guidelines for Materials & Welding in Black Liquor Recovery Boilers" contains information on suggested handhole cap repair procedures.

Clearing of steam condensate from superheaters during start-up should be emphasized. Graphs of the superheater tube outlet temperatures are valuable to show a spike in the tube temperature when the tube clears.

Procedures for determining the safe temperature to start the waterwash following the char bed cooldown should be established by the mills. Thermal imaging guns are a tool that can be used to identify hot areas of the bed but should not be the final determination of the appropriate temperature. Thermocouple readings should be the final determination. Operators should probe all areas of the bed with the thermocouples and should concentrate on the areas that show up hot from the thermal imaging camera. Chapter 8 of the Post ESP Procedure document and Chapter 2.7 of the Personnel Safety Subcommittee Guideline document have additional information on bed cooldown procedures.

Testing of ESP System

The Subcommittee is submitting the following draft language to be added to Section 2.2 – "Routine Operator Checks" of the guideline document to recommend an annual check to verify that whatever alternate system is used to actuate the ESP functions will be able to send a signal to those elements either by conducting a continuity check or by a functional test:

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

At least annually, also verify the "alternate means" to actuate individual ESP elements and any "remote" means to initiate the ESP or actuate individual ESP elements will transmit a signal to the intended ESP element. Actuation of the ESP device is not necessary; only verification that a signal is transmitted to the device.

Clarification of "Dedicated Stand –Alone"

The Subcommittee is continuing to work on the appropriate language for a clarification of "Dedicated Stand-Alone" as it refers to the ESP system architecture. The following suggested language has been developed for further discussion:

Recommended Change to second sentence of Chapter 1:

> Upon initiation of the Emergency Shutdown Procedure, ~~a dedicated, stand-alone~~ the system shall perform the following automated actions:

Add paragraph to the after bulleted items on Page 4

> The Emergency Shutdown Procedure functions must be activated and controlled either by means of relay technology and hard wiring or other dedicated system as defined in Chapter 2 of the *Instrumentation Checklist and Classification Guide*. In the latter case, it must not be possible to carry out reprogramming during operation or in error. See also Chapter 4 of the *Instrumentation Checklist and Classification Guide*. Whatever technology is utilized, the BMS or DCS systems can be used to monitor operation of the functions. Any time modifications are made to the system, the system shall be functionally tested prior to putting the unit back on line.

The intent of the suggested language is to emphasize that the system that initiates all the functions of the ESP system such as closing the feedwater stop valve and opening the rapid drain valves should be a accomplished by a system that only performs those functions and either a hard wired "ESP Relay" or a dedicated PLC type system can be used. It is emphasized that the system only has to send the signal to the field devices upon initiation by the operator with the only logic being the time delay for the vent valve. The monitoring function of the position feedback from all the field devices can be done with some other system such as the DCS or the Boiler Safety System.

List of Operating Boilers

The lists of Operating Boilers in the USA and Operating Boilers in Canada are posted on the BLRBAC Website and will be updated by Jules Gommi. Please submit any updated information to Jules.

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

Jack Clement will be stepping down from the committee after many years of serving as the Secretary and recently as a member of the Subcommittee. The Subcommittee is very appreciative of all the effort and dedication that Jack has given to the work of the Subcommittee. We will be in the process of deciding on a replacement and Jack has agreed to work with the Subcommittee until that replacement has been named.

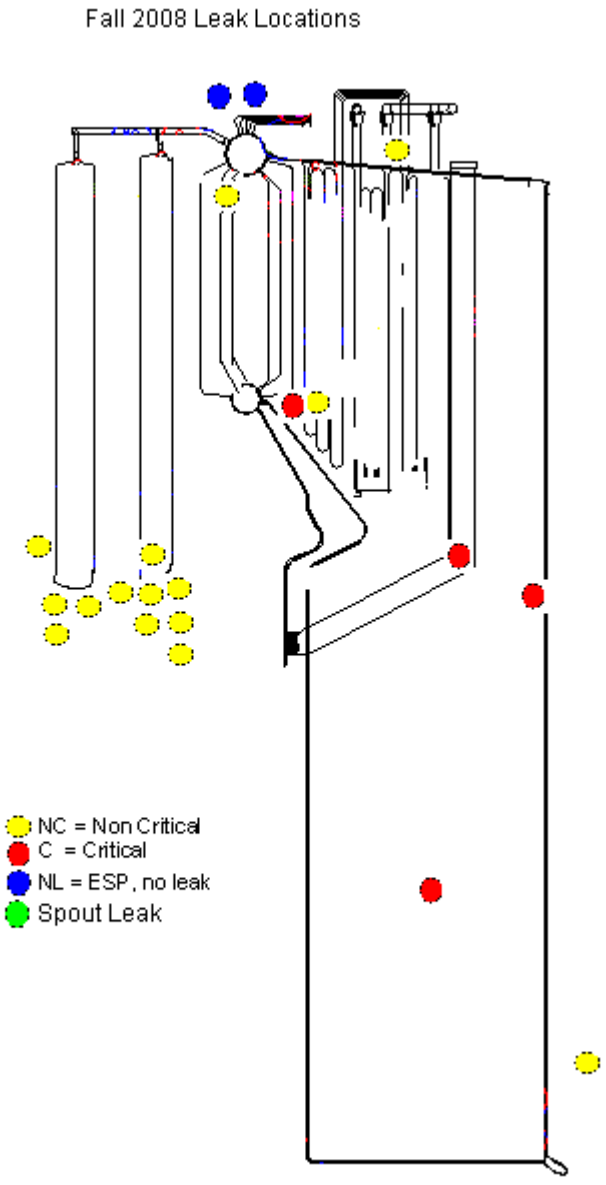
Incident Questionnaires

The Subcommittee appreciates the effort that is required to prepare the incident questionnaires since it is important to receive that information in order to help BLRBAC continue to provide guidelines for the industry.

The ESP Questionnaire continues to be updated and mills are requested to obtain the current version from the BLRBAC website if an incident needs to be reported. The completed form should be submitted to Jules Gommi at the e-mail address listed on the form. Please note that Jules' mail box is limited to a file size of 10 megabytes so please consider this limit when submitting the report. 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.

Are there any questions?

Figure 1


Fall 2008 Leak Locations
NC = Non Critical
C = Critical
NL = ESP, no leak
Spout Leak

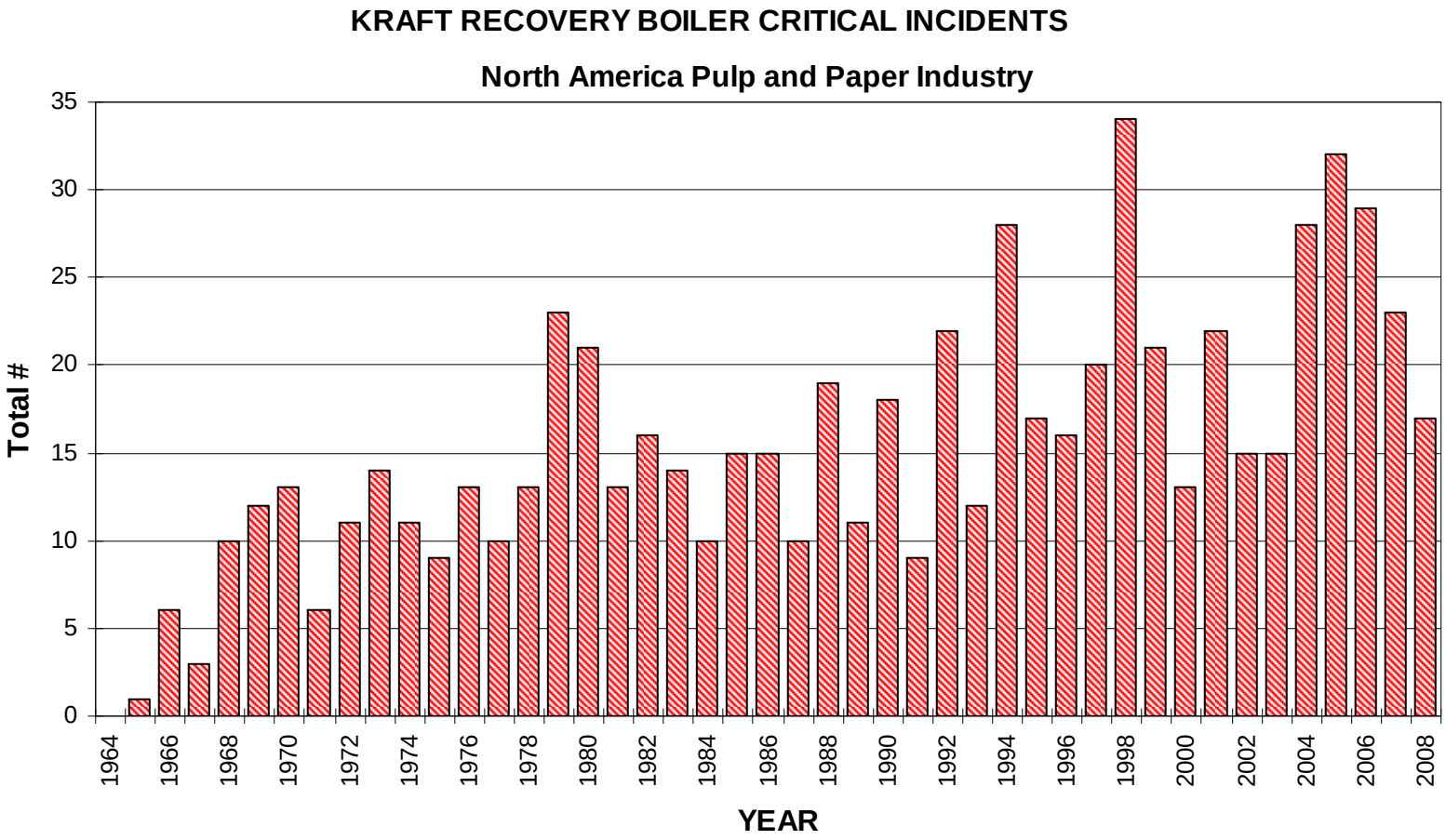
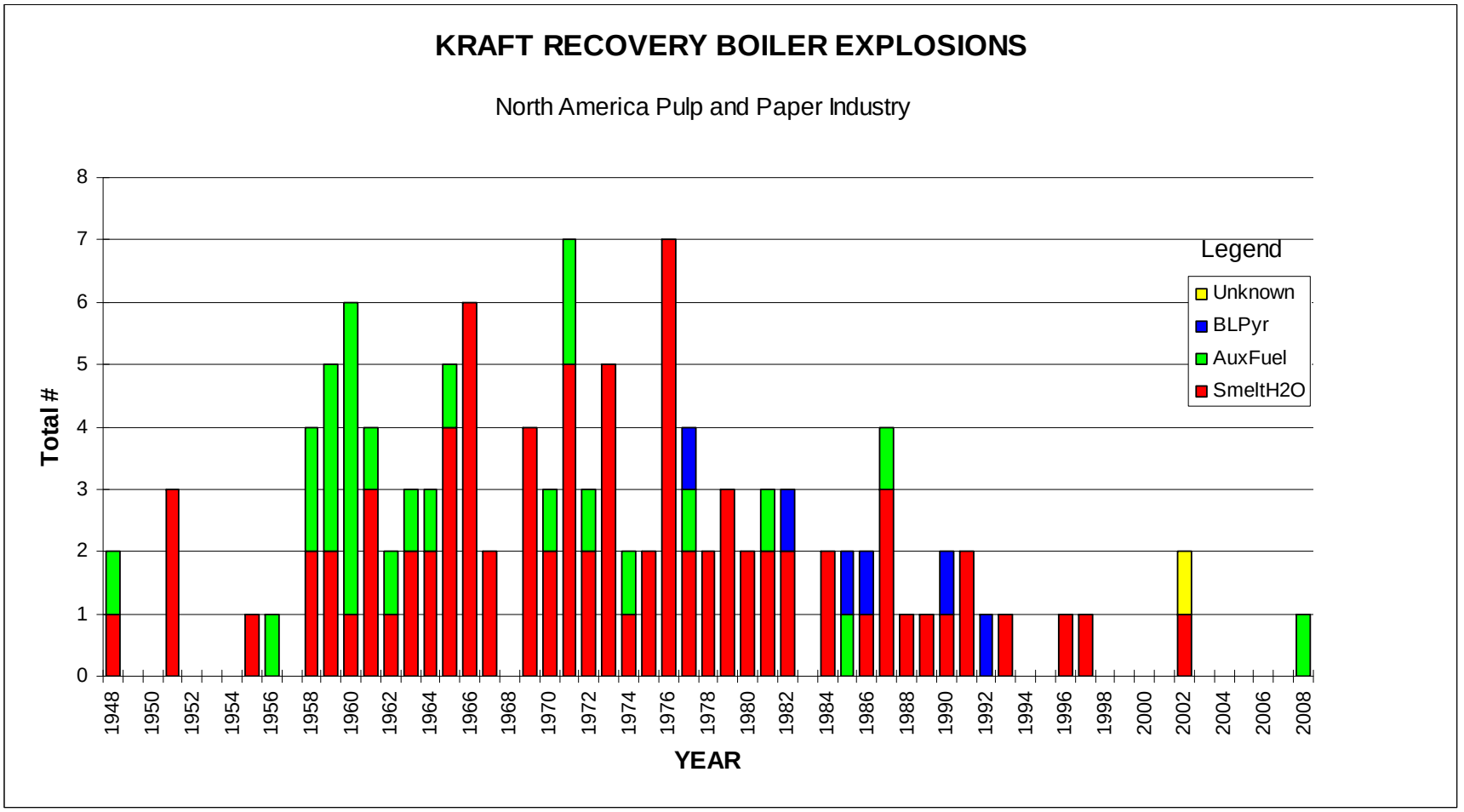


Figure 2

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


KRAFT RECOVERY BOILER EXPLOSIONS
North America Pulp and Paper Industry
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Legend
Unknown
BLPyr
AuxFuel
SmeltH2O
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1
2
3
4
5
6
7
8
1948
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1952
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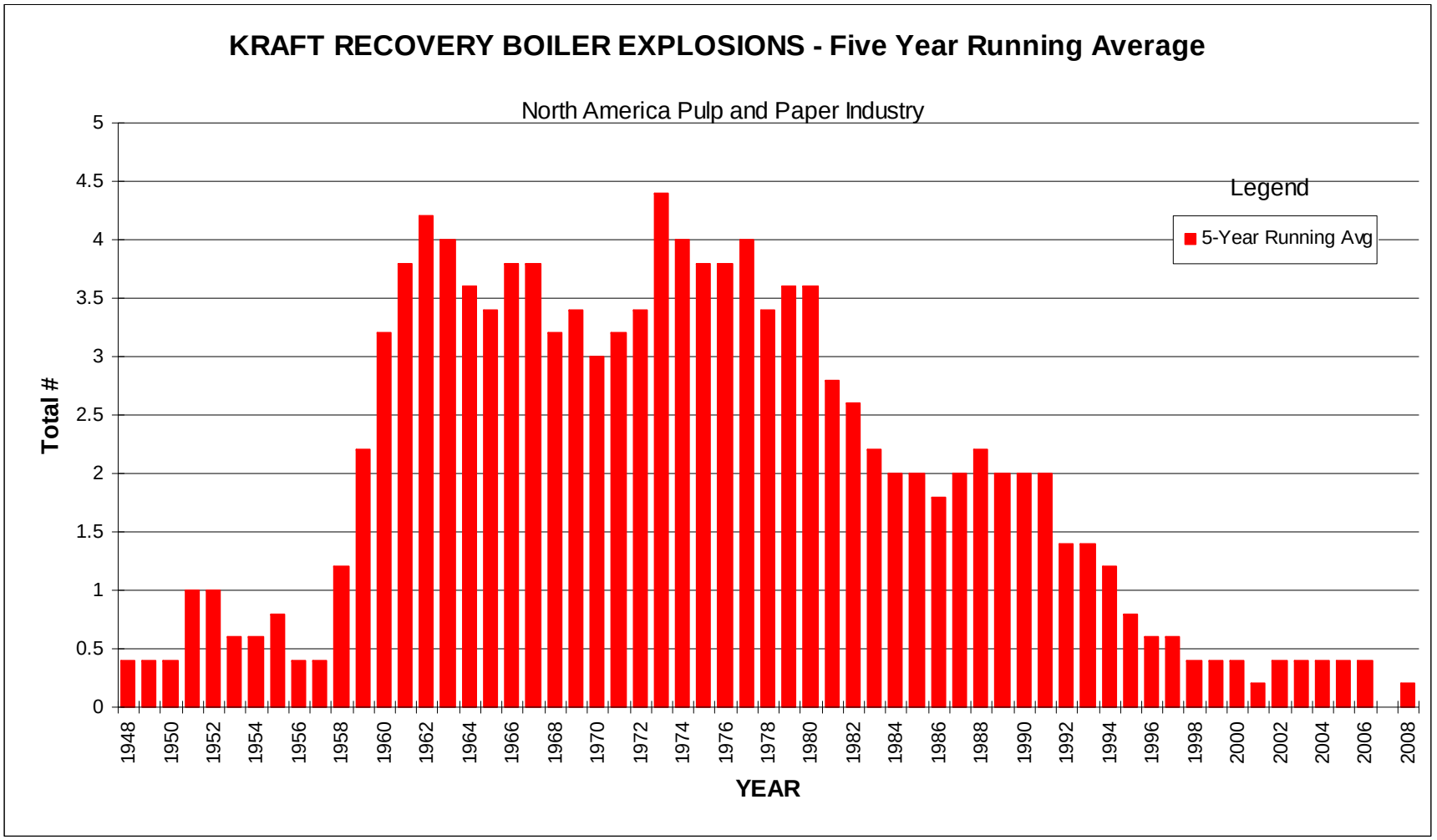
Figure 3


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
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2008

Figure 4

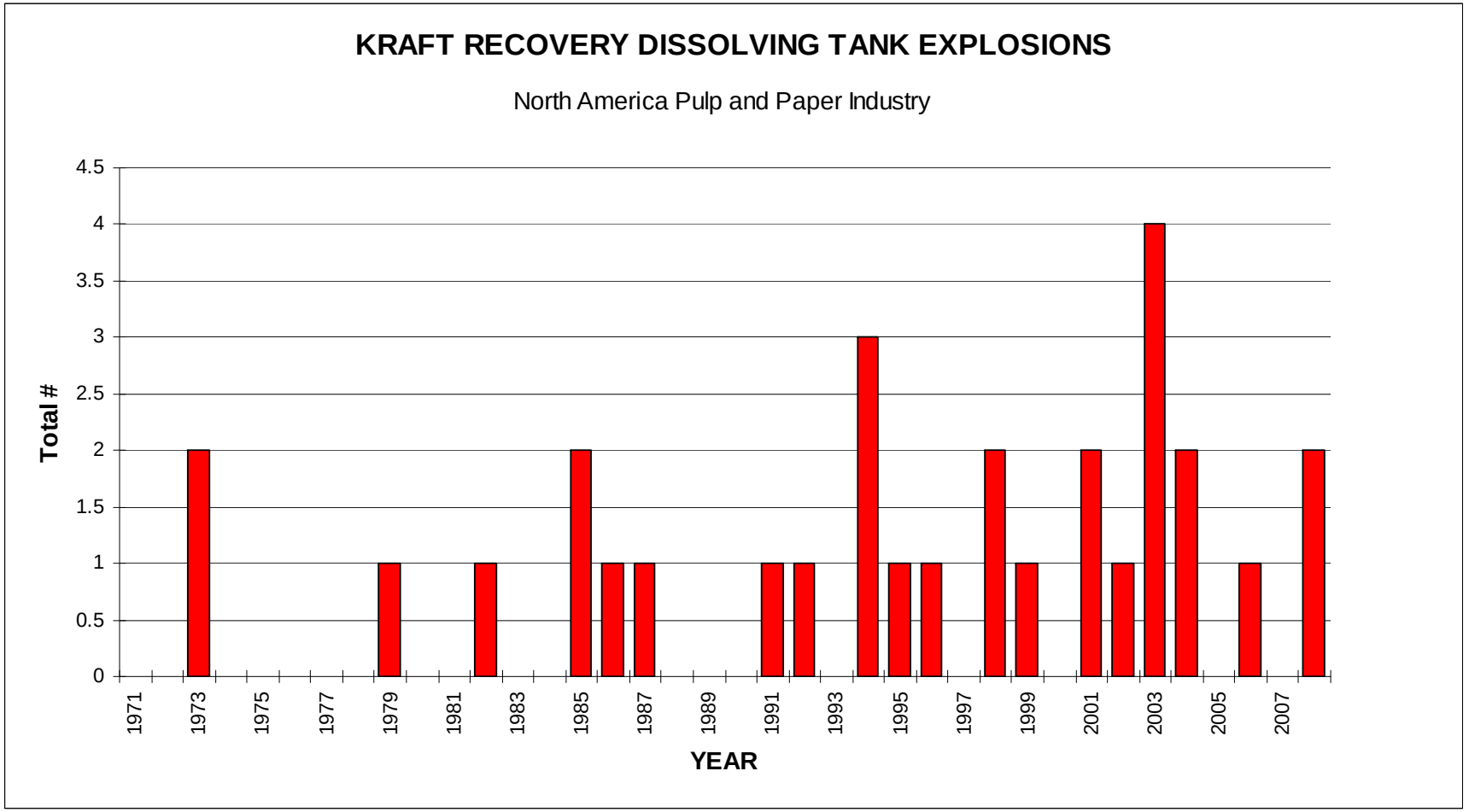

KRAFT RECOVERY DISSOLVING TANK EXPLOSIONS
North America Pulp and Paper Industry
Total #
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
YEAR

Figure 5

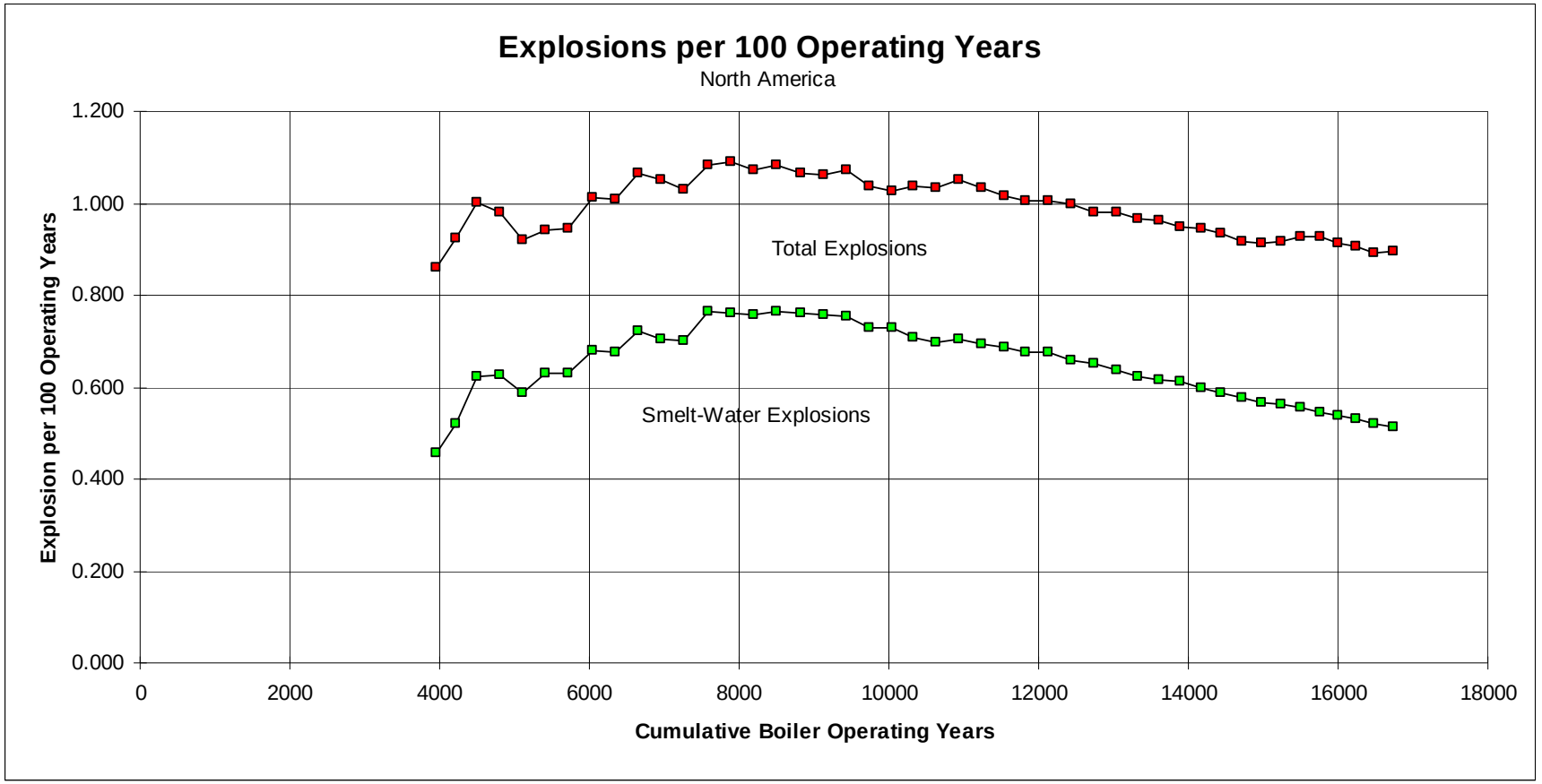

Explosions per 100 Operating Years
North America
Explosion per 100 Operating Years
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Total Explosions
Smelt-Water Explosions
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
Cumulative Boiler Operating Years

Figure 6

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

5.4 **FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS REPORT** – Chris Jackson

In the morning we held an Open meeting with four of seven subcommittee members and seven guests. There was no afternoon meeting.

As there was no meeting last April, minutes from October 2007 meeting were reviewed and accepted.

There were no incidents reports submitted since the last meeting. We sincerely hope that this reflects good safe conditions prevail in the mills with Cyclones and Cascades.

In an effort to bring value to the membership, the subcommittee hosted a mini-seminar at this meeting. Four presenters offered OEM, owner and insurer perspectives on the past and future of Cascades and Cyclones.

Following a brief outline of the history and accomplishments of the subcommittee since its reactivation, Craig Cooke of FM Global discussed some of the major loss events experienced by FM Global. It was a good reminder that the significant fire events have been associated with plant-wide power outages, which led to a discussion of the effectiveness of suppression systems. Two visitors described how in their experience, temperature detectors did not alert the operators to a high temperature situation and did not initiate the fire suppression system. These sensors were proven to be functional and their failure is attributed to a phenomenon of laminar airflow that does not allow the heat to spread evenly in all directions.

Nick Merriman, formerly of SAPPI Fine Papers and now with Austrian Energy & Environment was available to discuss the details of a major loss in SAPPI's Tugela mill that was reported to the membership in 2006. This loss still has things to teach us about the role of Management of Change, Lockout-Tagout and Work Permit procedures.

Joe Davis of Andritz talked about the benefits, concerns and options involved with conversion to low-odor operations. I was interested to learn that in spite of the name, low-odor conversion is principally driven to improve energy efficiency.

John Yash of Babcock & Wilcox spoke on the history of the technology and highlighted some of his company's findings when inspecting this aging equipment.

There was no old business to address. The subcommittee had received no questions about the document, and as there was no new business to bring before the subcommittee, we ended the meeting with a discussion about the subcommittee's future.

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

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

After six years, only five incident reports have been sent to the subcommittee for review. In all cases, the subcommittee determined that the document adequately addressed the root cause and contributing causes of these events and required no modification. Also, in that time very few requests for interpretation or correction were received. Only an annual meeting, held in October, has been held for the past four years.

It was the consensus of the subcommittee that the Executive Committee should be consulted on the whether or not the subcommittee had completed its work and should be dissolved. Four options were offered to the Executive Committee, which included maintaining the status quo, and we will await that decision.

Next Meeting – It is the subcommittee's intention to hold a spring meeting only if an incident report is received or if a request for assistance comes in that cannot be handled satisfactorily otherwise. The subcommittee is actively soliciting suggestions to make the sessions more useful to the membership.

CHAIRMAN: The Executive Committee did review and take under advisement your four options. After much deliberation, we decided that you are still on the hook! We would appreciate it if you would continue to meet once a year, albeit even if it is a short meeting. There are still issues coming up with Direct Contact Evaporators and we would like to continue to provide the membership with a venue for discussing them.

5.5 **INSTRUMENTATION REPORT** – Dave Avery

The instrumentation subcommittee met in a special work session on Sunday afternoon with nine members present. The goal was to set procedures and tools to facilitate the "Reconciliation of the Instrumentation Checklist with the other current Recommended Good Practices". As the meeting progressed it became apparent that alignment of members with the other "Good Practices" was needed to keep track of changes to these documents. Continuing this train of thought we have decide to request that the executive committee consider if some form of "Management of Change" is needed among the sub-committees for communication of changes.

Work continued with development of a template for adding cross-references, comments and revision tracking date for our checklist spreadsheets 'A' thru 'I'. Section "D" DCE fire protection was used for development. In an exhaustive review of the "Recommended Good Practice Fire Protection in Direct Contact Evaporators and Associated Equipment" several items were identified and added to the current checklist. References to the checklist line items were tied back to the original practice. The meeting was adjourned at this point for presentation to the Sub-committee in open session on Monday.

5. **SUBCOMMITTEE REPORTS** (Cont.)
INSTRUMENTATION REPORT (Cont.)

Our Monday morning meeting was an open meeting with 12 out of fifteen members and 17 guests present. Our session began with introductions of members and guest. This was followed by a review of April's minutes where it was noted that I had referenced March instead of October as the minutes reviewed. This will be corrected, and with no further comments the minutes were accepted.

Our business session began with a presentation of our revised spreadsheet from Sunday's meeting. Several details were adjusted to better fit our requirements. The guests were then invited to review our proposal and provide feedback. I appreciate our guests' involvement; this provides valuable end user feedback that allows us to tweak our proposal, providing the user the best result that we can deliver. The template was then finalized and members and guest were divided into review groups for moving forward with checklist reconciliation.

The afternoon session had 12 members and 5 guests. Our work continued with the development of a legend to explain the checklist layout, revision date code, and acronyms. Chris Jackson, sub-committee chairman for Fire Protection in Direct Contact Evaporators and Associated Equipment stopped by at our request. Chris reviewed our progress and helped with a couple of suggestions that were implemented. I would like to thank him for his help and we will be looking to the other sub-committees in the future for help to review checklist sections that are pertinent to their "Recommended Good Practices".

To follow-up with our Sub-committee alignments the following assignments were made:

Recommended Good Practice	Assigned to:
Fire Protection in Direct Contact Evaporators and Associated Equipment	John Cover /Andy Smith
Safe Firing of Black Liquor in Black Liquor Recovery Boilers	David Boudreau /Richard Pothier/Alan Laflamme
Waste Stream Incineration	Jari Sopanen/Dan Mott
Personnel Safety & Training	John Cover /Michael Fay
Safe Firing of Auxiliary Fuel in Black Liquor Recovery Boilers	Bruce Knowlen /Gail Lance /Michael Kiper
Emergency Shutdown Procedure (Dated: ESP)	Roger Smith /Rick Matarrese
Checklist and Classification Guide for Instruments and Control Systems	John Browning/David Avery

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

5.5 **INSTRUMENTATION REPORT** (Cont.)

These members will monitor their assigned "Good Practices" for any changes.

Our plans are to work through e-mails and phone calls until the spring meeting in order to have several checklists ready for review. The subcommittee has agreed again to meet on Sunday afternoon before the spring meeting as a working session to continue this process.

John Rickard, subcommittee chair for "Waste Streams," stopped by at our request to give insight on several questions about that document and where the boundaries are for waste streams as intended by their scope. Our assigned members will continue to work with Waste Streams to insure that we capture the correct items for the checklist. I want to thank John for working with us now and in the future.

The final action for the day was to agree in principle to drop the term "SIS" Safety Instrumented System and replace it with "RBSS" Recovery Boiler Safety System from the Instrumentation Guidelines. We plan to define the RBSS term in the front end of the document and will present this to the membership in the near future.

Finally, the instrumentation sub-committee would like for you to stop in and visit. The work this sub-committee produces is "used by all of us" and when you participate you are helping us to deliver an optimum product. Without your involvement you'll get the very best we can deliver; but remember, leaving everything to us "Sparkys" may sometimes leave the end user wondering, "what did they say?" We'll see you soon!

5.6 **MATERIALS & WELDING REPORT** – Jesse Worsham reporting for Dave Fuhrmann
(See Appendix C - Industra's Feed Water Service Repair at Weyerhaeuser in Springfield, OR)

We reviewed the BLRBAC Anti Trust Statement.

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

Attendance

1. The Materials and Welding Subcommittee met in morning session on October 6, 2008 with 11 of 18 members represented and one guest.
2. Membership attendance was reviewed. One member was added, Doug Singbeil, FPInnovations Paprican.

5. **SUBCOMMITTEE REPORTS** (Cont.)
   5.6 **MATERIALS & WELDING REPORT** (Cont.)

Old Business

1. The chairman advised the group of the Executive Committee's comments after review of the document submitted to them for review. The Executive Committee advised that focus should be placed on completing references for material. Assignments were made to provide listings from various reference documents:
   a. ASME – Dave Lang
   b. NACE – Billy Walker / Michael Lykins
   c. NBIC – (to be assigned)
   d. B&W Plant Services Bulletins – Steve Osborne - Complete
   e. TAPPI TIPs – Michael Lykins
   f. AF&PA – Dave Fuhrmann - Complete
   g. Alstom Power Bulletins – Dennis Hollenbach
   h. Welding Manual – Jesse Worsham
   i. Copper contamination of welds – Henry Tessier

New Business:

1. References provided for existing and proposed sections:
   a. B&W PSB's (8)
   b. TAPPI TIPS (2)
   c. The Strength of Recovery Boiler Tubes Containing Stress-Assisted Corrosion, 2004 International Chemical Recovery Conference; Sharp, W.B.A.
   d. WATERSIDE STRESS-ASSISTED CORROSION CRACKING; M. Moskal; Joint AF&PA-BLRBAC CORROSION SEMINAR; April 3-4, 1996; Atlanta, GA
   e. An Overview of Stress-Assisted Corrosion in the Pulp and Paper Industry; W.B.A. Sharp; NACE Paper 04513 (2004).
2. The subcommittee reviewed a draft forward for Temporary Repairs. The subcommittee was not able to define a temporary repair, so the discussion was tabled.
3. Task Team Assignments were reviewed and drafts were requested so that the subcommittee could continue reviews during sessions. December - January
4. Future work would be on section documents to be inserted into the overall document when fully approved.

Afternoon Session:

The afternoon session met in an open meeting with 13 members present and 10 guests.

1. The chairman presented a review of the closed meeting proceedings, including the Anti Trust statement.
2. Guest registration was completed with a solicitation for new members.
   a. Michael Hollern – New Page
3. A presentation weld burn-through on a feedwater air heater was presented by Wendy Coyle – International Paper, Springfield, OR.

5. **SUBCOMMITTEE REPORTS** (Cont.)
MATERIALS & WELDING REPORT (Cont.)

4. Question on value of stud repairs - Dave Bennett Paper review – Technical Review: Laboratory testing and Boiler Trials Fail to Produce Evidence that Studs Mitigate Corrosion of Recovery Boiler Tubes; TAPPI Engineering Conference (2008), Portland, OR
5. Butt weld of carbon to composite and composite-to-composite welds must have adequate carbon root weld thickness.
6. The meeting adjourned at 3:30 pm

Possible topics for the next meeting include:
1. Review welding and material references
2. Update status on Individual and Task Team assignments
   a. 2.4 Corrosion resistant weld overlay application on tubes – Fabian
   b. Sandy Sharp presentation on Stress Assisted Corrosion – David Lang
3. Continue draft reviews and get subcommittee approval.
4. Consideration was given to development of a glossary to better define specific terms. Jesse Worsham will develop a draft to present to the group next session.
5. Develop Technical Bulletins for Materials –
   a. Chemical Cleaning – George Bodman, Mike Garfield, Max Moskal
   b. Refractory Installation (sloped floor) – Lynn Barrett, Steve Osborn
   c. Refractory Installation (decanting Hearth) – John Heffernan, Dennis Hollenbach
   d. Tube coatings (fireside) – Dave Fuhrmann, Fabian Henriques
   e. Tube coatings (cold side) – Ron McCarty, Dan Phillips
6. Additional Technical Bulletins and Procedures will be developed, approved and inserted into the document as completed.
7. Presentations of experiences that may be of interest to this group.
   a. Refractories
   b. Welding Research Council

CHAIRMAN: As a note, this document has been posted for a while on the WEB site in order to make the information available to the membership. The current revisions will be posted following this meeting and open for member comment. Then that will be brought to a vote pending comments at the spring 2009 meeting. It is a good document. It's worthwhile if you need some reference information. And it is on the website right now.

5.7 **PERSONNEL SAFETY REPORT** – Robert Zawistowski

The Personnel Safety Sub-committee met in an "open" session on Monday, April 7, 2008. There were 10 members (out of 19) and 31 guests in attendance during the meeting.

Representation at our meeting by regular members and guests included original equipment manufacturers Babcock & Wilcox, Diamond Power and Metso Power. Representation from insurance and insurance service companies included Axa Corporate Solutions, FM-Global, and Sampo Japan.

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

Operating company representation was present at this meeting with representatives from Abitibi Bowater, Boise Inc., Carter Holt Harvey Pulp & Paper, Domtar, Evergreen Packaging, Georgia Pacific, International Paper, Interstate Paper, Lincoln Paper & Tissue, Longview Fiber, Marathon Pulp, Inc., Mondi Swiecie, SA, Northern Pulp NS, Packaging Corporation of America, Rayonier, Sappi, Smurfit Stone, VCP – Votorantim Pulp & Paper and Weyerhaeuser.

Water treatment representation included Buckman Labs. Consultant representation included Lenro, RSI and Power Specialists Associates, Inc.

There have been two changes in membership since the last meeting. Alarick Tavares has switched to the new water treatment subcommittee. Phil English is no longer with Smurfit-Stone and has resigned from the subcommittee.

We had a discussion about the use of jumpers at the request of the Executive Committee. We reviewed the existing jumper information in the Auxiliary Fuel, Black Liquor and instrument Checklist sections. We found the information consistent and as a group we felt it was sufficient. In additional discussion we learned that some mills are holding weekly reviews to determine the status of jumpers. It appears that some jumpers can remain in place for some time and there may be a tendency to forget about them. (Note: This appeared to be jumpers on low priority systems.) It may be beneficial to add language to the existing documents to include "periodic reviews." At this point in time we do not see a need to add jumper information to the Personnel Safety document. We will forward our discussion points to those subcommittees with documents that contain jumper language.

Additional points in discussion:

1. Should follow OSHA
2. Who's approving jumpers
3. Experience factor
4. Timeframe to notify superintendent
5. What interlocks should never be jumpered
6. "Tiered" system where certain interlocks are more critical such as those that result in a boiler trip such as a drum level vs. a conveyor

It had been suggested by the Executive Committee to add references to the SOP/ESOP list in our document. In seeking clarification from the Executive Committee we will add references to other BLRBAC documents where applicable.

Additional points in discussion:

1. The subcommittee membership felt there should be an addition procedure addressing low boiler water pH. In the Executive Committee meeting it was decided this would be handled in the newly formed water treatment subcommittee.

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

We discussed operator response to water leaks. This was a lengthy discussion as some information suggests it is taking operators longer to respond to leaks prior to taking action. There may be a number of factors involved in this trend. Included is the fact that instrumentation systems are better today than they were years ago. Because systems run better less operator interaction is required further removing them from the process. Boilers operate smoothly for long periods of time before some event occurs that requires operator intervention so the response may be delayed due to "second guessing" the instrumentation or being ready to take action. It was suggested there may be delay because operators are more "in tune" with the production (financial) impact. It was discussed that scenario training may be a way to improve operator response to leaks.

Additional discussion points:

1. Not only training operators to respond to normal operations and emergencies but having them demonstrate capability.
2. Better define the minimum of what should be done
3. Operator concern for production impact may delay decision process.

A clarification question about escape respirators in elevators was asked. The question was, "Do there need to be escape respirators in the elevator if the elevator doors are only contained within the protective stairwell?" After discussion it was agreed no change to the personnel safety document was required. The related question to this one was, "If the answer to the above question was "yes," does there need to be escape respirators in the protective stairwell?" At this point in time we do not specify escape respirators in the protective stairwell.

We had a clarification question on doors in recovery boiler buildings. The question was posed to determine if doors should open into the recovery area in control rooms, labs and between a recovery boiler and a power boiler. The language in the Personnel Safety documents focuses on door opening direction relative to the "protective areas." In our interpretation this includes the protective stairwell, control room and other areas the mill may have designated "protective." This certainly could include areas and rooms such as labs if they are of pressure resistive construction. Generally areas between boilers would not be considered "protective" and therefore not addressed. Each situation needs to be evaluated individually and defined by the mill.

Personal protective equipment (PPE) was discussed this meeting. As we do not want to specify what mills should use for personnel safety gear, we will only be adding some language to our document suggesting that safety gear be evaluated to assure it is "fit for purpose."

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

A rough draft of Hazards associated with Auxiliary Fuel Start-up procedures was reviewed and discussed. In this draft examples of hazards were described. Based on this draft it was decided by the committee that if this document continued in this direction it was becoming more like training material rather than the guide it currently is. After discussion it was agreed that the material should be simplified by only "bulletining" the hazards. This change will be made and the next draft will be reviewed during the spring 2009 meeting. In the Executive Committee meeting this was further discussed and it was decided to move this over to the Auxiliary Fuel Subcommittee.

A couple of "Near misses" were discussed. One user asked if some of these near misses could be put on the website. We brought this item to the Executive Committee and they decided that near misses will not be posted on the web but can be addressed in the meeting minutes and/or subcommittee reports.

Following the fall BLRBAC meeting I received information about a US based source of material for fabricating protective garments for use in the smelt spout area. This material was suggested by one of the offshore users. Following are specifications and contact information for the company supplying this material. As always, we suggest that each mill evaluate whether or not this material is fit for the purpose intended and to define how it is to be used. In the Personnel Safety Subcommittee we are always interested in receiving feedback, positive or negative, on your experiences with this or any other materials used to protect personnel:

FREESTYLE 600 FABRIC - TECHNICAL INFORMATION

FABRIC WIDTH
60" inches

TYPE OF FINISH
Dyed Fabric

WEIGHT PER SQ METER
5.4864 oz per sq meter

WEIGHT PER SQ YARD
6 oz per sq yard

Type of Knit

WEFT, WARP, THICKNESS
NOMEX fiber TYPE 462

YARN SIZE 30/2 NOMEX Tipo # 462

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

FABRIC COMPOSITION

93% NOMEX,
5% KEVLAR,
2% CARBON FIBER

FOR MORE INFORMATION CONTACT SOUTHERN MILLS
AT 1-770-969-1000
ASK FOR: HARRIET

In closing, we are always happy to welcome to new committee members who can participate in any capacity.

5.8 **PUBLICITY & NEWS REPORT** – Craig Cooke

Good morning. I am the Chair and the only member of a rather exclusive subcommittee, News and Publicity. In this position I basically distribute a summary of BLRBAC activities and future meeting dates to multiple technical journals. Are there any questions?

5.9 **WASTE STREAMS REPORT** – John Rickard

On October 6, 2008 the Waste Streams Subcommittee met in closed session at 9:00 AM with 11 members and one visitor present and in open session at 1 PM with 11 members and 4 visitors present. Last meeting's minutes were read and approved by a unanimous vote.

Craig Aderman has resigned from the subcommittee to join the new Water Treatment Subcommittee. Three people have joined: Chris Cahoon, Domtar; Mathias Lindstrom, MWV; and Ann Schlegel, A.H. Lundberg.

Since our last meeting, the subcommittee has had five submittals of comments and questions concerning guidelines amounting to a total of 15 items. These are covered in detail below:

1. Guidelines recommend locating CNCG equipment outside the boiler house, however, the CNCG line can be shorter if the equipment is located inside the boiler house.

Response: The guidelines will be revised to not require that equipment be outside the boiler house and an explanation of the guidelines will be added.

2. Chapter 5 indicates that medium pressure (MP) steam is used for the CNCG steam ejector. Use of low pressure (LP) steam should not be ruled out.

Response: Guidelines will be revised to remove indication of steam pressure.

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

3. Chapter 5 guidelines require proving CNCG flow and pressure. Proving pressure is adequate proof of flow.

Response: A nozzle can be plugged resulting in adequate pressure but inadequate flow.

4. Chapter 5 guidelines require that the last block valve be closest to the burner. The flame arrestor should be closest to the burner to minimize the volume of gas between the furnace and the flame arrestor.

Response: The guidelines and flow diagram will be revised to show the flame arrestor closest to the burner without reference to the block valves.

5. Chapter 5 recommends that the CNCG lance be cooled with steam but not with air. After a steam purge, the guide lines should allow CNCG lance cooling with air.

Response: More information on lance cooling with air will be needed.

6. Chapter 4, Collection of DNCG: Including a pressure controlled second dilution stage of DNCG with air just ahead of collection fan will ensure that the DNCG system is well diluted ahead of that fan and provide a more constant DNCG flow to the recovery boiler.

Response: This is a good design for a DNCG system; however design of the transport system is not part of the guidelines.

7. Chapter 4, Chip Bin Gas: Nothing is mentioned where the condensate shall be taken. It is important to avoid accumulation of turpentine-enriched condensate within digester liquor system (SW cooking plant), which then results in high content of turpentine in vapor to chip bin. Therefore this condensate should always be pumped to the foul condensate tank in the evaporation plant for treatment in the stripper.

Response: The disposition of condensates at the digester departs from the scope of the guidelines. The guidelines could have a comment that the system designer should recognize the implications of re-cycling condensates having potential turpentine content.

8. Chapter 7, Dedicated Burner: The methanol rectifier produces variable quality of methanol resulting in difficult burner operation. Burning methanol and turpentine in the limekiln works fine.

Response: The burning of methanol and turpentine waste streams in a recovery boiler adds complexity and potential hazards to the operation. Recognizing this, it is not intended that these guidelines encourage such practice. Rather, the intent is if a recovery boiler owner feels it is necessary to burn methanol and/or turpentine in their recovery boiler, these guidelines should be followed to assist in minimizing the potential for accidents.

9. Chapter 6, Blending Methanol with Black Liquor: Why is the allowable methanol flow rate for mixing with black liquor so small? Burning methanol in the lime kiln works fine.

Response: It is not the intent of these guidelines to discourage the burning of methanol in the lime kiln. However, for those locations where it is desired to incinerate methanol in the recovery boiler and the quantity of methanol is small, the guidelines offer a methodology that will assist in minimizing the operational difficulties and the potential for accidents. Additionally, the cost of a blending system for the small flow of methanol solution is significantly lower than a separate burner system.

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

10. Has the Waste Streams subcommittee evaluated the new cooking methods where turpentine is not separated from black liquor in digester plant via flashing? Black liquor including turpentine is pumped to evaporation plant. Vaporized turpentine in larger amount than before will then be found in the DNCG system.

Response: The Waste Streams Subcommittee does not have digester operation in its mission. This concern is valid in that the turpentine that is in the chips would be redistributed through the liquor system and affects the DNCG from all associated liquor tanks. In that the DNCG LEL levels could be elevated, it may be worth a cautionary comment to the DNCG system designer.

11. A HAZOP study should be performed on all DNCG and CNCG system designs. Any deviation from Waste Streams Guidelines should be listed and explained thoroughly.

Response: A process hazard analysis such as HAZOP or other safety review will be suggested for all guidelines. It is discussed in Chapter 6. It will be added to Chapters 3, 4, 5, 7 and 8.

12. Chapter 4, Cooling DNCG to 110F. What is the background for 110F? Many mills are challenged to cool to that temperature, and also, there are systems that are designed for 120F rather than 110F.

Response: 110F is a suggested maximum temperature that will result in the DNCG having a 50% relative humidity when it is heated to 150F. 50% relative humidity ensures that entrained water will not be transported into the furnace. A motion was made by Marla to reword the DNCG paragraph concerning gas temperatures and relative humidity; and it was seconded by Wendy. The vote was unanimous. Bentley Sherlock began work a revised paragraph to provide a better explanation of the value in the guidelines. Later in the meeting, Bentley presented his revised paragraph. Wendy made a motion to accept the new wording; second by Ann and the vote was unanimous.

13. What is the basis for cooling CBNCG to 90F?

Response: The exhaust temperature guideline is based on saturation concentrations for turpentine that is near its 100% LEL. This would apply to turpentine-bearing softwoods. Recognize that the LEL for the resultant chip bin vent condenser exhaust will include the TRS contribution as well as that for any turpentine. Temperature limits for hardwoods and non-turpentine species (e.g., hemlock) can be higher. In many locations, summer cooling water temperatures may be too high to meet a 90 F limit and the intent of the guideline is not to force addition of a chilled water system. If you are pre-diluting the chip bin NCG with low contaminant streams ahead of any likely ignition source, the extent of such dilution can be considered in setting the temperature limits from the Chip Bin Vent Condenser.

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

14. An international mill has carefully designed a system for blending red oil (a foul turpentine) with black liquor and has performed a HAZOP on the design. The high cost of a dedicated burner system drove the decision to blend red oil with BL.

Response: There are mills in the U.S. that generate a proportionately small amount of turpentine and could benefit from an economical method for disposing turpentine (or red oil). Wendy made a motion for the subcommittee to prepare guidelines for blending turpentine with black liquor; second by Hank. The motion carried with one nay vote. Hank Beder will prepare a revised section using the methanol guidelines as a "go-by". Initial discussion during the meeting indicated that the allowable turpentine flow for blending would not exceed 0.1% of black liquor flow.

15. It was suggested that the scope of the subcommittee's interlocks for firing CNCG extend to the rupture disks that are upstream of the steam ejector (they are part of the gas collection piping).

Response: The subcommittee's opinion is that the BLRBAC guidelines are in the vicinity of the boiler house, starting at the steam ejector and continues to the furnace. The safety features upstream of the steam ejector are very important, but they should be the responsibility of others.

The subcommittee reviewed the questionnaire that has been prepared by Hank and Arie. It will be revised by Arie based on the comments from the review. The questionnaire will inform the subcommittee about the number of recovery boilers that are firing waste streams. It will also provide feedback about basic system design and in this regard, the questionnaire asks for information concerning waste streams incineration in power boilers also. After approval by the Executive Committee, it will be emailed by Mike Polagye to all BLRBAC operating companies, requesting that the questionnaire be filled out for each boiler that fires NCG.

The subcommittee returned to working on revising the first part of the guidelines, the forward and chapters 1, 2 and 3. The chairman pointed out that the "Foreword" followed by an "Introduction" chapter were redundant. The subcommittee voted to combine the two sections and John Lewis volunteered to do this work.

Mark Cooper reviewed his and Wendy's revision to Chapter 3. Mark will incorporate comments received during this review and send the revised document to me for submittal to the subcommittee. In the spring we will have a final review of the chapter and then vote on it.

Work items for the spring 2009 meeting include: follow up on items mentioned in this report, discussion of items on a list of potential revisions, and any new submittals.

The spring subcommittee meeting will start at 9 AM in closed session. The afternoon meeting, starting at 1 PM, will be an open session.

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

The subcommittee meeting was adjourned after a good day's work.

Today the main committee will vote on Chapter 8, Chip Bin NCG and revisions to Chapter 4 concerning chip bin NCG. Chapter 8 provides technical information on the "varieties" of CBNCG and guidelines for stand alone CBNCG incineration. In some circumstances, CBNCG can be considered to be a DNCG and the guidelines in Chapter 4 then will be used.

CHAIRMAN: Will the voting members please stand. Are there any comments on the proposed language to the revisions to the Waste Streams document? Those in favor of approval, please raise your hand. Opposed? New Chapter 8 and accompanying revisions to Chapter 4 were approved unanimously.

JOHN RICKARD: The next item up for vote involves using a steam purge on CNCG lines. Presently the guidelines do not allow purging a CNCG line from the blocked valve to the furnace. This reduces the potential of introducing condensate through the steam purge line. If you have a steam purge line that is sitting idle, it can collect condensate like soot blowers can collect condensate through the soot blower steam line. So we haven't allowed any type of purge. (The guidelines also state you do not use air for a purge because that could/would lead to a gas mixture in an explosive range.) But in any case new recovery boilers are being designed that are much larger and that have much larger bore piping and longer runs of piping and they really have a greater vulnerability because of the amount of pipe between the block valve and the furnace. The designers would prefer to use steam purge due to the volume of CNCG that is retained in the line. So we have changed the wording to allow steam purging. There is an additional paragraph that describes the problems if you don't get the steam line condensate removal system design correct and what could happen. An important part of using a steam purge is to be able to always purge the steam so that it doesn't have condensate in it.

CHAIRMAN: Voting members please rise. Those in favor of approval, please raise your hand. Opposed? Revisions to Chapter 5 to address steam purging on the CNCG line to a recovery boiler were approved unanimously.

BOB ZAWISTOWSKI: Is the new questionnaire going to be limited to recovery boilers?

JOHN RICKARD: Bob is asking about the questionnaire we are going to send out. Part of the survey is to find out how many waste streams are being burned in recovery boilers and also it is to find out some technical details on the CNCG and SOG incineration systems. In that case, we are also asking for any information on power boilers. It is a two-part questionnaire. One is an inventory count on recovery boilers that are firing all sorts of waste streams and the second one is for details on CNCG and SOG incineration. We are asking for recovery boiler or power boiler details. The questionnaire will be worded such that we hope it will be understandable.

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

5.10 **WATER TREATMENT REPORT** – Tom Madersky

The water treatment subcommittee met Monday morning in closed session and in the afternoon in an open session.

Fourteen (14) subcommittee members attended the closed session meeting, the breakdown was as follows:

Three (3) mill personnel
One (1) insurer
Four (4) original equipment manufacturers
Four (4) water treatment company representatives
Two (2) industry consultants

The afternoon session had an additional 18 guests in attendance.

Two mill members attending the afternoon session signed up for the subcommittee.

Norris Johnston and I would, again, like to thank all the subcommittee members and guests for their pro-active participation and valued contributions.

Major items discussed were as follows:

- Review BLRBAC antitrust statement

- Announcement of vice chair, and selection of a secretary

- A review and discussion regarding the sub committee's statement of objectives

- Approval by the subcommittee of the statement of objectives

- This was followed by a discussion regarding potential issues to be addressed. The subcommittee scrutinized several of these potential issues with respect to their adherence to the statement of objectives.

- Once the committee was satisfied with the alignment, a discussion ensued regarding the scope of work that should be considered for issue to the BLRBAC executive committee. These discussions focused upon prioritizing what systems should be developed first and how they should be structured.

- Since boiler safety, reliability and availability are our principle "charge", the group agreed that the Recovery boiler should be the initial focus. In phase I, the water quality requirements associated with the feedwater support systems would be included with emphasis placed upon feedwater contaminant ingress cause and impact. A more complete development of the water support system protocols and practices will follow in subsequent phases.

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

- The group brainstormed what potential issues, within the boundaries of the boiler proper, would have the potential to impact safe - reliable operation of the boiler.

- For outline of subordination purposes, those potential issues would be sub categorized as follows:
  - Thermal considerations
  - Mechanical considerations
  - Chemical practices and protocols
  - Water specific operational practices and protocols
  - Water and boiler specific maintenance practices and protocols
  - Water and boiler specific I&C practices and protocols

- With the time constraints, we limited discussion to those six categories. The path forward we will also include:
  - Training practices and protocols
  - Chemical/Mechanical Cleaning considerations

- The closed session meeting results were captured and prepped for use in the afternoon session.

- At the conclusion of the afternoon session recap, questions and suggestions from guest attendees were fielded and discussed. The "need for" items have been summarized as follows:
  - Need for more information on water testing protocols (test frequency etc.)
  - Need for more information regarding mechanisms for tube leaks
  - Need for more information on water monitoring and instrumentation requirements
  - With the erosion of knowledge and skills, the need for more practical/general water system and water treatment information

- We closed the afternoon session with a commitment from the subcommittee to produce multi-disciplined "infused", practical recovery boiler and boiler support system water management guidelines for end users.

Path forward: The committee chair will compile and edit the information generated during the morning brainstorming session and forward that document to the subcommittee members for additional editing.

In the first quarter of 2009, we will submit to the executive committee a detailed draft outline addressing the scope of work and the critical path for the sub committee.

In closing we are looking for three or more mill volunteers to serve on the subcommittee. If you are interested in participating, please respond to my e-mail address at:

Tom.Madersky@PSAengineering.com.

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

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, 32 companies participate in the Program including 6 non-AF&PA member companies. The Program members represent nearly 96% of the total production of sulphate pulp in the U. S. There are three other companies operating recovery boilers that are not in the Program. We will continue to encourage them to join with the current members in the cooperative efforts for 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.

Currently, there are 119 mills operating 173 recovery boilers in the U. S. They produce about 40% of the total energy used in the U. S. pulp and paper industry. The average age of the boilers is about 29 years. Over 67% of the boilers were installed prior to 1979.

Operational Safety Seminars

AF&PA is continuing to sponsor three Operational Safety Seminars each year as it has done since 1985. Over, 2,800 superintendents, supervisors, operators and maintenance personnel have attended the seminars. Three seminars were held this year with a total of 163 attendees from 20 companies and 34 mills. Attendance was up from the previous year. Some mills that sent operators this year either had not sent anyone in the past, or had not sent anyone in a good number of years. This was the second year that we have had the new format of one and one-half day sessions that included a review and discussion of the AF&PA training material and BLRBAC guidelines, in addition to the usual discussion of explosions. One seminar was held in Portland OR and the other two were held in Atlanta. Dr. Tom Grace and Ron McCarty are the monitors for discussions with the attendees for actual reported explosions and critical incidents, and the review of the AF&PA and BLRBAC guidelines. Attendees continue to feel that the dialogue among the attendees and monitors is outstanding and most beneficial to all. We plan to have three seminars again next year, one in Portland, Oregon and two in Atlanta. It was very encouraging to see the record number of attendees and the continued interest in the seminars as well as receiving the high evaluation from the attendees. We hope attendance will continue to increase and more "newer" operators will attend.

Training Program

The AF&PA Recovery Boiler Training Program for computer-based training (CBT) is available through Power Specialists Associates (PSA)). Information may be found on the AF&PA and PSA websites. PSA may be contacted about and has information available on its website for arranging an electronic demonstration at the mills. This arrangement has worked very smoothly at the mills that have already done this.

Recovery Boiler Reference Manuals

The Operation and Maintenance Subcommittee is reviewing the AF&PA Recovery Boiler Reference Manuals to include any possible new information. They are planning to put the manuals onto CDs to make them more available at the mills.

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

Non-Destructive Technologies for Detecting Water-Side Deposits

The final report for the Non-Destructive Technologies for Detecting Water-Side Deposits was completed earlier this year. The study did not reach its goal in testing the several different technologies – although some showed some promise – it was not what we had hoped. The Advisory Group is now in contact with another vendor (Aptech) to determine the prospect of its instrument for future study.

Including Economizer Tube Failure Study Recommendations and Guidelines into AF&PA Guidelines and Checklist Document

The Operation and Maintenance Subcommittee is reviewing the recommendations and guidelines developed in the Economizer Tube Failure Study. These are being processed so that the AF&PA Guidelines and Checklist document maybe updated to include these recommendations.

Study of Superheater Failures

The final report for the study of Superheater Failures was completed earlier this year. The objectives were to understand the causes of the failures, maintenance needs and degraded performance, and to identify methods and practices to minimize their occurrence. A primary focus was to identify methods and practices to permit extending the final superheater steam temperature to higher values. It also focused on providing guidance in how to operate the boiler in ways that would minimize the development of problems in the superheater that would affect superheater availability.

Study on Smelt Dissolving Tank Explosions

Earlier this year, the study on dissolving tank explosion incidents was completed at IPST/Georgia Tech. The R & D Subcommittee discussed the results with the BLRBAC Safe Firing of Black Liquor in Recovery Boilers Subcommittee. From the outcome of these discussions, AF&PA is sponsoring a study on the calculations of green liquor density vs. TTA as a function of composition. The study will explore this situation in order for the BLRBAC subcommittee to make a decision for the preferred test methods. Currently, there are no guidelines for this. Thus, this study would aid in a decision to guide in reducing dissolving tank explosions.

Updating "Kraft Recovery Boilers" Blue Book

The R & D Subcommittee is reviewing and will update the "Kraft Recovery Boilers" textbook. The Subcommittee feels that enough commercial advances and research activities have been documented to warrant a new edition. Dr. Tran will spearhead this effort with the authors with a target date for completion at the end of 2010. Copies of the current edition are available for purchase from TAPPI.

Possible TAPPI TIP Sheets

The TAPPI Subcommittee, in addition to reviewing the AF&PA sponsored study on Economizer Leaks to develop a TIP sheet, is reviewing the possibility of TIP sheets for industry use from the other AF&PA sponsored studies on Behavior of Furnace Corners in Explosions; Superheaters, and Floor Tubes.

Other Research Projects Under Review

The Committee is considering several studies related to recovery boiler safety.

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

Annual Meetings and Conference

AF&PA's annual Recovery Boiler meetings and Conference were held in Atlanta in February. Attendance and participation was very good. As usual, it is open to all operating companies, insurers, vendors and manufacturers. The presentations included reports on the projects currently sponsored by the AF&PA Recovery Boiler Program and subcommittee reports on their accomplishments, as well as other research being done 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 that will be held in Atlanta January 27th and 28th.

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

No report given at this meeting.

8. **TAPPI RECOVERY BOILER SUBCOMMITTEE OF STEAM & POWER REPORT** – Jim Dickinson (See Appendix C - Power Point Presentation)

No written report was submitted.

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

The spring meeting was held in Edmonton, Alberta. The host Mill was ALPAC (Alberta Pacific) and included a Mill tour.

A total of 24 people attended that included mill representation and boiler and equipment manufacturers. A review of two submitted incidents was conducted with the mills sharing viewpoints on each incident. Both of the incidents have been submitted to Atlanta BLRBAC committee. All submitted incidents of the fall 2007 meeting in Atlanta were discussed.

There were two presentations from Boiler Manufacturers:

Alstom Power presented NCG Incineration in Recovery Boilers
Babcock & Wilcox presented Waste to Energy Initiative

The next meeting is scheduled for Vancouver, BC, on November 4 and 5, 2008.

10. **ACTIVITIES OUTSIDE NORTH AMERICA REPORTS –**

10.1 BRAZIL - A PowerPoint presentation, not presented during the meeting, was submitted. (See Appendix D – Report from Brazil)

11. **OPERATING PROBLEMS SESSION REPORT** – Scott Moyer

At the Operating Problems Session we had approximately 150 people present. A good discussion on questions regarding smelt spouts included hydro procedures, spout operation, plugging of spouts, flow restrictors, and back up shatter jets. Also discussed were operating issues including liquor nozzles.

We had a technical presentation following the Operating Problems Session on new technology for removing lignin from black liquor other than through black liquor combustion in a recovery boiler.

I had a suggestion from a member company and I am looking for some feedback on it. The observation is that there appear to be fewer actual boiler operators coming to BLRBAC currently than used to come. The suggestion is to have a focus group on Monday during the committee meetings to get operators to come and talk about some operational issues; whether it is procedures, ESP's or other things that will grab an operator's interest. I think that the committee work is very important, but for operators who have never been to BLRBAC before or are unable to attend regularly, the subcommittee meetings are not particularly beneficial and we kind of lose those guys. So we are looking for some feedback on the idea of an operator focus group and some volunteers that can help to put it together.

CHAIRMAN: Are there any other new business items from the members that you would like to bring forward? If not, can I have a motion to adjourn the meeting? Second? All in favor? The fall meeting of the 2008 BLRBAC is now closed. Everyone have a safe trip home!

NEXT MEETING: April 6, 7 & 8, 2009, at the Crowne Plaza Hotel, Atlanta GA.

TECHNICAL PRESENTATION – Scott Moyer

Recovery Boiler Leak Detection:

Representatives from Hercules, Nalco, Buckman, and Triple 5 Industries discussed their technologies for recovery boiler leak detection followed by an attendeee Q&A . It was a good for those attendees who are considering a leak detection system or who are involved in trouble-shooting an installed system.

Appendix A – Summary of Incidents

ESP ONLY - NO LEAK

FALL 2008 - 1	
Classification:	**ESP Only – No Leak**
Location:	**Weyerhaeuser Co (Now IP), Pine Hill, Alabama**
Unit:	B&W 2-drum Large Econ
Unit Size:	3.9 MM lb ds/day; 600,000 lb/hr steam at 1500? psig, 900°F, 1500 psig design
Incident Date:	December 2, 2007
Downtime hrs, leak/total:	93.5 hrs
ESP?	**Yes**
Leak/Incident Loc:	None
How discovered:	Major split in FW flow, steam flow, drum level; increase in Furnace draft, IDFan rpm
Wash adjacent tube:	n/a
Root cause:	n/a
Leak detection:	?
Bed cooling enhanced	Yes Southland NaHCO3
Last full inspection:	?
Sequence of events:	Sunday 8:55 pm Operator saw major split in FW flow, steam flow, and drum level, and an increase in furnace draft and ID fan rpm, all classic indicators of a tube rupture. He initiated an ESP, all parts successful. After 12-hour wait period, visual showed no sign of disruption in bed. Mon 1:00 pm NaHCO3 used to cool bed. Tues 11:15 am prep for hydro. 5:-10: pm 2 hydros and inspections found no leaks. Washed out bed by Wed 8: pm. 3d hydro showed no leak. Startup 10:45 pm, walk down inspection again negative. On liquor Thurs 6:25 pm
Repair procedure:	Hydroed unit: no leak, and returned to service
Future prevention:	

ESP ONLY - NO LEAK

FALL 2008 - 2	
Classification:	**ESP Only – No Leak**
Location:	**Longview Fibre, Longview WA**
Unit:	#18 RB, 1965 CE #2964; 2-drum Direct Contact Evap (DCE); ABB-CE rebuilt 1994 (1997?)
Unit Size:	2.1 MM lb ds/day; 367,000 lb/hr steam at 800 psig, 750°F, 975 psig design
Incident Date:	August 3, 2008
Downtime hrs, leak/total:	93.5 hrs
ESP?	**Yes**
Leak/Incident Loc:	None
How discovered:	Leak detection system alarmed with slightly low drum level and steam flow; steam noise up high
Wash adjacent tube:	n/a
Root cause:	Steam flow venturi flow meter had broken loose; noisy crack in sootblower steam supply
Leak detection:	LeakTrac water balance
Bed cooling enhanced	No
Last full inspection:	?
Sequence of events:	Sunday 9:45 pm LeakTrac water balance went into alarm. Index rising at 45° angle. Noted slightly low drum level, slight steam flow drop. Shut off soot blowers, and had walk down done. Helper heard steam noise up high so checked power control valve on roof – OK. Opened upper manhole door, saw possible steam. Reported to fireman, and ESP'd at 10:43 pm. Monday morning, ESP checked all OK. No visible sign of leak in upper furnace coating. Continue cooldown. Tuesday backfilled SH, filled for hydro, successful hydro – no leaks. Start up on aux fuel, inspect upper furnace again. Found crack in sootblower steam supply (was the noise), and repaired it.. Since making steam but no steam flow showing, shut unit down. Found steam flow venturi broken loose and out of alignment with pressure taps (was the flow differential).
Repair procedure:	Inspected unit, back-filled SH, did hydro: no leak, and returned to service
Future prevention:	

Appendix A – Summary of Incidents (Continued)

ECONOMIZER HAND HOLE CAP

FALL 2008 - 3	
Classification:	**Non-Critical**
Location:	**International Paper, Texarkana, TX**
Unit:	1976 B&W PR-186; 2-drum Large Econ; **1991** B&W Large Econ (from DCE)
Unit Size:	4.55 MM lb ds/day; 763,500 lb/hr steam at 1050 psig, 813°F, 1200 psig design
Incident Date:	February 14, 2008
Downtime hrs, leak/total:	27
ESP?	**No**
Leak/Incident Loc:	Crack in hand hole cap weld, 2° econ lower inlet header, center rear, left side
How discovered:	**Walk down**: water seen leaking out of hopper door and conveyor
Wash adjacent tube:	No
Root cause:	Crack in weld
Leak detection:	No
Bed cooling enhanced	No
Last full inspection:	Oct 2007
Sequence of events:	During walk down, water was seen leaking out of hopper door and conveyor
Repair procedure:	Gouge out old cap, repair seat, weld in new cap
Future prevention:	-

ECONOMIZER HAND HOLE CAP

FALL 2008 - 4	
Classification:	**Non-Critical**
Location:	**International Paper, Texarkana, TX**
Unit:	1976 B&W PR-186; 2-drum Large Econ**; 2005** B&W Econ
Unit Size:	4.55 MM lb ds/day; 763,500 lb/hr steam at 1050 psig, 813°F, 1200 psig design
Incident Date:	June 11, 2008
Downtime hrs, leak/total:	27
ESP?	**No**
Leak/Incident Loc:	Porosity at start-stop in hand hole cap weld, 1° econ lower inlet header, rear, right side
How discovered:	**Walk down**: water seen leaking out of hopper doors
Wash adjacent tube:	No
Root cause:	Porosity at start-stop point in weld
Leak detection:	**No**
Bed cooling enhanced	**No**
Last full inspection:	Oct 2007
Sequence of events:	The boiler assistant operator found water coming out of the north and center primary economizer hopper doors on his boiler walk down. The leak could be heard from a manway door in the middle of the economizer. There was no chance of water entering the furnace.
Repair procedure:	Replaced cap
Future prevention:	-

Appendix A – Summary of Incidents (Continued)

ECONOMIZER HAND HOLE CAP

FALL 2008 - 5	
Classification:	**Non-Critical**
Location:	**International Paper, Texarkana, TX**
Unit:	1976 B&W PR-186; 2-drum Large Econ; 2005 B&W Econ
Unit Size:	4.55 MM lb ds/day; 763,500 lb/hr steam at 1050 psig, 813°F, 1200 psig design
Incident Date:	August 24, 2008
Downtime hrs, leak/total:	30
ESP?	**No**
Leak/Incident Loc:	Hole at slag pocket in left hand hole cap weld, 1° econ lower right side inlet header,
How discovered:	**Walk down**: saw water leaking out of hopper door in hopper on conveyer
Wash adjacent tube:	No
Root cause:	Slag pocket in hand hole cap weld; at a start/stop point in the cover pass weld
Leak detection:	**Yes**
Bed cooling enhanced	**No**
Last full inspection:	Oct 2007
Sequence of events:	**Assistant operator found water dripping out of primary economizer conveyor, hopper door and hopper leg lines. At a manway opening at the bottom of the primary economizer, the leak could be heard with the IK's off, but could not be seen due to the flow of salt cake.**
Repair procedure:	Replaced cap
Future prevention:	Caps were welded at the B&W shop, 2005. Plan to replace the other 22 caps in October 2008

Appendix A – Summary of Incidents (Continued)

ECONOMIZER HAND HOLE CAP

FALL 2008 - 6	
Classification:	**Non-Critical**
Location:	**Weyerhaeuser Co, Port Wentworth GA**
Unit:	#3 RB 1979 B&W PR-190; 2-drum Large Econ, 1991 B&W Econ
Unit Size:	4.7 MM lb ds/day; 700,000 lb/hr steam at 600 psig, 750°F, **1700** psig design
Incident Date:	July 30, 2008
Downtime hrs, leak/total:	37
ESP?	**No**
Leak/Incident Loc:	2" toe crack in 2nd from right hand hole cap 2° lower econ inlet header. Feedwater erosion created a hole approximately 1/8 inch diameter to the surface of the weld and opened up an approximate 1 inch at the surface of the weld
How discovered:	**Walk down** inspection: saw water in conveyor
Wash adjacent tube:	**No**
Root cause:	Investigating: Weld cracked due to cyclical thermal stresses and Feedwater erosion
Leak detection:	**No**
Bed cooling enhanced	**No**
Last full inspection:	March 2007
Sequence of events:	The Economizer Sluice Tank began experiencing high level. The Econ Sluice Tank returns to the Evaporators & does not return to RB liquor system. During investigation, the Economizer Conveyor was inspected Wed 10:15 PM - Water visually seen in Economizer Conveyor. 10:30 PM – Notified Area Mgr. Checked boiler hoppers – no water found. Checked 2° indications and no leaks. Possible leak determined to be non-critical as water only located in Lower Economizer section. 11:15 PM – Shut soot blowers again to listen for leak. Could hear something too close to ID Fan. 11:15 PM – Economizer Conveyor shut down and water drained from low point. Water returned when drain closed. 11:30 PM – Leak determined to be non-critical, decision made to shut boiler down in orderly manner 11:52 PM – Taking liquor out – auxiliary fuel in 12:54 AM - Fire out of Boiler – Leak visually located in lower header of Econ 2, 2nd handhole from right wall. Leak spraying downward toward hopper center baffle. Repairs, boiler hydro, boiler restarted, liquor in 8/1/08 at 2:02 PM. Liquor out time 37:08
Repair procedure:	Removed cap, verified cap-to-header fit dimension, welded in cap to Code, 3rd party did PT.
Future prevention:	Scheduling all Econ lower Header hand holes to be x-rayed during next extended outage

Appendix A – Summary of Incidents (Continued)

ECONOMIZER

FALL 2008 – 7	
Classification:	**Non-Critical**
Location:	**Domtar, Plymouth NC**
Unit:	1975 CE, 2-drum Large Econ; 1992 Tampella Econ
Unit Size:	6.2 MM lb ds/day; 917,000 lb/hr steam at **850** psig, 800°F, 875 psig design
Incident Date:	August 25, **2007**
Downtime hrs, leak/total:	40 ¾
ESP?	**No**
Leak/Incident Loc:	#1 tube, 1/8" pinhole after crack in weld, at 6:00 at tube-to-lower-extruded bottle-header, 2° econ inlet
How discovered:	**Control Panel**: Mass balance alarm & DCS indicator, and no Trasar alarm
Wash adjacent tube:	**No**
Root cause:	Weld porosity defect or fatigue crack
Leak detection:	Yes Nalco Trasar and mass balance
Bed cooling enhanced	**No**
Last full inspection:	Feb 2007
Sequence of events:	Control room operator got a mass balance alarm. He sent the field operator to check for leaking blow down valves, rapid drain valves, and to listen for leaks. The trends on the DCS did not show indications of a leak. Trasar did not alarm so operator knew it was a superheater or economizer leak. Control room operator took the boiler off of liquor and performed a walkdown with the Supt. They opened doors on boiler and found the leak at the economizer bottom bottle header. Operator burned the bed down and shut down the boiler in a controlled manner.
Repair procedure:	Ground out crack and did weld repair
Future prevention:	-

ECONOMIZER

FALL 2008 – 8	
Classification:	**Non-Critical**
Location:	**Domtar, Plymouth NC**
Unit:	1975 CE, 2-drum Large Econ; 1992 Tampella Econ
Unit Size:	6.2 MM lb ds/day; 917,000 lb/hr steam at **850** psig, 800°F, 875 psig design
Incident Date:	December 3, **2007**
Downtime hrs, leak/total:	44
ESP?	**No**
Leak/Incident Loc:	#3 tube 1/8" pinhole after crack in weld, at 6:00 at tube-to-lower-extruded bottle-header, 2° econ inlet
How discovered:	**Control Panel**: Operator noticed slight steam:feedwater separation. No other indications. Operators performed a walkdown and found water around the door on the economizer hopper.
Wash adjacent tube:	**No**
Root cause:	Weld porosity defect or fatigue crack
Leak detection:	Yes Nalco Trasar and mass balance
Bed cooling enhanced	**No**
Last full inspection:	Feb 2007
Sequence of events:	Operator noticed slight steam feedwater separation. No other indications. Operators performed a walkdown and found water around the door on the economizer hopper.
Repair procedure:	Ground out crack and did weld repair
Future prevention:	Working with OEM to install restraints and perform NDT and destructive testing during the March 08 annual outage.

Appendix A – Summary of Incidents (Continued)

ECONOMIZER

FALL 2008 – 9	
Classification:	**Non-Critical**
Location:	**Domtar, Plymouth NC**
Unit:	1975 CE, 2-drum Large Econ; 1992 Tampella Econ
Unit Size:	6.2 MM lb ds/day; 917,000 lb/hr steam at **850** psig, 800°F, 875 psig design
Incident Date:	April 1, 2008
Downtime hrs, leak/total:	32.5
ESP?	**No**
Leak/Incident Loc:	1/8" pinhole after crack in weld, at 12:00 at tube-to-lower-extruded bottle-header, 2° econ
How discovered:	**Walk down**: Field operator noticed puddle of water on 3rd floor. Upon investigation, found water sitting in doorsill on 4th floor. With door opened he could hear leak and see water spraying.
Wash adjacent tube:	**No**
Root cause:	Weld porosity defect or fatigue crack
Leak detection:	Yes Nalco Trasar and mass balance
Bed cooling enhanced	**No**
Last full inspection:	March 2008
Sequence of events:	Recovery boiler was operating at full load 520 gpm Field operator noticed puddle of water on 3rd floor. Upon investigation, found water sitting in doorsill on 4th floor. With door opened he could hear leak and see water spraying. He notified his shift engineer.
Repair procedure:	Ground out crack and did weld repair
Future prevention:	Investigating the design and acquisition of a new economizer. Continuing to perform metallurgical analysis on samples removed during the annual outage in March 08. Installed handcuff restraints & baffle cross braces during the March 08 outage. Performed 100% RT of lower header tube 1 – all 99 platens – tube to header wave. Performed shear wave on tubes 1&2. Remove 13 samples of tube welds that showed indications.

Appendix A – Summary of Incidents (Continued)

ECONOMIZER

FALL 2008 – 10	
Classification:	**Non-Critical**
Location:	**International Paper, Courtland, AL**
Unit:	#2 RB 1979 B&W #524-0180; 2-drum DCE Direct Contact Cyclone Evap.
Unit Size:	4.15 MM lb ds/day; 500,000 lb/hr steam at 450 psig, 550°F, 550 psig design
Incident Date:	March 22, 2008
Downtime hrs, leak/total:	54/58
ESP?	Yes
Leak/Incident Loc:	Erosion hole 1 ½ in. by ¾ in. 1st tube in from right side, just above the lower economizer inlet header, in horizontal section forming lower header manway
How discovered:	**Control Panel - Leak detection alarm**; Verified by walk down by the outside operator
Wash adjacent tube:	No
Root cause:	External erosion of the tube by sootblower, with history of condensate
Leak detection:	Yes Mill-developed mass balance
Bed cooling enhanced	Yes Southland NaHCO3 + N2
Last full inspection:	Sept 2007
Sequence of events:	**March 21, 7:05 pm** -Operator received a level 2 leak detection alarm. (Leak detection had not alarmed in 10 days.) The unit was checked but no problems found. **10:30 pm** -Leak detection cleared. **11:50 pm**-Level 2 leak detection alarmed again. The unit was checked again but nothing found. **3/22/08, 2:20 am** -Level 3 leak detection alarm started. The field operator walked the boiler down listening and checking hoppers but found nothing. **6:30 am** The unit was again checked but again nothing found. **8:20 am** Control room operator had the field operator to check the boiler again. The field operator first checked the blow down lines to make sure they were not hot and then went to 10th floor to start a walk down. The sootblowers were stopped. Operator noticed drum level was indicating low on the Hydrostep. On 7th floor he opened door above the north ash hopper but did not hear anything. On 7th floor south side he found water dripping from the #30 IK stuffing box (SE corner of the economizer) but did not hear any loud noises. On 3rd floor he discovered a lot of water coming down on the inlet of the south cyclone. At the time the control room operator was having trouble keeping enough water in the steam drum and the solids were decreasing. The location of the leak was unknown at that time. At this point the decision was made to ESP the boiler. **8:42 am** ESP'd the unit. All the components of the ESP functioned properly.
Repair procedure:	The tube with the hole was removed and plugs were installed in the top and bottom economizer header. The other tubes in the area were checked and found to marginally thin. Shielding was attached to the tubes in this area.
Future prevention:	Past history of sootblower erosion thickness loss in numerous sootblower lanes Shield the remaining tubes near the failed tube. Inspect other areas of the boiler that have similar tube orientation below or above sootblowers that are not traditionally inspected. Develop a thorough NDE and visual examination plan for the upcoming outage. Inspect sootblower condensate removal system for proper operation, slope, and design. Verify sootblower proper operation, poppet pressure, and nozzle type on #30 IK.

Appendix A – Summary of Incidents (Continued)

ECONOMIZER

FALL 2008 - 11	
Classification:	**Non-Critical**
Location:	**Domtar, Johnsonburg PA**
Unit:	1993 Tampella #90132
Unit Size:	2.8 MM lb ds/day, 400,000 lb/hr steam at 1250 psig, 900°F, 1600 psig design
Incident Date:	March 28, 2008
Downtime hrs, leak/total:	35.75
ESP?	**No**
Leak/Incident Loc:	Crack in weld 1" above weld between tube and extruded econ header Platen 7 tube 12 at 9:00
How discovered:	**Walk down** – Operator found wet ash
Wash adjacent tube:	No
Root cause:	Poor shop welds are root cause of failure. Stress assisted corrosion; stress corrosion fatigue cracking; both thermal expansion of the tube length, and cantilever effect of sloped portion of tube
Leak detection:	No
Bed cooling enhanced	No
Last full inspection:	May 2007
Sequence of events:	**Thurs March 27 Noon** The feedwater pump supplying the recovery boiler tripped due to electrical malfunction, causing recovery boiler trip on low drum level. At approximately Mar 2810:00 am During walk down, operator saw water in economizer #1 ash conveyor. The operator notified Crew Leader and Team Leader. The boiler was shut down normally Mar 2811:15 am liquor out. The bed was burned out, and initial lockout was performed. 8:30 pm Start water washing of the economizer only. After water wash and initial inspection the boiler was drained, and the waterside locked out. Mar 29 Repair to the leak was completed. 12:50 pm Hydro successful. 4:30 pm Unit was unlocked, and first fire. 11:00 pm Unit was back on liquor.
Repair procedure:	Defect was ground out, and weld repaired
Future prevention:	During past 7 years, many similar leaks from this design/poor shop welds

ECONOMIZER

FALL 2008 - 12	
Classification:	**Non-Critical**
Location:	**International Paper, Mansfield LA**
Unit:	#1 RB 1981 B&W PR-199, 2-drum; 2008 B&W Economizer
Unit Size:	2.7 MM lb ds/day, 493,000 lb/hr steam at 1250 psig, 915°F, 1475 psig design
Incident Date:	June 19, 2008
Downtime hrs, leak/total:	25.5
ESP?	**No**
Leak/Incident Loc:	Pinhole leak in economizer tube 1 row 18 weld to inlet header, 2° economizer
How discovered:	**Walk down**. Found leak in economizer wet hopper.
Wash adjacent tube:	No
Root cause:	Porosity in bad factory weld
Leak detection:	No
Bed cooling enhanced	No
Last full inspection:	Feb 2008
Sequence of events:	Operator on normal rounds. Found water coming into the economizer wet hoppers. Notified shift manager and area manager. Decided to pull liquor and burn out the bed. No problems were noted during the burn out of the bed
Repair procedure:	Grind out weld and heli arc weld tube. Acuren Inspection did PT
Future prevention:	Do good cleaning before weld repairs to avoid porosity

Appendix A – Summary of Incidents (Continued)

ECONOMIZER

FALL 2008 - 13	
Classification:	**Non-Critical**
Location:	**International Paper, Franklin VA**
Unit:	#4 RB 1963 CE #1263; 2-drum Direct Contact Evaporator, 1998 CE Econ
Unit Size:	1.7 MM lb ds/day, 274,000 lb/hr steam at 600 psig, 750°F, 700 psig design
Incident Date:	August 19, 2008
Downtime hrs, leak/total:	38.75
ESP?	**No**
Leak/Incident Loc:	1/8" pinhole located on cold side at tube bend 12" above the lower header access door on the south side of the boiler. LHSW Row 6 Tube 1. Minor leak.
How discovered:	Walk down. Operator saw small amount of water dripping out of south casing behind economizer on the 5th floor
Wash adjacent tube:	No (checked by ndt)
Root cause:	Corrosion attack on tube bend due to insufficient water washing and drying in the past
Leak detection:	Yes Internally developed mass balance
Bed cooling enhanced	No
Last full inspection:	Apr 2008
Sequence of events:	Operator saw small amount of water dripping from south casing behind economizer, 5th floor. IK steam cut off to check for poppet valve leak by above the economizer header. No abnormal conditions with steam/water DP or boiler chemistry. Notified foreman. Pulled liquor. Walk down again for abnormal noises or conditions. Economizer door removed. Water seen spraying towards the back away from the economizer baffle. Decided to burn bed out and do a controlled shutdown. After the smelt bed was burned out the boiler was shutdown in an orderly fashion
Repair procedure:	Installed Dutchman
Future prevention:	Will do spot checks on economizer outer walls during future outages. Visual inspection this and previous outages has shown signs of corrosion without major changes from outage to outage. This will need to be continuously monitored until a new tube bank can be installed.

SUPERHEATER

FALL 2008 - 14	
Classification:	**Non-Critical**
Location:	**International Paper, Ticonderoga NY**
Unit:	#1 RB 1969 B&W #523-0131; 2-drum large economizer
Unit Size:	2.01 MM lb ds/day, 300,000 lb/hr steam at 875 psig, 825°F, 975 psig design
Incident Date:	February 21, 2008
Downtime hrs, leak/total:	75.5
ESP?	**No**
Leak/Incident Loc:	½" hole in 2°Superheater pendant 15 at IK 7 elevation, 80 ft above hearth AND during hydro: Crack in 2°Superheater pendant at D-Link tie location at IK 7 elevation
How discovered:	Walk down. Operator heard steam blowing near door during a chill and blow
Wash adjacent tube:	No
Root cause:	Damage by lance: Inadequate loop ties and failure to clear condensate from loops on start up. D-link bottomed out
Leak detection:	No
Bed cooling enhanced	No
Last full inspection:	May 2007
Sequence of events:	While monitoring chill & blow results, steam leak was seen in 2° SH. Unit smelted out, taken off line and water washed. Pendant found bent into soot blower lane, causing damage by lance. Repair made. Hydro revealed second leak. Repair made. Back on line 11:40 pm Feb 24.
Repair procedure:	Installed two Dutchman to allow reuse of bend; Weld overlay of D-link crack
Future prevention:	Maintenance of superheater ties is a priority on the Annual Outage Repair Scope. All D-Links will be replaced with T&G links. Start up procedure modified to include monitoring of super-heater loop temperatures to assure condensate is blown out prior to bringing boiler on line.

Appendix A – Summary of Incidents (Continued)

SUPERHEATER

FALL 2008 – 15	
Classification:	**Non-Critical**
Location:	**Longview Fibre, Longview WA**
Unit:	#18 RB 1965 CE #2964; 2-drum Direct Contact Cascade; 1997 ABB-CE SH
Unit Size:	2.2 MM lb ds/day, 367,000 lb/hr steam at 800 psig, 750°F, 975 psig design
Incident Date:	July 11, 2008
Downtime hrs, leak/total:	0 Found during outage
ESP?	No
Leak/Incident Loc:	5 cracked tubes in 1° Superheater tubes inlet at the high crown seal attachment welds and 1 crack in 1° outlet.
How discovered:	During outage furnace quick-wash, water observed running out of SH in penthouse
Wash adjacent tube:	No
Root cause:	Possible thermal expansion differentials
Leak detection:	Yes
Bed cooling enhanced	No
Last full inspection:	May 2007
Sequence of events:	Prior to shutdown, no reports of noises. During outage furnace quick wash, water observed running out of SH in penthouse and down platens. Hydro revealed actual leak spots
Repair procedure:	Sectioned out cracked tube lengths and replaced. Repairs were radiographed and hydrotested.
Future prevention:	Have been shutting of sootblowers while doing walk downs. Also had similar leaks in 2000. Alstom did warrantee repairs, claiming thermal expansion differentials. All accessible high crown seal to tube welds were MT or PT inspected by Acuren. JHKelly ground out numerous shallow indications. None extended into the tubes.

Appendix A – Summary of Incidents (Continued)

FEEDWATER AIR HEATER

FALL 2008 – 16	
Classification:	**Non-Critical**
Location:	**Weyerhaeuser Co (Now IP), Springfield OR**
Unit:	#4 RU 1971 CE 2-drum Large Economizer; 2000 Andritz Feedwater air heater
Unit Size:	2.8 MM lb ds/day, 550,000 lb/hr steam at 900 psig, 825°F, 900 psig design
Incident Date:	March 24, 2008
Downtime hrs, leak/total:	20
ESP?	No
Leak/Incident Loc:	In heater at coil-to-header or coil U-bend. No sign of carryover into registers
How discovered:	**Control board.** Air heater Leak detection alarm (high level) on air heater collection pot
Wash adjacent tube:	No
Root cause:	Fabrication quality of the header to tube weld with weld push through created a site for waterside corrosion. 25% of the tube welds with internal undercut, melt-thru of the parent metal, and internal penetration that are providing additional sites for future failures
Leak detection:	Yes – Furnace = Triple-5 Acoustic; Air heater has it's own pot level and acoustic alarm.
Bed cooling enhanced	No
Last full inspection:	Sept 2007
Sequence of events:	Note: Air duct rises after heater, so no leak can run into registers. Telltale drains were dry. Some SO2 increases lately. 2:24 am Received alarm. Drained pot full of water. Telltales dry. 2:40 Low air temp alarm. 3:00 Water out of telltales. Couldn't isolate heater section - valves wouldn't close completely. 3:53 Steam-water differential increasing. Orderly shutdown to prevent carryover risk. Day shift - Inspection showed pockets of standing water in heater. Hydroed to find leaks - only in 1st stage. Nightshift – Isolated 1st stage and put unit back on line. 3/25/day shift - Isolation valves not holding due to valve design. Reset valves. Plugged leaking coil.
Repair procedure:	Plugged specific coil – had to cut into distribution headers, install plugs in coil inlet & outlet, and then re-weld header windows. Hydro tested both the 1st & 2nd stage heaters to 2250 psig and no other leaks were found.
Future prevention:	Any future repairs very difficult. Replacement plans on board. Heater isolation valves need to be exercised during outages and properly lubricated. In addition, training on how far to run the valve in to the seat (valves won't seal if they are run past their mechanical stops) is critical for isolation of the heater. Drain & vent piping for each heater is all connected together and does not allow proper venting when trying to drain a heater coil and provides no visual means to prove that a coil has been sufficiently drained and pressure removed from the system. Added eight ¾" drain holes in the bottom of the ductwork on inlet & outlet of the primary air heater to ensure water cannot pool up and then be entrained by air velocities in the ductwork.

Appendix A – Summary of Incidents (Continued)

SCREEN

FALL 2008 - 17	
Classification:	**Critical Incident #706**
Location:	**Domtar, Plymouth NC**
Unit:	1975 CE, 2-drum Large Econ; 2001 B&W Screen
Unit Size:	6.2 MM lb ds/day; 917,000 lb/hr steam at **850** psig, 800°F, 875 psig design
Incident Date:	February 26, 2008
Downtime hrs, leak/total:	119
ESP?	**Yes**
Leak/Incident Loc:	180 degree crack around the bend of the tube at the membrane termination, fatigue cracked that opened up Screen Platen # 19, tube 10 located ~ 73 feet above floor; Found two other tubes leaking, platen 17, 21 tube #10. After the hydro prior to the chemical cleaning found another leak platen 10, tube #10.
How discovered:	**Nalco Trasar RBLI leak detection system**
Wash adjacent tube:	-
Root cause:	Cause was fatigue where the membrane and the bend of the tube meet Potential variables: Compression, fatigue, vibration, membrane termination by tube bend
Leak detection:	Yes Nalco Trasar and mass balance
Bed cooling enhanced	Yes Southland NaHCO3
Last full inspection:	Feb 2007
Sequence of events:	Tues **2:34 am** Operator received a TRASAR loop counter alarm. Operator called field operator to walk down the boiler and check the blowdown valves and rapid drain valves. Operator called feedwater operator and reported that TRASAR was dropping. The feedwater operator ran more boiler water tests and confirmed the TRASAR was dropping. Field operator reported no unusual noises on the boiler. **2:49am** Operator received a TRASAR alarm. Operator called the Shift Engineer to report the problem. Operator turned on the red flashing lights and sirens. Field operator and Shift engineer performed a walk down on the boiler. They opened several doors and couldn't see or hear any unusual noises. After the walk down, shift engineer and operator analyzed the leak detection trends. They noticed steam/feedwater separation, the ID fan was speeding up, and TRASAR was dropping. **4:20am** The Nalco mass balance alarm activated. **4:46 am** -The operator ESP'd the boiler.
Repair procedure:	Replaced tube bend assemblies on all 35 platens tube #10. Added Dutchman to bring the tube bend assemblies back into plane. Cut the membrane back about 2 feet on all tube bend assemblies. Added lower ties to tube #10 on all platens. Did 100% RT on all weld repairs.
Future prevention:	Performing metallurgical analysis on sample removed. Will perform camera inspection in the area to check for vibration.

Appendix A – Summary of Incidents (Continued)

SCREEN – smelt-water reaction

FALL 2008 - 18	
Classification:	**Critical Incident with SWR #707**
Location:	**Weyerhaeuser Co, Columbus MS**
Unit:	1990 B&W PR-212; 1-drum Large Economizer
Unit Size:	6.0 MM lb ds/day, 900,300 lb/hr steam at 1675 psig, 925°F, 1825 psig design
Incident Date:	May 27, 2008
Downtime hrs, leak/total:	127.25
ESP?	**Yes – 15-20 min**
Leak/Incident Loc:	**Complete rupture** following fatigue fracture at toe of weld between boiler screen tube and nose arch tube, 12th from right of 38, 130 feet above hearth. Minor .5mm weld undercut suggests higher stress at weld
How discovered:	High furnace pressure trip
Wash adjacent tube:	No
Root cause:	A low cycle, high stress fatigue failure
Leak detection:	Yes Triple-5 AMS (acoustic) and Betz Leaktrac AAI (mass balance)
Bed cooling enhanced	Yes Austin Fire Protection NsHCO3 + N2
Last full inspection:	April 2008
Sequence of events:	6:27 am High furnace pressure trip, immediately followed by low drum level alarm. 6:35 Started furnace purge, but no FD fans. Spouts sputtering and reacting violently. Severe blowback out openings. Two distinct rumblings/reactions 6:45 Lights and sirens activated and personnel evacuated**. 7:00 ESP'd unit – successful Began 12-hour wait. May 28 9:45 am Bed cooled. Water level 9' below rapid drain valves, = most hearth tubes dry.**
Repair procedure:	Failed tube was gouged free at seal weld and sectioned 30 feet below to above roof. 3 welds to replace tube pieces. Welds were double elliptical x-rayed
Future prevention:	All rear wall support tube penetrations were dye checked. Majority showed signs of undercut. B&W recommended to weld overlay the seal welds. Remaining 37 tubes will be sectioned and replaced.

Appendix A – Summary of Incidents (Continued)

UPPER FURNACE

FALL 2008 – 19	
Classification:	**Non-Critical**
Location:	**Tembec Enterprises, Skookumchuck BC**
Unit:	1993 ABB CA91105 1-drum Large Economizer
Unit Size:	3.49 MM lb ds/day, 463,000 lb/hr steam at 630 psig, 750°F, 900 psig design
Incident Date:	July 29, **2007**
Downtime hrs, leak/total:	25
ESP?	**No**
Leak/Incident Loc:	1/8" pinhole crack on external weld attachment, right side boiler bank side wall tube by rear generating bank close to roof (elevation 155')
How discovered:	**Walk down**. Found water leaking from casing
Wash adjacent tube:	No
Root cause:	Weld on attachment was not terminated properly
Leak detection:	No
Bed cooling enhanced	No
Last full inspection:	June 2007
Sequence of events:	3:00 pm Operator walk down saw water leaking from casing. Notified supervisor. Removed insulation and casing. Found pinhole leak on external attachment. Since safe, monitored leak until 3 am July 31: Took off liquor; 5 am Shut down and cooling. 1:30 pm Repairs complete.
Repair procedure:	2 passes of stringers run horizontal along existing attachment weld
Future prevention:	Area dye pen tested – no other cracks found

UPPER FURNACE

FALL 2008 – 20	
Classification:	**Critical Incident #708**
Location:	**International Paper, Franklin VA**
Unit:	#4 RB 1963 CE #1263, 2-drum Direct Contact Cascade
Unit Size:	1.75 MM lb ds/day, 274,000 lb/hr steam at 600 psig, 750°F, 700 psig design
Incident Date:	March 17, 2008
Downtime hrs, leak/total:	43
ESP?	No
Leak/Incident Loc:	Crack in weld at door attachment on cold side of tube, on top left corner of door frame where welded to tube #61 on 4½ floor access door. LHSW, elevation 107'. Leak weeping moisture down and gathering on buckstay
How discovered:	**Walk down**. Saw wet spot on floor 4 buckstay
Wash adjacent tube:	No
Root cause:	Bad attachment weld of vertical support of manway door
Leak detection:	Yes. Internally developed mass balance.
Bed cooling enhanced	No
Last full inspection:	April 2008
Sequence of events:	Hydro after outage. During post-outage (with clean hearth) start up walk down, saw wet spot on floor 4 buckstay. Immediately backed unit off start up curve and removed casing and insulation around door way. Found leak on cold side of tube. Made repairs
Repair procedure:	Installed 2-piece Dutchman, requiring 3 welds in tube #61 in 19 ft of 2" OD x .180
Future prevention:	Multiple failures at attachment points in this area. April 2006 ESP was same cause. Plan to replace both manway doors and tubes on #4 recovery boiler at the 4-1/2 floor level eliminating the attachment weld problems

Appendix A – Summary of Incidents (Continued)

UPPER FURNACE

FALL 2008 - 21	
Classification:	**Critical Incident #709**
Location:	**Leaf River Cellulose, New Augusta MS**
Unit:	1984 Gotaverken #551-992 1-drum Large economizer
Unit Size:	6.435 MM lb ds/day, 984,000 lb/hr steam at 1225 psig, 900°F, 1250 psig design
Incident Date:	August 13, **2007**
Downtime hrs, leak/total:	155
ESP?	**Yes**
Leak/Incident Loc:	**Very small pin-hole leak that originated at the termination point of membrane to tube weld just as the Rear wall maintenance beam door tube began its outward bend, in lower crotch, 6th floor 98' above hearth**
How discovered:	**Walk down**. Operator saw water dripping from a maintenance beam door opening
Wash adjacent tube:	No
Root cause:	Stress-Assisted Corrosion SAC. Some Cu present.
Leak detection:	Yes Alert Systems – Recovery Boiler Advisor mass balance (Leak too small to trigger)
Bed cooling enhanced	Yes Southland NaHCO3 by N2
Last full inspection:	April 2008
Sequence of events:	5:17 pm Operator saw water dripping from a maintenance beam door opening at 6th floor. 5:20 pm ESP'd the unit. All OK. Southland began, and took 36 hours. Aug 15 8:30 am began waterwash.
Repair procedure:	Replaced tube in kind
Future prevention:	Replaced last 3 doors (of 5) during April 2008 outage

Appendix A – Summary of Incidents (Continued)

EXPLOSION DISSOLVING TANK

FALL 2008 - 22	
Classification:	**Dissolving Tank Explosion #29**
Location:	**MeadWestvaco, Charleston, SC (now KapStone Paper&Packaging)**
Unit:	1984 B&W PR-206, 2-drum Large Economizer, sloped hearth
Unit Size:	4.5 MM lb ds/day, 691,000 lb/hr steam at 1450 psig, 880°F, 1725 psig design
Incident Date:	April 17, 2008
Downtime hrs, leak/total:	132.33
ESP?	**No**
Leak/Incident Loc:	Dissolving tank below sloped hearth unit with plugged spouts. After hydro, 2 leaks in two secondary SH Loops, 3/4 x 1/8"
How discovered:	Dissolving tank: Explosion; SH Tube leaks: Hydro
Wash adjacent tube:	No
Root cause:	Extended period with no upper furnace water wash and many sootblowers requiring maintenance. Large salt cake accumulation in furnace bottom during startup causing plugged spouts and melting smelt behind plug. Heavy smelt runoff when unplugging a spout under heavy smelt buildup in bottom.
Leak detection:	Yes Internal Westvaco Acoustic System
Bed cooling enhanced	No
Last full inspection:	Apr 2007
Sequence of events:	Apr 16. 300 days since upper furnace cleaning. Did sootblower water wash? Many blowers needed maintenance, so weren't effective. 7:00 pm Unit started up without one starting burner. April 17 1:00 am Spouts plugged from excess salt cake on hearth. 5 am -8 am operators in full safety gear still trying to unplug spouts. 8:17 am one spout unplugged, and heavy smelt run-off occurred. Attempts to control it with flow-limiter rod were unsuccessful. Evacuated area when runoff was too great. Explosion occurred. Control room operator did a main fuel trip and sounded evacuation alarms.
Repair procedure:	Repair damage: No. 2 smelt spout dog box was blown away from the unit. The hood wash piping, shatter jets, and Dissolving Tank skirting on Nos. 1, 2, and 3 spouts were severely mangled. Several of the spout water supply and return headers were damaged and leaking. The Dissolving Tank and its wall support beams were bowed out approximately halfway up the tank. The west and center dissolving tank agitator mounting bolts were sheared and the center agitator motor coupling was torn off. There was smelt buildup that was cleaned from the green liquor piping. The No. 2 spout was plugged and its dog box was capped off. The No. 1 dog box was pulled away from the boiler. The Dissolving Tank, lower vestibule, and spout opening were inspected Tube leaks – replaced SH loops
Future prevention:	Improve sootblower maintenance. Schedule 6-month upper furnace sootblower water washes with better checklists. Revise procedures for handling plugged spouts and shut down procedures if can't unplug spouts. Develop better spout flow limit device. Improve tank explosion damper. Get third agitator in service. Share learnings with BLRBAC and AF&PA. Consult on use of NaHCO3 for bed cooling. And hydro blasting following a safety shutdown. History of tube leaks

Appendix A – Summary of Incidents (Continued)

EXPLOSION DISSOLVING TANK

FALL 2008 - 23	
Classification:	**Dissolving Tank Explosion #30**
Location:	**Georgia-Pacific, Toledo OR**
Unit:	#2 RB 1959 CE #5959 2-drum Direct Contact Cascade, decanting hearth
Unit Size:	1.4 MM lb ds/day, 170,000 lb/hr steam at 600 psig, 700°F, 700 psig design
Incident Date:	May 31, 2008
Downtime hrs, leak/total:	98
ESP?	**No**
Leak/Incident Loc:	Dissolving Tank
How discovered:	
Wash adjacent tube:	N/A
Root cause:	Spout shatter jets steam inadvertently left off. Unit smelting with no spout rodder attending. Heavy smelt runoff. Established Checklist not followed.
Leak detection:	-
Bed cooling enhanced	-
Last full inspection:	-
Sequence of events:	May 31 Sat 00:30 Start natural gas fire in unit. Bring to operating level for liquor firing. 5:50 am 1st liquor gun. Shatter jet steam inadvertently left off, despite checklists. 6:30 shift change at two separate spots. New port puncher not aware of liquor on line. When informed, spouts were already plugged. Cleared one spout, getting major runoff with no shatter steam. Shatter steam jets turned on. Excess smelt flow caused rumbling and excess steam and poor visibility in area. Personnel backed away. Violent rumbling, then EXPLOSION occurred. Smelt spout dog house blew 8-10 feet away. A 20-foot wide span of building siding was torn off and landed outside on pipe racks in a vacant courtyard. No personal injuries were sustained. Shut down FD fan to stop smelt flow. Unit shut down. Area secured. When safe, damage assessed.
Repair procedure:	One of two doghouse covers over Dry Spout smelt spouts was destroyed. Spouts and tank were not severely damaged. Some tank anchor bolts were damaged, one agitator and both green liquor pump bases required realignment. Some building siding was fractured off of the exterior wall in front of the doghouse. Total repair costs including, demolition, fabrication, abatement, scaffold, and reinstallation of dog house $78,000.
Future prevention:	Reconfirm procedures. Hold central shift change meeting with everyone. Improve mentoring. Follow checklists.

Appendix A – Summary of Incidents (Continued)

EXPLOSION

FALL 2008 - 24	
Classification:	**EXPLOSION #159**
Location:	**Durango-Georgia, St. Marys GA**
Unit:	#2 RB 1948 CE #22547 **3-drum** DCE Direct Contact Cascade; 1995 ABB Alstom rebuild
Unit Size:	**.831** MM lb ds/day, 108,000 lb/hr steam at 610 psig, 725°F, 700 psig design
Incident Date:	August 17, **2002**
Downtime hrs, leak/total:	Unit shut down permanently.
ESP?	**Yes**
Leak/Incident Loc:	Furnace
How discovered:	Explosion
Wash adjacent tube:	No
Root cause:	Undetermined
Leak detection:	No
Bed cooling enhanced	N/A
Last full inspection:	Partial NDT 2002
Sequence of events:	**OSHA**: On August17, 2002, During an attempt to relight the unit after a low drum level trip, an employee introduced a continuous flow of steam-atomized #6 fuel oil into the unit for at least several minutes without purging. The flame flickered a few times but would not remain lit. While the employee continued to add fuel into the unit, another employee was sent to assist with the relight. That employee reportedly closed the oil recirculation valve to increase the oil pressure at the guns. During this process, the fuel was continuously introduced into the unit without intermittently suspending fuel and purging the unit. The flame flickered several more times, and then the boiler ignited. Several seconds later, the explosion occurred. Employees working around the recovery unit were exposed to a violent explosion, There was catastrophic failure of the unit, along with flying boiler and related equipment parts, and burns from the released boiler contents – steam, condensate, hot black liquor and smelt. **Georgia Dept of Labor, Safety Engineering Division**: Fires were lost about 5:00 am. Explosion occurred about 5:10 am. Employees ere attempting to bring another boiler on line. There were tube failures.
Repair procedure:	Severe damage throughout unit. 30” wall deflections 36” corner openings. Most of floor bent down 8 feet. Unit shut down permanently. Demolished in 2006. Site sold for residential development.

Appendix A – Summary of Incidents (Continued)

EXPLOSION AUXILIARY FUEL

FALL 2008 - 25	
Classification:	**EXPLOSION – AUXILIARY FUEL (Natural Gas) #160**
Location:	**International Paper, Vicksburg MS**
Unit:	1967 B&W PR-105, 2-drum DCE Cyclone
Unit Size:	3.0 MM lb ds/day, 509,000 lb/hr steam at 1020 psig, 825°F, 1200 psig design
Incident Date:	May 3, 2008
Downtime hrs, leak/total:	Unit still down
ESP?	**No**
Leak/Incident Loc:	Furnace EXPLOSION.
How discovered:	Explosion
Wash adjacent tube:	n/a
Root cause:	Auxiliary fuel explosion – cause under investigation
Leak detection:	-
Bed cooling enhanced	-
Last full inspection:	April 2008
Sequence of events:	Incident occurred during start-up from the mill's routine annual maintenance outage. The boiler was being fired on natural gas using startup burners, preparing to come back on line after completing the annual outage. A major explosion occurred at approximately 3:12 PM on May 3, 2008.
Repair procedure:	Plans announced to repair the unit. Estimate 6 months. Severe damage. The furnace floor separated from the front wall, all 3 floor beams deflected and the end connections were broken/disengaged. The front of the floor dropped several feet, several supply tubes under the floor were broken and all supplies were bent. The sidewalls separated from the floor. All 4 corners of the furnace were either opened or rounded from the floor to the roof. All buckstays were damaged, most corner end connections were broken but a few were still holding on some rounded corners. The nose arch was forced down, bending and then ripping the seals to the sidewalls, putting holes in a number of sidewall tubes. All sloping runs of the furnace screen tubes were damaged as the nose moved and some of the screen vertical tubes were damaged. The roof tubes were bent as they moved upwards. The sidewalls separated from the roof. The superheater was mostly undamaged. All casing on unit was severely damaged back through the economizer, including lower vestibule, wind boxes, furnace corner seals, penthouse, boiler bank and economizer. The boiler bank hopper and the flue from the economizer to the cyclone evaporator were damaged. The electrostatic precipitator internal plates were damaged. Building siding was blown off in areas. Sootblower supports were damaged, most sootblowers disengaged from the wall boxes. There was damage to some of the building floors and to floor steel; some cable trays and wiring were damaged. <u>Components Being Replaced</u>: All 4 walls of the furnace including floor and roof complete header to header including supplies and risers. Five new floor beams will be installed. All new buckstays. Most of the furnace screen tubes and a few sections of superheater tubes. All casing and flues as listed as damaged above. All sidewall tubes on boiler bank and on economizer, economizer outlet piping. Repairs to floors and floor steel as needed. Repair sootblowers as needed. Repair/replace cable trays and wiring as needed.

ESP Subcommittee

Committee Report
Wednesday October 8, 2008

BLRBAC 1

Meeting Attendance

- Closed session Monday October 6th
  - 12 of 13 members represented
  - Shawn Casey represents W Canada
- Open session Tuesday October 7th
  - 12 of 13 members
  - About 180 guests

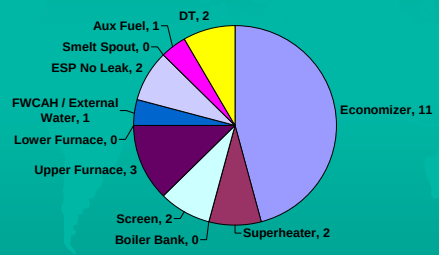
BLRBAC 2

Incident Questionnaire Review

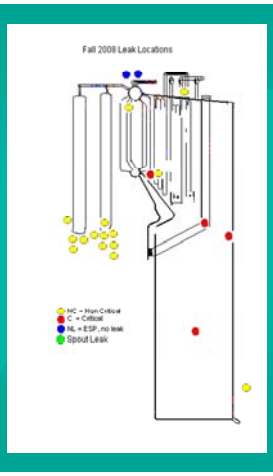
- 25 North American incidents
  - 4 Explosions
    - 1 Aux Fuel
    - 1 Unknown
    - 2 DT Explosions
  - 4 Critical
  - 15 Non-critical
  - 7 EPD'd
    - 4 Critical
    - 100% of Critical that Should ESP
  - 2 ESP w/ no leak

BLRBAC 3

Incident Locations

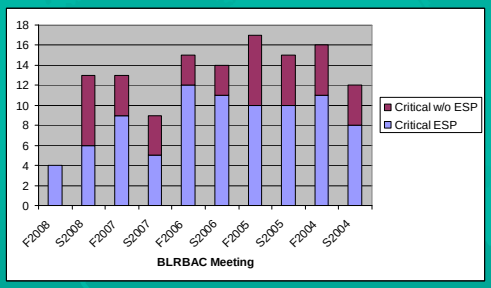


BLRBAC 4



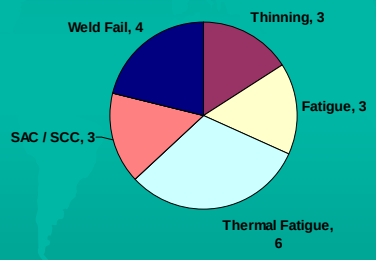
BLRBAC 5

ESP History



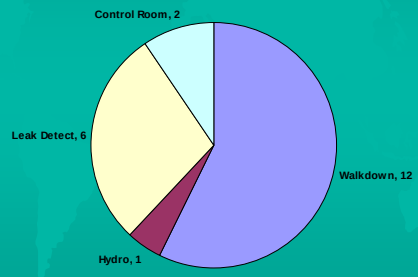
BLRBAC 6

Root Cause



BLRBAC 7

How Discovered



BLRBAC 8

Leak Detection Systems

- Leak Detection Systems installed – 12
  - Indentified leak – 6
  - Confirmed leak - 1
  - Economizer leaks – 6

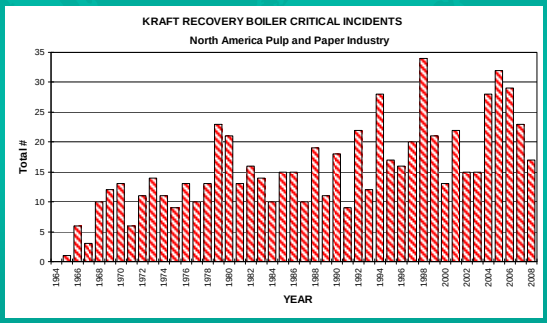
BLRBAC 9

Initiation of ESP

- Ranged from 1 minute 6.4 Hrs
- Median was 33 minutes
- One incident with smelt water reaction

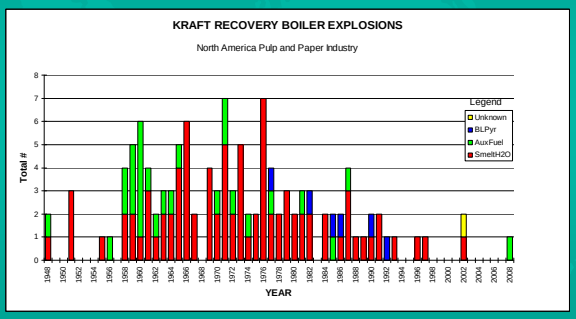
BLRBAC 10

Critical Incidents to Date



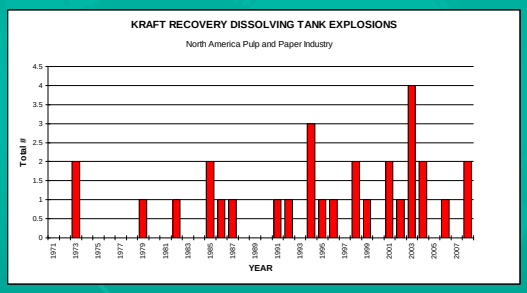
BLRBAC 11

Boiler Explosion History



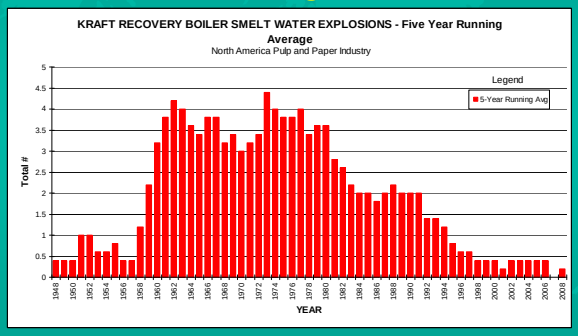
BLRBAC 12

Dissolving Tank Explosions



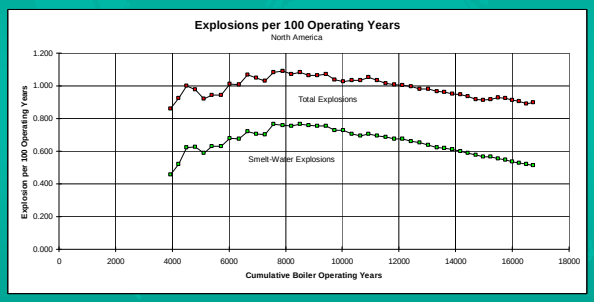
BLRBAC 13

Explosion History - Five Year Avg.



BLRBAC 14

Explosion History per 100 Oper Yr



BLRBAC 15

Learnings

- Need to establish reference or benchmark level for smelt pool to shut down boiler before all the spouts plug
- Need to include appropriate time interval between high FP and low DL for closing feedwater control valve.
- Several incidents reported of initiating ESP w/o having to visually confirm leak.
- Handhole repair procedures continue to be a problem

BLRBAC 16

Learnings

- Clearing Superheaters
  - Graph of SH tube outlet temps valuable to show spike in temperature when tube clears
- Char Bed Cooldown
  - Thermal imaging guns are tool to identify hot areas of the bed but thermocouples should be the final determination
  - Probe all areas of bed not just those accessible
  - Post ESP Procedure – Chapter 8
  - Personnel Safety – Chapter 2.7

BLRBAC 17

Testing of ESP System

In Section 2.2 Routine Operator Checks:

At least annually, also verify the "alternate means" to actuate individual ESP elements and any "remote" means to initiate the ESP or actuate individual ESP elements will transmit a signal to the intended ESP element. Actuation of the ESP device is not necessary; only verification that a signal is transmitted to the device.

BLRBAC 18

ESP Architecture

Suggested Language

Recommended Change to second sentence of Chapter 1:

Upon initiation of the Emergency Shutdown Procedure, a ~~dedicated, stand-alone~~ the system shall perform the following automated actions:

BLRBAC 19

ESP Architecture

Add paragraph to the after bulleted items on Page 4

The Emergency Shutdown Procedure functions must be activated and controlled either by means of relay technology and hard-wiring or other dedicated system as defined in Chapter 2 of the *Instrumentation Checklist and Classification Guide*. In the latter case, it must not be possible to carry out reprogramming during operation or in error. See also Chapter 4 of the *Instrumentation Checklist and Classification Guide*. Whatever technology is utilized, the BMS or DCS systems can be used to monitor operation of the functions.
Any time modifications are made to the system, the system shall be functionally tested prior to putting the unit back on line.

BLRBAC 20

Operating Boiler Lists

- List of Operating Boilers in US and Canada posted on BLRBAC website.
  - Jules Gommi will maintain
  - Contact Jules with any corrections or updates

BLRBAC 21

Thank You Jack

Jack Clement will be stepping down from the committee after many years of serving as secretary and member

BLRBAC 22

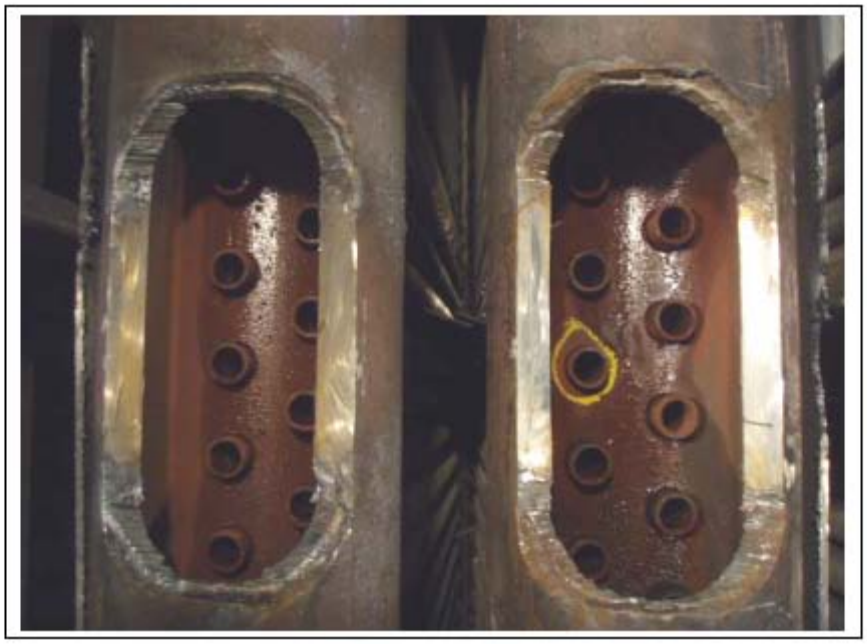
INDUSTRA Service Corp.

7600 NE 47th Ave.
Vancouver, Washington 98661
(360) 567-3645

Weyerhaeuser Paper Co. - Springfield, Oregon

Feed Water Air Heater Repair
#4 Recovery Boiler

Date of Repairs: April 10, 2008



National Board Inspection Code
Repair Documentation
&
NBIC Form R-1 Report of Welded Repair

Industra Service Job No. 30-3821

DAN PHILLIPS MS, CWI
WELDING ENGINEER

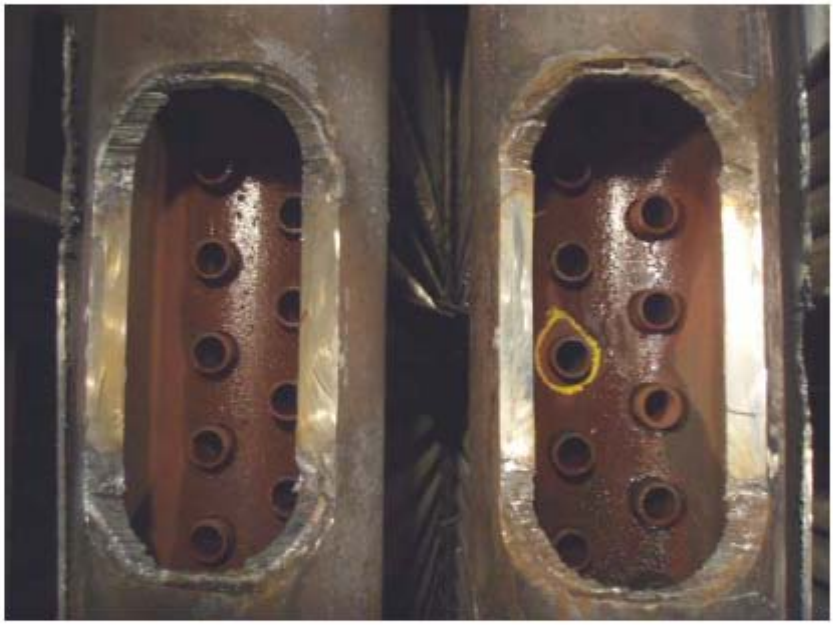
Appendix C – Feedwater Coil Air Heater Repair (Continued)

WEYERHAEUSER PAPER Springfield, OR #4 RB Feed Water Air Heater Repairs

Pressure Parts Work Summary:

Industra Service Corp performed Code Repairs to the #4 Recovery Boiler combustion air preheater *(feed-water air heater)* located at Weyerhaeuser Paper's Springfield, Oregon facility on April 7 through 10, 2008.
The air preheater (heat exchanger unit) unit was manufactured as an ASME section VIII Code Pressure Vessel, by Aerofin Co. in 2000. It is comprised of two stages, each with three finned tube heaters inside a gas tight enclosure, fit into the forced air duct on the second floor of the #4 RB building. The pressure parts circuitof the heater are contained within the feedwater system, between the feedwater economizer and the boiler steam drum.

Air Heater:
One leaking finned tube return-bend element was plugged inside of the supply and outlet headers.



Access was not possible from the gas side (FD Air Duct) due to configuration. For access, the 6 inch schedule 160 feed and return headers were cut open. The tubes were located and plugged, and the header openings were replaced and welded.

Following the welded repairs and final non-destructive examination (NDE), a successful pressure test was performed.

Vent and Drain Piping:
Several feed-water vent and drain valves were installed per Customer details, to provide isolation, venting, and draining. Materials were provided by Customer. Industra Service Corp installed the piping and performed visual and pressure testing.

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NBIC CODE REPAIRS & ALTERATIONS
ASME DESIGN – FABRICATION - INSTALLATION
PROJECTS - SHUT DOWNS – ANNUAL MAINTENANCE

Appendix C – Feedwater Coil Air Heater Repair (Continued)

Code Paperwork:

Documentation covering repairs to this unit include the following items:

- Industra Service Corp. NBIC Form R-1 Repair Form
- Industra Service Corp QC Form – Job Traveler
- Aerofin Manufacturer's Pressure Vessel Data Report - ASME Form U-1 (For Reference)

- NDE Report from ACUREN *(provided directly to Owner by ACUREN- copy on file)*

Comments & Recommendations:

The leak formed at the toe of the tube to header weld. Due to configuration, access is not possible (except for the first row on inlet and outlet) on the air side to plug the tube as normally done. Access has to be gained through the back side of the headers and a header plug installed. This is a more difficult and involved repair to plug a tube.

The inside of the tubes, as viewed from inside the headers, exhibited weld related tube ID discontinuities (see photos). This is immediately beneath the pressure part welds for the tube to header. In the author's opinion this set in motion the root cause for the tube to header weld leak.

A percentage of the tube-to-header welds from original fabrication were performed in such a way as to melt the tube inside surface. This is the site of observed selective corrosion on the waterside. This corrosion combined with the notch (stress concentration) formed by the internal defects and vibration of the fin tube elements from gas side flows, caused the defect to grow and breech the pressure boundry.

Inspection of the tubes visible from inside of the header access openings showed about 25% of the tubes welds with internal undercut, melt-thru of the parent metal, internal penetration, etc…

Expect continued leaks in these elements.

Repair options are limited. Reliability demands, outage and repair costs for this component will drive the repairs. Replacement will become an option if failure frequency increases. At that point, a serviceable design should be considered.

Appendix C – Feedwater Coil Air Heater Repair (Continued)

WEYERHAEUSER PAPER Springfield, OR #4 RB Feed Water Air Heater Repairs

Photos:

Right Side of Heater – Lagging and casing removed over header areas near leaking tube Header side and crossover piping side	
Left Side of Heater Return bend side	

Appendix C – Feedwater Coil Air Heater Repair (Continued)

WEYERHAEUSER PAPER Springfield, OR #4 RB Feed Water Air Heater Repairs

View of the FD Air side of the heater – showing the finned tubes, this is the outlet side of the heater as viewed from the front left lower man access door

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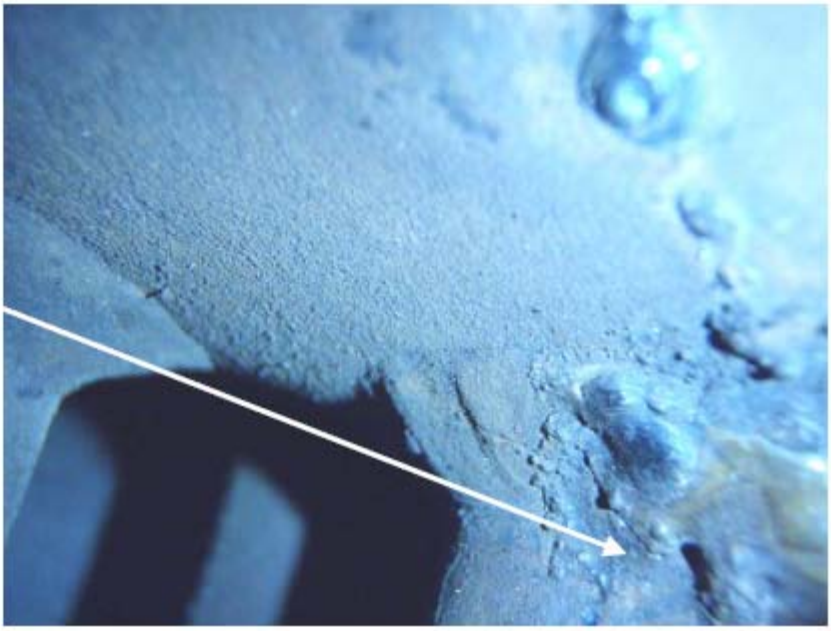
NBIC CODE REPAIRS & ALTERATIONS
ASME DESIGN – FABRICATION - INSTALLATION
PROJECTS - SHUT DOWNS – ANNUAL MAINTENANCE

Appendix C – Feedwater Coil Air Heater Repair (Continued)

WEYERHAEUSER PAPER Springfield, OR #4 RB Feed Water Air Heater Repairs

Looking between the feed and return headers, View from the right side – shows the tube to header manifold welds.	
Tube to header weld close up of the leak site, after failed attempt to weld from gas side. The attempt was made with a mirror, and unsuccessful. The unit was isolated and repaired days later.	

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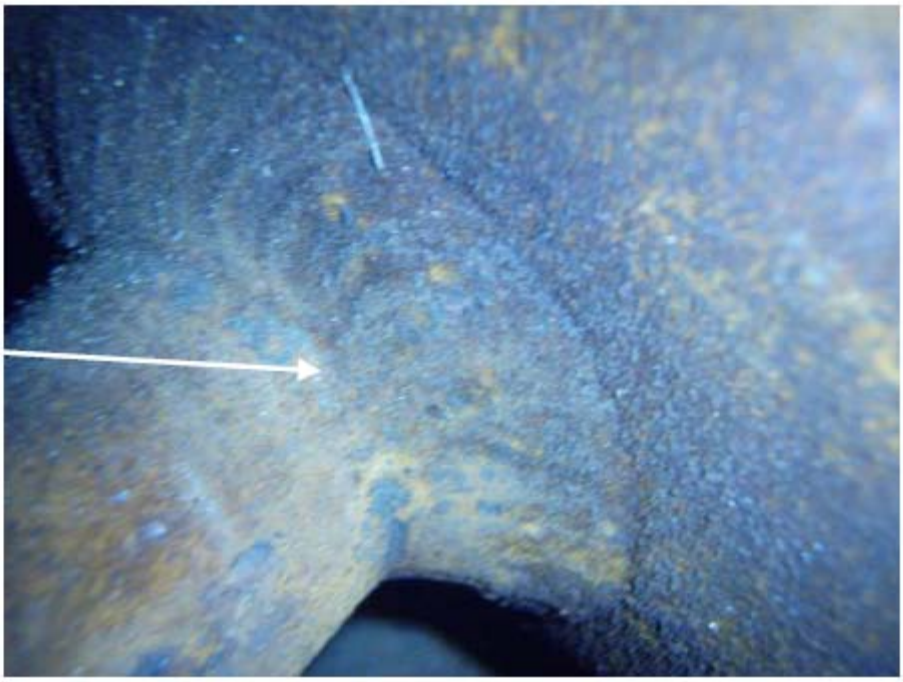
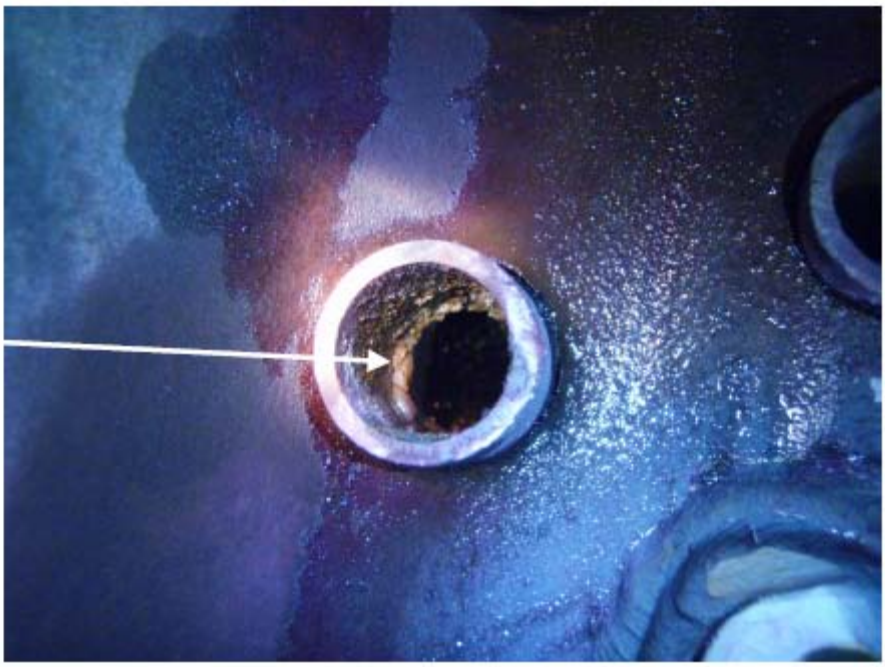
NBIC CODE REPAIRS & ALTERATIONS
ASME DESIGN – FABRICATION - INSTALLATION
PROJECTS - SHUT DOWNS – ANNUAL MAINTENANCE

Appendix C – Feedwater Coil Air Heater Repair (Continued)

WEYERHAEUSER PAPER Springfield, OR #4 RB Feed Water Air Heater Repairs

Close up view of tube to header weld – gas side Toe of weld on tube side that is the leak prone area.	
Internal protrusion into tube – result of melt thru from tube to header shop weld	

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NBIC CODE REPAIRS & ALTERATIONS
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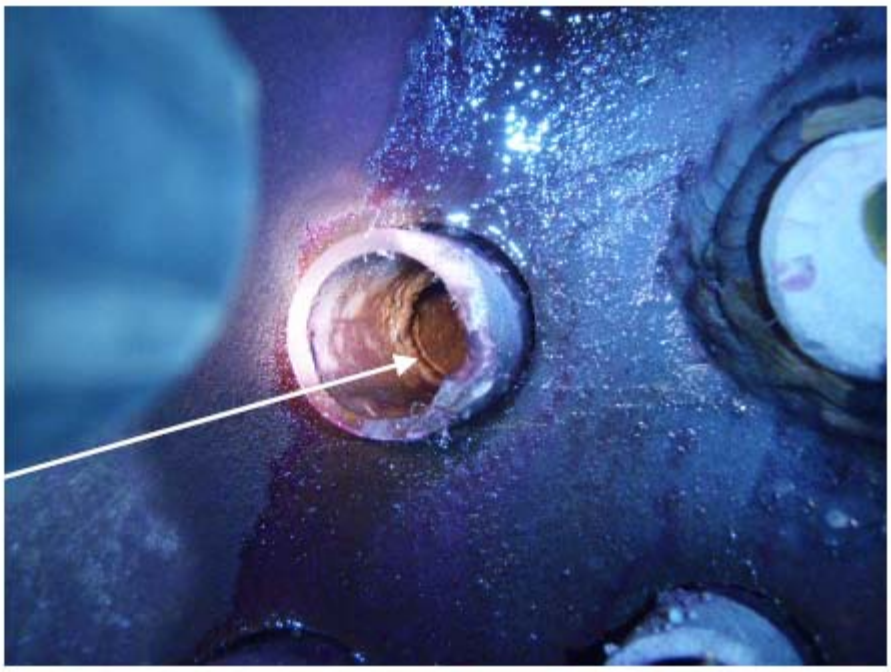
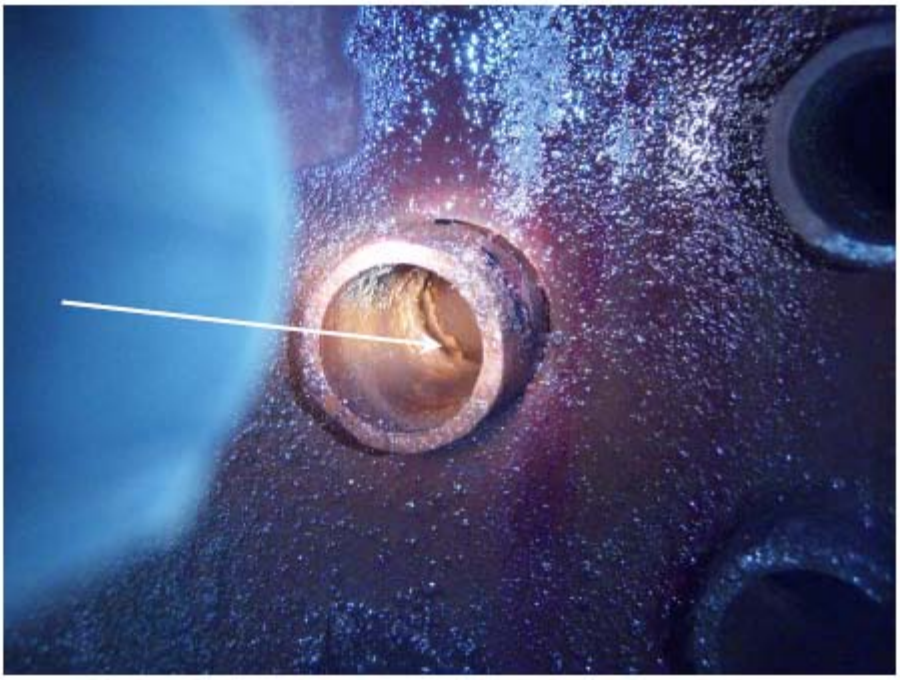
Appendix C – Feedwater Coil Air Heater Repair (Continued)

WEYERHAEUSER PAPER Springfield, OR #4 RB Feed Water Air Heater Repairs

Another tube with internal burn thru, resultant of weld from outside of pressure part – NOTE: indication of active corrosion (bright orange) this linear indication appears to be a crack.	
Another tube with internal burn thru, resultant of weld from other side of pressure part – NOTE: indication of active corrosion (bright orange) this linear indication appears to be a crack.	

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NBIC CODE REPAIRS & ALTERATIONS
ASME DESIGN – FABRICATION - INSTALLATION
PROJECTS - SHUT DOWNS – ANNUAL MAINTENANCE

Appendix C – Feedwater Coil Air Heater Repair (Continued)

WEYERHAEUSER PAPER Springfield, OR #4 RB Feed Water Air Heater Repairs

Tube ID with no signs of internal weld related tube ID remelt or internal protrusion.	
Tube ID with minor amount of internal melt – called a "heat line"	

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NBIC CODE REPAIRS & ALTERATIONS
ASME DESIGN – FABRICATION - INSTALLATION
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Appendix C – Feedwater Coil Air Heater Repair (Continued)

WEYERHAEUSER PAPER Springfield, OR #4 RB Feed Water Air Heater Repairs

Header side (Right side of boiler setting) of unit was opened up and access to the tubes was cut into the feed and return headers -	
Header plug – machined from SA105 FS pipe fitting	

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NBIC CODE REPAIRS & ALTERATIONS
ASME DESIGN – FABRICATION - INSTALLATION
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Appendix C – Feedwater Coil Air Heater Repair (Continued)

WEYERHAEUSER PAPER Springfield, OR #4 RB Feed Water Air Heater Repairs

ANSI B16 Fitting Stamp visible Note: SA/A105 Code markings	
Header plug in place after welding & PT Examination	

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NBIC CODE REPAIRS & ALTERATIONS
ASME DESIGN – FABRICATION - INSTALLATION
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Appendix C – Feedwater Coil Air Heater Repair (Continued)

WEYERHAEUSER PAPER Springfield, OR #4 RB Feed Water Air Heater Repairs

Header sections welded back into place and NDE – MT Examined prior to pressure testing	

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NBIC CODE REPAIRS & ALTERATIONS
ASME DESIGN – FABRICATION - INSTALLATION
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Appendix C – Feedwater Coil Air Heater Repair (Continued)

INDUSTRA Service Corp.

EXHIBIT 3 - NBIC REPAIRS JOB TRAVELER
for NBIC Repairs & Alteration

Edition: 3
Date of Edition: August 29, 07
Section Revision No. 0

CUSTOMER:	WEYERHAEUSER PAPER – SPRINGFIELD, OR	JOB No. :	30-3821
UNIT I.D.	No. 4 Feed water air heater – HEAT EXCHANGER	DATE:	4-09- 08

Set up the Traveller hold points **BEFORE THE WORK** with the QCM & AI: These are indicated with an "H" or "V" belov
Not all items on this form apply to a given Code Repair or Alteration
"H" indicates Hold - No work to proceed beyond without AI & QC approval
"V" indicates Verification and approval sign off - by QSM & CI as noted- no hold, work may continue.
NOTE: For Routine Nature Repairs, the AI typically waives on site Hold Points – but it is necessary to confirm with the AI & QCM the extent of paperwork and forms required for the Code package.

Pressure Retaining Item(PRI) repaired:	Boiler Proper – Steam & Mud Drums		National Bd.# 1036 (Aerofin)
ISC Responsible Person assigned as "On Site QCM ":		Dan Phillips	
Authorized Inspector:	Bob Morin (FM Global)	Date Notified & by Whom:	4-4-08 Dan Phillips
Notes & Comments:	Combustion air preheater for the No 4 CE Recovery Boiler manufactured by AEROFIN in 2000		
This is a finned tube air heater using feedwater on the tube side, and combustion air (FD Air) on the shell side.			
One tube had a leak on the tube to header manifold (gas side) of the unit. There was no access to the header welds on the gas side so			
Access openings were torch cut into the 6" x 0.71" thick As106B Pipe headers to access the tubes for pluging, no PWHT required.			
ANSI B16, A105 FS SW Plugs were utilized for the plugs, all stampings verified for materials ID.			

Note: For "Routine Nature Repairs" the minimum required paperwork is the original data report, this traveler & the R-1 Report. Attach additional forms to this as required, such as: PRI Sheet, MTR's, C. of C.'s, Welder Listing & maps, Welders Certs, NDE Reports; PWHT

↓ HOLD & VERIFICATION "Witness" Points: ↓		Sign-off & Date	
Item Or Activity	Specific Comments	A. I.	QCM - Designee
Traveler set up	By QCM D. Phillips	H.....(AI)	H.....(DBP)
Drawings	- N/A -		V.....(DBP)
Calculations	*(for Alterations Only)*	NA	NA
Materials: MTR's, C. of C., material markings, etc…	*Copy of MTR's with signature & where it was used in Unit.* UI From Aerofin ✓		V.....(DBP)
Include original data report and drawings to identify materials	No MTR with A106 Plugs - ANBi Stamping OK ✓		V.....(DBP)
Welding: WPS(s) used	Header A106, P-#1 use		V.....(DBP)
Fit-up or root check, etc…	WPS 101 SMAW E7018 #103 As Req'd		4-10
WPQR's	J. Dill, T. Olds, DWM,		V.....(DBP)
Non destructive Examination:	*Code required or Info* ACCEN – PT Plug Welds &		4-10
HEADERS – MT Root MT Final Cap ON Headers ✓	*If NDE is to be used in lieu of* contact QCM NO – ON HEADERS – MT Root & Hot pass FINAL MT Cap		V.....(DBP) 4-10-08
Final Visual – Stencil & Weld Maps	*Welds - Materials & weld – maps*		V.....(DBP)
Post Weld Heat Treatment	*For PWHT or Alternate Rules - contact QCM*		
Pressure Test: Isolated the VIII-1 Heat Exch. From #4 Feed Water System & Tested	MAWP / Design Press.+ 1500 PSIG Test Press 2200 .PSIG Metal Temp 80 °F		H.....(DBP) 4-10-08
R-Stamping & Nameplate	(N/R in some cases for Routine Repairs) *Contact QC*	NA	NA
Final Sign off –	**Repairs/Alteration Forms R-1 / R-2**	H.....(AI)	H.....(DBP) 4/14/08

Remarks: Hold and Verification Points to be inserted in the above columns by the AI and/or QCM, or Designee. Approval to proceed and acceptance of noted items, or functions, as being in compliance with Code is certified by sign off.
Dated: 4-14-08 QCM A.I.: D. Phillips

Appendix C – Feedwater Coil Air Heater Repair (Continued)

NBIC FORM R-1 REPORT OF REPAIR

In accordance with provisions of the National Board Inspection Code

1. Work performed by: INDUSTRA SERVICE CORP. (Name of Repair Organization) — NA (Form R No.)
7600 NE 47th Ave. Vancouver, WA 98661 (address) — 30 - 3821 (P.O. No. Job No. etc.)

2. Owner: Weyerhaeuser Paper Co. (Name)
785 N. 42nd – Springfield, Oregon 97478 (address)

3. Location of installation: SAME (name)
SAME (address)

4. Unit identification: #4 FW Air Heater (boiler, pressure vessel) — Name of original manufacturer: AEROFIN

5. Identifying nos.: (mfg serial no.) — 1036 (National Board No.) — (jurisdiction no.) — (other) — 2000 (year built)

6. NBIC Edition/Addenda: 2004 (edition) — 2006 (addenda)

Original Code of Construction for Item: ASME (name/section/division) — 1998 / A-98 (edition/addenda)

Construction Code Used for Repair Performed: ASME (name/section/division) — 2004 / 2006 (edition/addenda)

7. Repair Type: [X] Welded [ ] Graphite Pressure Equipment [ ] FRP Pressure Equipment

8. Description of work: Repair Feedwater Air Heater - finned tube heat exchanger – Tube leak at 6" header to 1" tube weld (use supplemental sheet, Form R-4, if necessary)

No access on gas side to fin tubes and manifold welds - accessed thru 6" Header (T= 0.70") – A106 B

Plug welded one fin tube element loop inside headers two plugs used on return loop inside supply and return headers

No PWHT Req'd. to reweld header(s)

Pressure Test, if applied 2200 psi Design Pressure - MAWP 1500 psi

9. Replacement Parts. Attached are Manufacturer's Partial Data Reports or Form R-3s properly completed for the following items of this report:

No parts used – materials only (name of part, item number, data report type, mfg's. name and identifying stamp)

10. Remarks: ANSI B16 - A105 FS, SW Pipe Plug insert used for Tube Plugs.
Header opening Welds received MT examination on root/ hot pass, and final Cover pass prior to Pressure Test.
All final results acceptable.

CERTIFICATE OF COMPLIANCE

I, Dan Phillips, certify that to the best of my knowledge and belief the statements in this report are correct and that all material, construction, and workmanship on this Repair conforms to the National Board Inspection Code.

National Board "R" Certificate of Authorization No. R - 4169 expires on October 7 2010

Dated 4-10, 2008 Industra Service Corp. (Name of Repair Organization) Signed Dan Phillips (Authorized Representative of Repair Organization)

CERTIFICATE OF INSPECTION

I, Bob Morin holding a valid Commission issues by The National Board of Boiler and Pressure Vessel Inspectors and certificate of competency issued by the jurisdiction of Oregon and employed by Factory Mutual Insurance Co. of Johnston, RI Have inspected the work described in this report on 2008 and state that to the best of my knowledge and belief this work complies with the applicable requirements of the National Board Inspection Code.

By signing this certificate, neither the undersigned nor my employer makes any warranty, expressed or implied, concerning the work described in this report. Furthermore, neither the undersigned nor my employer shall be liable in any manner for any personal injury, property damage or loss of any kind arising from or connected with this inspection.

Date , 2008 Signed Commissions (National Board and Jurisdiction, and Nos.)

Appendix C – Feedwater Coil Air Heater Repair (Continued)

NBBI #1036
Aerofin

Feed Water Air-Heater
#4 RB@ Weyco Springfield

FORM U-1 MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

1. Manufactured and certified by AEROFIN CORPORATION, 4621 MURRAY PLACE, LYNCHBURG, VA 24502 (Name and address of Manufacturer)

2. Manufactured for AHLSTROM RECOVERY, INC., ALPHRETTA, GA. (Name and address of Purchaser)

3. Location of installation WEYERHAEUSER COMPANY, SPRINGFIELD, OR. (Name and address)

4. Type: HORIZONTAL (Horiz, vert., or sphere) | HEAT EXCHANGER (Tank, separator, jkt. vessel, heat exch., etc.) | 000201 (Mfg's serial no.)
— (CRN) | X-13591 (Drawing No.) | 1036 (Nat'l Bd. No.) | 2000 (Year Built)

5. ASME Code, Section VIII, Div. 1 | 1998, A-98 (Edition and Addenda (date)) | — (Code Case No.) | — (Special Service per UG-120(d))

Items 6-11 incl. to be completed for single wall vessels, jackets of jacketed vessels, shell of heat exchangers, or chamber of multi-chamber vessels.

6. Shell (a) No. of course(s): 1 (b) Overall length (ft. & in.): 9' - 1"

Course(s)			Material	Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B, & C)			Heat Treatment	
No.	Diameter, in.	Length (ft & in.)	Spec./Grade or Type	Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	6" NPS	9' - 1"	SA106, GR. B	.719"	—	S	NONE	100	—	—	—	—	—

7. Heads: (a) SA-516, GR. 70 (Mat'l. Spec. No., Grade or Type) H.T. – Time & Temp. (b) — (Mat'l Spec. No., Grade or Type) H.T. – Time & Temp.

	Location (Top, Bottom, Ends)	Thickness Min	Thickness Corr.	Radius Crown	Radius Knuckle	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure Convex	Side to Pressure Concave	Category A Type	Category A Full, Spot, None	Category A Eff.
(a)	ENDS	1.25	—	FLAT	—	—	—	—	6.625"	—	—	—	—	—
(b)														

If removable, bolts used (describe other fastening) — (Mat'l Spec. No., Grade, size, No.)

...e of jacket — Jacket closure — (Describe as ogee & weld, bar, etc.)

...r bar, give dimensions — If bolted, describe or sketch.

9. MAWP 1500 (internal) — (external) psi at max. temp. 600 (internal) — (external) °F Min. design metal temp. 35 °F at 1500 psi.

10. Impact test NO (UG-20f, UCS-66a) [Indicate yes or no and the component(s) impact tested]

11. Hydro., ~~pneu., comb.~~ test press. 2250 Proof test —

Items 12 and 13 to be completed for tube sections.

12. Tubesheet:

Stationary (Mat'l Spec. No.)	Dia., in. (subject to press.)	Nom. thk., in.	Corr. Allow., in.	Attachment (welded or bolted)
Floating (Mat'l Spec. No.)	Dia., in.	Nom. thk., in.	Corr. Allow., in.	Attachment

13. Tubes:

Mat'l Spec. No., Grade or Type	O.D., in.	Nom. thk., in. or gauge	Number	Type (Straight or U)
SA-210, GR. A1	1"	.095"	92	U

Items 14-18 incl. to be completed for inner chambers of jacketed vessels or channels of heat exchangers.

14. Shell (a) No. of course(s): (b) Overall length (ft. & in.):

Course(s)			Material	Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B, & C)			Heat Treatment	
No.	Diameter, in.	Length (ft & in.)	Spec./Grade or Type	Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time

15. Heads: (a) (Mat'l. Spec. No., Grade or Type) H.T. – Time & Temp. (b) (Mat'l Spec. No., Grade or Type) H.T. – Time & Temp.

	Location (Top, Bottom, Ends)	Thickness Min	Thickness Corr.	Radius Crown	Radius Knuckle	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure Convex	Side to Pressure Concave	Category A Type	Category A Full, Spot, None	Category A Eff.
(a)														
(b)														

If removable, bolts used (describe other fastening) — (Mat'l Spec. No., Grade, size, No.)

10/97) AEROFIN CORPORATION, LYNCHBURG, VA U-1 MANUFACTURER'S DATA REPORT

Appendix C – Feedwater Coil Air Heater Repair (Continued)

NBBI # 1036 Aerofin

FORM U-1 (Back)

16. MAWP _____ (internal) _____ (external) psi at max. temp. _____ (internal) _____ (external) °F. Min. design metal temp. _____ °F at _____ psi.

17. Impact test _____ (Indicate yes or no and the component(s) impact tested)

18. Hydro., pneu., comb. test press. _____ Proof test _____

19. Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc.)	No.	Diameter or Size	Flange Type	Material		Nozzle Thickness		Reinforcement Material	How Attached		Location (Insp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
INLET	1	6" NPS	--	SA-106 GR. B	--	.719"	--	N/R	UW-16.1(A)	--	END
OUTLET	1	6" NPS	--	SA-106 GR. B	--	.719"	--	N/R	UW-16.1(A)	--	END
DRAINS	2	¾" NPS	--	SA-106,B	--	.154"	--	N/R	UW-16.2(K)	--	END
VENT	1	2" NPS	--	SA-106,B	--	.218"	--	N/R	UW-16.1(A)	--	END

20. Supports: Skirt NO (Yes or No) Lugs --- (No.) Legs --- (No.) Others --- (Describe) Attached --- (Where and how)

21. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report: (List the name of part, item number, mfg's. name and identifying number)

22. Remarks: AEROFIN SO# 998850-TRB-002
NTL= 10'-3"
HEAT EXCHANGERS CONTAINING SERIAL NO'S. 000201, 000202, & 000203 ALSO CONSIST OF (2) SECTIONS OF CONNECTING MANIFOLD PIPING (ONE- 6" NPS x .719" THICK, SA-106, GR. B PIPE AND TWO- 6" SCH. 160, SA-234, GR. WPB, ELBOWS EACH.)

CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1.

U Certificate of Authorization No. 2916 Expires OCTOBER 30 , 20 01

Date 2-25-00 Name AEROFIN CORPORATION (Manufacturer) Signed (Representative)

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or State or Province of VIRGINIA and employed by FACTORY MUTUAL INSURANCE CO. of JOHNSTON, RI have inspected the pressure vessel described in this Manufacturer's Data Report on 3-1 , 20 00 , and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 3-1-00 Signed (Authorized Inspector) Commissions NB 7822 VA 558 AIS (Nat'l Board incl. endorsement, State, Province and No.)

CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE

We certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms with the requirements of ASME Code, Section VIII, Division 1.

U Certificate of Authorization No. _____ Expires _____ , 19 _____

Date _____ Name _____ (Assembler) Signed _____ (Representative)

CERTIFICATE OF FIELD ASSEMBLY INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or State or Province of _____ and employed by _____ of _____ have compared the statements in this Manufacturer's Data report with the described pressure vessel and state that parts referred to as data items _____, not included in the certificate of shop inspection, have been inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel in accordance with ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of _____ psi. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date _____ Signed _____ (Authorized Inspector) Commissions _____ (Nat'l Board incl. endorsement, State, Province and No.)

TAPPI Steam & Power/Energy Management Committee

Officers:

- Chairman – Norris Johnston - Hercules
- Vice Chair – John Andrews – Mead-Westvaco
- Secretary – Dave Parrish – Factory Mutual
- Membership Chair – Jim Dickinson – B&W

Subcommittees:

- Recovery & Power Boilers – Alarick Tavares - GP
- Water Treatment– Jim Graham – Buckman Labs
- Energy– Tom Harriz – Jacobs
- Gasification – Jay Gregory – Longview Fibre

1

Membership:

85 members

- 23 Mill
- 18 Suppliers
- 20 Consultants
- 10 AE Firms
- 14 Other (University, Retired, Labs, etc.)

Subcommittee Breakdown:

Recovery & Power Boilers	43
Water Treatment	11
Energy	21
Gasification	10

2

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

3

Recovery Boiler – Current Activities:

- Stripping of Kraft Pulping Process Condensates – Regulations, Design & Operations
  - Being updated, 5-year mandatory review, nearly complete
- Collection and Burning of Concentrated NCG's – Regulations, Design, Operation
  - Being updated, 5-year mandatory review, nearly complete
- Recommended Test Procedures for Black Liquor Evaporators
  - New TIP to document test procedures for evaporators
  - Work just beginning
- Recovery Boiler Sootblowers – The Basics
  - New TIP (Sootblowers 101) - Alarick Tavares/Danny Tandra
  - Two TIP's – "The Basics" and "Practical Guidelines"
  - Drafts in-progress

4

Recovery Boiler – Current Activities:

- Guidelines for Replacement of Generating Bank Tubes with Expanded Joints in Two-drum Boilers
  - Being updated, 5-year mandatory review, nearly complete
- Specification for Procurement of Recovery Boiler Economizer
  - New TIP, Appendix 1 from recent AF&PA economizer study – Jack Clement, initial draft in-progress
- Guidelines for Operating and Maintenance Impacting Recovery Boiler Economizers
  - Also new TIP, Appendix 2 from recent AF&PA economizer study - Jack Clement, work just beginning

5

Recovery Boiler – Past/Recently Released TIP's

- Recovery Boiler Energy Efficiency Improvements
- Recovery Boiler Performance Calculation Forms
  - Long Form – Completed, in publication form
  - Short Form – Completed, published (includes spreadsheet)
- Effect of Composition on the First Melting Temperature of Fireside Deposits in Recovery Boilers
- K and Cl Measurement and Control in the Pulping & Recovery Cycle
- Composite Floor Tube Inspection Guidelines
- Tube Rolling Procedures and Quality Guidelines

6

Power Boiler – Current Activities:

- "Performance Test Procedure for Boilers Using Biomass as a Fuel"
- "Sampling Procedures for Biomass Fuel for Boiler Performance Testing"
  - Original TAPPI Technical paper, have been made into two separate TIP's – Jack Clement
  - Released, published, available from TAPPI

7

Water Treatment Activities

- Keys to Successful Cleaning of Boilers
  - Mandatory 5-year review
  - Reviewed, edited, to be released to TAPPI
- The A-B-C's of Ion Exchange
- Steam Purity
- Boiler Water Considerations: Start-Up, Shutdown, Out-of-Service Storage
  - Panel Discussion planned for 2009 TAPPI Conference
  - Possible TIP development
- Recovery Boiler Waterside Inspection
- Boiler Chemical Cleaning Frequency
- Condensate Monitoring and Control
  - Panel Discussion held at 2008 TAPPI Conference, Portland

8

Meetings:

- Twice/year
  - Fall Technical Conference + Spring
    - Next Meeting – April 8, 2009 - Atlanta (after BLRBAC)

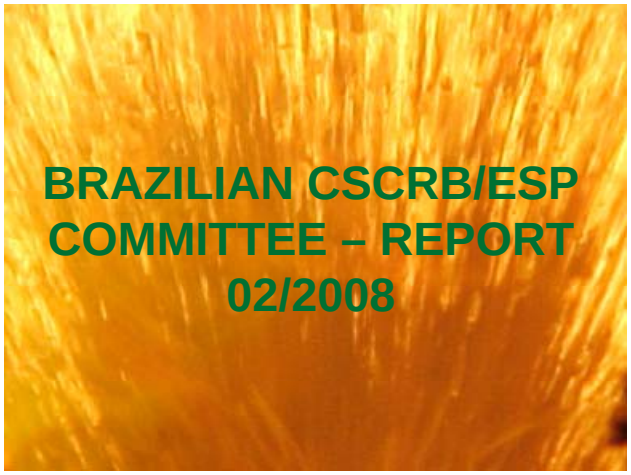
2009 TAPPI Engineering, Pulping & Environmental Conference

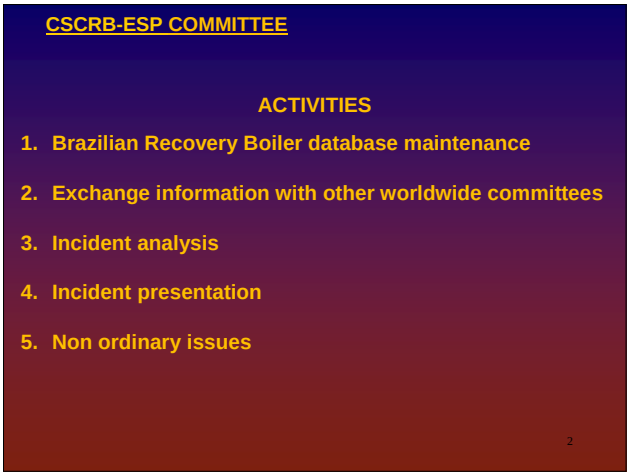
- October 11-14, 2009
- Memphis, TN
- Reyhaneh Shenassa, Metso – Steam & Power Program Chair

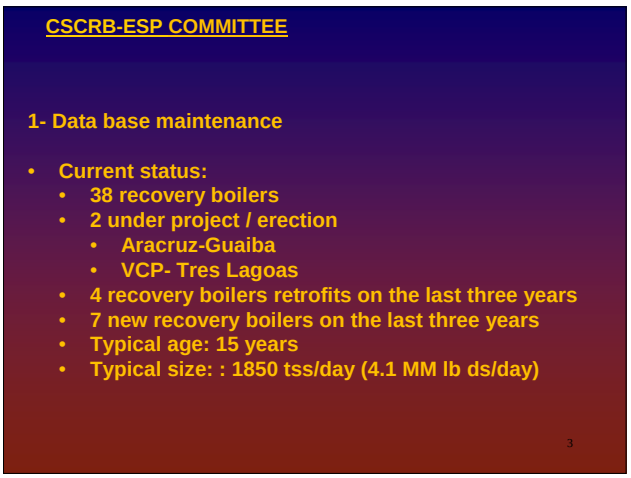
Requirements to Join?

- TAPPI Member
- Interest in working on activities of the Subcommittees

9


BRAZILIAN CSCRB/ESP COMMITTEE – REPORT 02/2008


CSCRB-ESP COMMITTEE
ACTIVITIES
1. Brazilian Recovery Boiler database maintenance
2. Exchange information with other worldwide committees
3. Incident analysis
4. Incident presentation
5. Non ordinary issues
2


CSCRB-ESP COMMITTEE
1- Data base maintenance
• Current status:
• 38 recovery boilers
• 2 under project / erection
• Aracruz-Guaiba
• VCP- Tres Lagoas
• 4 recovery boilers retrofits on the last three years
• 7 new recovery boilers on the last three years
• Typical age: 15 years
• Typical size: : 1850 tss/day (4.1 MM lb ds/day)
3

Appendix E – Report from Brazil (Continued)

CSCRB-ESP COMMITTEE – recovery boilers list

CSCRB - COMITE DESEGURANCA EM CALDEIRAS DE RECUPERACAO DO BRASIL SUB COMITE PARADA DE EMERGENCIA CADASTRO GERAL DE CALDEIRAS DE RECUPERACAO (ATUALIZADO EM 07/08)

#	Empresa	Fornecedor	Status	Start up (ano)	Reforma (ano)	Idade (anos)	Cap. (orig) (tss virgem /dia)	Cap. (real) (tss virgem /dia)	Pressao (bar)	Temp. (C)	Vazao processo (t/h)	Area (m2)	Ratio (tss/m2.dia)	Responsavel	Contato
1	Aracruz Celulose	Kvaerner	Em operação	2001		7	3440	3440	64	450	524	156,7	22,0	Juliano Takahashi	jtakahashi@aracruz.com.br
2	Aracruz Celulose	Kvaerner	Em operação	1991	2002	17	2200	3600	64	450	524	165,7	21,7	Juliano Takahashi	jtakahashi@aracruz.com.br
3	Aracruz Celulose	Andritz	Em operação	1997	2000	11	2200	2900	64	455	433	130,8	22,2	Juliano Takahashi	jtakahashi@aracruz.com.br
4	Aracruz - Guaiba	B&W	Em operação	2002		6	1950	1950	64	465	300	125	15,6	Humberto Batista	hlbatista@riocell.com.br
5	Aracruz - Guaiba	Metso	Em projeto	2010		0	6130	6130	94	490	1022	270,9	22,6	Daniel Sidoruk	dsidoruk@aracruz.com.br
6	Bahia Pulp	CBC	Em operação	1995	1999	13	750	900	63	450	130	45,63	20,9	Cristovao Santos	cristovao_santos@bahiapulp.com
7	Bahia Pulp	CBC	Em operacao	2008		0	3000	3300	85	490	494	149,2	22,1	Joao Gonchorosky	marivaldo_florentino@pec-tech.com.br
8	CENIBRA	CBC	Em operação	1977	2003	31	1440	1800	65	450	250	93,86	19,2	Julio Ribeiro	julio.ribeiro@cenibra.com.br
9	CENIBRA	CBC	Em operação	1992	2004	16	2050	2700	65	450	422	138,13	19,5	Julio Ribeiro	julio.ribeiro@cenibra.com.br
10	CENIBRA	CBC	Em operação	2006		2	3500	3500	66/86	450	524/515	189	18,5	Julio Ribeiro	julio.ribeiro@cenibra.com.br
11	COCELPA	Gotaverken	Em operação	1988		20	160	220	45	425	30	12	18,3	Pedro Dominques	pedro.dominques@cocelpa.com.br
12	Iguacu	São Caetano	Em operação	1972		36	104	104	16	204	24	17,2	6,0	Wilson Lopes	wilsonlopes@iguacucelulose.com.br
13	IP - Luiz Antonio	CBC/Andritz	Em operação	1991	2005	17	890	1550	64	450	245	66	23,5	Evaldo Verdille	edivaldo.verdille@ipaperbr.com
14	IP- Mogi Guaçu	B&W	Em operação	1976		32	187	320	29	350	28	14,04	22,8	Geraldo Ferreira	geraldo.ferreira@ipaperbr.com
15	IP - Mogi Guaçu	B&W	Em operação	1985	2006	23	950	1144	27,6	340	120	51,85	22,1	Geraldo Ferreira	geraldo.ferreira@ipaperbr.com
16	Jarí Celulose	B&W/Gotaverken	Em operação	1979	1988	29	1360	1750	59	450	276,12	89	19,7	Ricardo Cintra	rscintra@jari.com.br
17	Klabin-Correa Pinto	CBC	Em operação	1987	1992	21	580	750	85	480	110	49	15,3	Camilo Peter Hoss	choss@klabin.com.br
18	Klabin Telemaco	Gotaverken	Em operação	1977	2000	31	1100	1850	46	430	250	92,5	20,0	Marcelo Gasparim	gasparin@klabin.com.br
19	Klabin Telemaco	CBC	Em operação	2007		1	1700	1700	106	503	243	79,6	21,4	Marcelo Gasparim	gasparin@klabin.com.br
20	Klabin-Otacílio Costa	Gotaverken	Em operação	1987		21	330	230	42	400	47,4	24,11	9,5	Gilmar Packer	gpacker@klabin.com.br
21	Klabin-Otacílio Costa	CBC	Em operação	1998		10	1100	1050	89	483	170,2	69,1	15,2	Gilmar Packer	gpacker@klabin.com.br
22	Lwarcel	CBC	Em operação	2002	2008	6	700	826	85	480	120	44	18,8	Cesar Anfe	cesar@lwart.com.br
23	Nobrecel	Stein Robaix/CBC	Em operação	1999	2006	9	270	270	45	450	37	16	16,9	Braz Leopoldo	celulose@nobrecel.com.br
24	Orsa	CBC	Em operacao	2006		2	400	400	42	400	74	26	15,4	Yoshiro Nagao	ynagao@grupoorsa.com.br
25	Rigesa	B&W	Em operação	1987		21	250	250	43	370	35,4	18,3	13,7	Rudimar Klitzke	rudimar.klitzke@rigesa.com.br
26	Rigesa	Ahlstrom	Em operação	1999		9	850	600	64	460	126	47,4	12,7	Rudimar Klitzke	rudimar.klitzke@rigesa.com.br
27	Ripasa	Gotaverken	Em operação	1972		36	270	510	42	380	65	24,11	21,2	Hildomar Raimondi	rhildomar@arri.ripasa.com.br
28	Ripasa	Gotaverken	Em operação	1981	2000	27	270	510	42	380	65	24,11	21,2	Hildomar Raimondi	rhildomar@arri.ripasa.com.br
29	Ripasa	CBC	Em operação	2002	2007	6	1100	1200	46	400	180	69	17,4	Hildomar Raimondi	rhildomar@arri.ripasa.com.br
30	Suzano - Mucurí	Metso	Em operação	1992	2007	16	1750	3000	85	480	420	144	20,8	Geraldo Simao	geraldosimao@suzano.com.br
31	Suzano - Mucurí	Metso	Em operação	2007		1	4700	4700	85	484		251	18,7	Geraldo Simao	geraldosimao@suzano.com.br
32	Suzano - Suzano	Gotaverken	Em operação	1973	2004	35	670	811	50	380	110	49	16,6	Marcos Pessotta	mpessotta@suzano.com.br
33	Suzano - Suzano	CBC	Em operação	1987	2002	21	800	1400	50	420	218	64,1	21,8	Marcos Pessotta	mpessotta@suzano.com.br
34	Trombini	BW/Orcepa	Em operação	1989	2000	19	140	180	21	420	30	10	18,0	Alceu Scaramocin	ascramocin@fbo.trombini.com.br
35	VCP-Jacarei	CBC	Em operação	1994		14	1430	1990	90	470	240	101	19,7	Estanislau Zautautas	estanislauvz@vcp.com.br
36	VCP-Jacarei	CBC	Em operação	2002		6	2500	2990	93	480	360	149	20,1	Estanislau Zautautas	estanislauvz@vcp.com.br
37	VCP - Tres Lagoas	Metso	Em montagem	2008		0	5300	5500				242	22,7	Fernando Raash Pereira	fernando.pereira@vcp.com.br
38	Veracel Celulose	Kvaerner	Em operação	2005		3	4000	4000	93,6	490	630	210	19,0	Ari Medeiros	ari.medeiros@veracel.com.br
												3518,17	0,0		-
*	Valores médios	N/P		N/P	N/P	15,1	1593	1843	60	434	226	93	19	N/P	N/P

4

Appendix E – Report from Brazil (Continued)

CSCRB-ESP COMMITTEE

5

CSCRB-ESP COMMITTEE

2 - Exchanged information

- **BLRBAC: Received from Jansen Spring/2008 incidents summary**
- **SNRBC: Received report issued on Feb/2008**
- **FRBC: Received report issued on May/2008**

6

CSCRB-ESP COMMITTEE

3 - Incident analysis:

We use four different classifications:

- **Critical**
- **Not critical**
- **Dissolving tank explosion**
- **Accident: When people or the recovery boiler itself were under risk, independent of leakages consideration.**

7

CSCRB-ESP COMMITTEE – event list

3 – Reported incidents

- **Two minor economizer tube failures**
- **One evaporator tube cracking**
- **One damaged furnace floor by slumped rock**
- **One smelt spout leakage with water entering furnace, followed by and ESP. No explosion**

8

CSCRB-ESP COMMITTEE – event list

4 - Incident presentation

- **VCP Evaporator leakage**

9

Appendix E – Report from Brazil (Continued)

Votorantim | Celulose e Papel

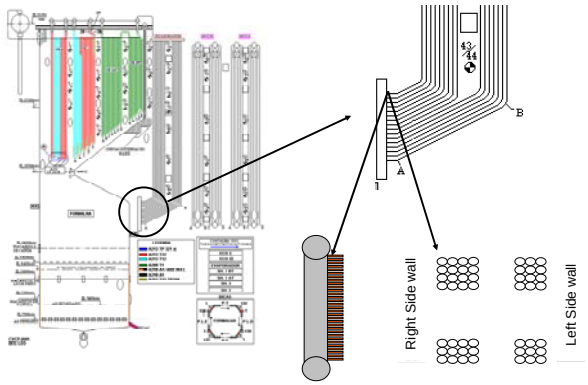
Recovery Boiler information

- Location: Votorantim Pulp & Paper – Jacarei – Sao Paulo – Brasil
- Unit: CBC/Mitsubishi – Single drum, 1 Evaporator, 2 Economizers
- Size: 4.4 MM lb ds/day; 485,000 lb/hr steam at 1200 psig; 905º F
- Start up: 1994 – last full inspection (before incident): August 2007
- Incident date: 24/july/2008
- Leak detection: No
- Downtime (hrs): 24
- Sequence: on july 23, during inspection routine by the area operator, he saw water dripping out of the Evaporator hopper / ash screw. He contact DCS operator to inform the problem and start investigation. We didn't have any indication from the process parameter (DCS trends).

2

Votorantim | Celulose e Papel

Low Vertical Coletor of the Evaporator RB#3



Votorantim | Celulose e Papel

General information

- 1. In every outage Inspection Company makes thickness measurements on tubes and headers of the panels of Evaporator and Economizers, where they may have access conditions, in other words, only on the bottom tubes of the panels.
- 2. Regarding to others tubes (unaccessable) inspection are only visual, from the latest tubes (2m).
- 3. To access the upper part of panels it was needed to cut casing plate and the space is too restrict.
- 4. Because of this incident, we did a visual inspection and PT on all upper tubes (during August 2008 outage) and found another tube on the other side that could fail in a short time.
- 5. To conduct this inspection, we need to carefully follow safety procedures due to the risk of falling stones from the upper parts.

4

Votorantim | Celulose e Papel

Photografic report

Crack with extension of half perimeter of the tube.

5

Votorantim | Celulose e Papel

Photografic report

Detail of the crack opening of the first tube to be repaired

Detail of repair of the first two tubes

6

Votorantim | Celulose e Papel

Final Comments

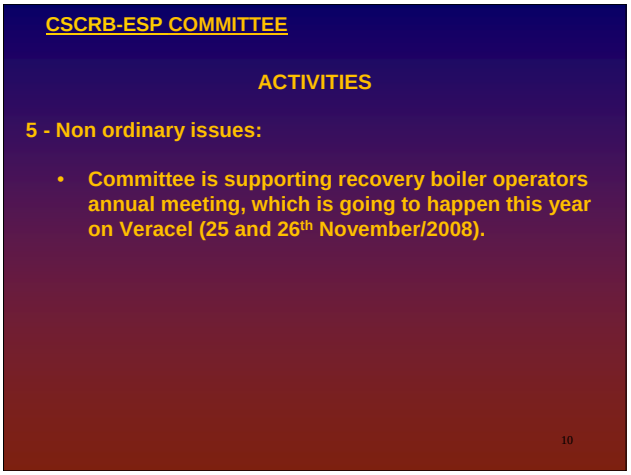
Records:

- 24/july – 04h10: start boiler shut down for cooling and draining of the Evaporator and release for maintenance.
- 24/july – 23h26: Conclusion of the Hydro test at operation pressure.
- 25/july – 01h10 – 04h20: restart of the boiler.

Notes:

- 1. We supose the root cause of the crack was due to stress welding fatigue.
- 2. For the next outage we will continue perfoming the visual and PT inspections on those tubes. It means we will remove partially the casing to have access in both sides of this area.
- 3. In 2008 outage we replaced both nipples that had failed in July 2008.

7 Voltar


CSCRB-ESP COMMITTEE
ACTIVITIES
5 - Non ordinary issues:
• Committee is supporting recovery boiler operators annual meeting, which is going to happen this year on Veracel (25 and 26th November/2008).
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BRAZILIAN CSCRB/ESP COMMITTEE WELLCOME BLRBAC MEMBERS TO VISIT OUR SITE:
ABTCP
WWW.ABTCP.COM.BR
AND THANK FOR THE OPPORTUNITY TO PRESENT IN 2008 FALL MEETING