BLACK LIQUOR RECOVERY BOILER
ADVISORY COMMITTEE

MINUTES OF MEETING
Crowne Plaza Hotel/Atlanta Airport
Atlanta, Georgia
March 26, 27 & 28, 2007

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 (new)
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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

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BLRBAC SUBCOMMITTEES

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BLRBAC MEETING SCHEDULE

Fall	**October**	**1, 2 & 3**	**2007**
Spring	**April**	**7, 8 & 9**	**2008**
Fall	**October**	**6, 7 & 8**	**2008**
Spring	**April**	**6, 7 & 8**	**2009**
Fall	**October**	**5, 6 & 7**	**2009**

"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 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

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 Joint BLRBAC Meeting on Wednesday

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

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fhholich@aol.com

BLRBAC Publications

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

Recommended Practices by BLRBAC

Fire Protection in Direct Contact Evaporators and Associated Equipment
(April 2007)

Safe Firing of Black Liquor in Black Liquor Recovery Boilers
(October 2006)

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

Post ESP Water Level
(January 2005)

Emergency Shutdown Procedure (ESP)
(October 2006)

Checklist and Classification Guide for Instruments and Control Systems
(October 2004)

Personnel Safety & Training
(April 2004)

Post ESP Guidelines
(October 2002)

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

Waste Stream Incineration
(October 2006)

If you have any questions, contact:

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NOTES:

1. Spring 2007 Meeting attendance was not reported
2. This Subcommittee does not plan on meeting in the fall of 2007. Their next meeting is scheduled for the spring of 2008 at 1:00 PM as an "open" meeting.

EMERGENCY SHUTDOWN PROCEDURES SUBCOMMITTEE

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Ralf Holm of Andritz substituted for John Phillips

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No Meeting held in spring of 2007

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Wendy Coyle* Weyerhaeuser Postal Bag 1020 Grande Prairie, Alberta Canada T8V 3A9 Tel: 780-539-8183 Fax: 780-539-8344 **wendy.coyle @weyerhaeuser.com**	E. Scott Crysel* FM Global Granite Park One Plano, TX 75024 Tel: 972-731-1658 Fax: 972-731-1820 **scott.crysel@fmglobal.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: 864-281-8535 Fax: 864-676-7630 **john.lewis@fluor.com**	Wayne MacIntire* International Paper P.O. Box 7910 Loveland, OH 45140-7910 Tel: 513-248-6834 Fax: 513-248-6679 **wayne.macintire@ipaper.com**

* = Attended 03/2007 Meeting

WASTE STREAMS SUBCOMMITTEE (Cont.)

Rob Orender Georgia Pacific Corp. 133 Peachtree Street, 18th Floor Atlanta, GA 30303 Tel: 404-652-4606 Fax: 404-584-1466 **rhorende@gapac.com**	Winston "Jerry" Pate* Smurfit Stone Container Corp. P. O. Box 709 Brewton, AL 36427 Tel: 251-867-8371 Fax: 251-867-1153 **wpate@smurfit.com**	Jean-Claude Patel A.H. Lundberg Associates, Inc. 406 Sagebrush Road Naperville, IL 60565 Tel: 630-355-5120 Fax: 630-355-5120 **jc.patel @lundbergassociates.com**
Paul Seefeld A.H. Lundberg Associates, Inc. 4577 Pebble Brook Drive Jacksonville, FL 32224-7643 Tel: 904-223-4147 Fax: 904-223-4146 **paul.seefeld @lundbergassociates.com**	H. Bentley Sherlock* Babcock & Wilcox 2302 Parklake Drive. N.E. Suite 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 Fax: 888-964-7348 **michael_sides@swissre.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**		

* = Attended 03/2007 Meeting

Registered for the meeting were:

Acuren Inspection
Cooper, Mike, North Charleston, SC

Alabama Pine Pulp
Browning, John, Perdue Hill, AL
Davis, Greg, Perdue Hill, AL
Moyer, Scott, Perdue Hill, AL

Alberta-Pacific Forest Industries
Manzulenko, Greg, Boyle Alberta, AB

Alstom Power
Gibowski, Steve, Pensacola, FL
Harbach, Paul, Suwanee, GA
Kistka, Gerry, Jacksonville, FL
Young, Frederick, Chattanooga, TN

American Forest & Paper Assoc.
Grant, Thomas, Yonkers, NY

Andritz, Inc.
Grace, Todd, Roswell, GA
Kujanpaa, Olli, Roswell, GA
Peltonen, Kimmo, Roswell, GA
Phillips, John, Roswell, GA
Sopanen, Jari, Roswell, GA

Applied Technical Services
O'Connor, Shawn, Riau Prima Energi

Babcock & Wilcox
Alesandrini, John, Barberton, OH
Blazer, Phil, Charlotte, NC
Dickinson, Jim, Barberton, OH
Hiner, Larry, Barberton, OH
Kulig, John, Barberton, OH
Lance, Gail, Barberton, OH
Osborne, Steve, Barberton, OH
Pon, Ronald, Napa, CA
Sherlock, H. Bentley, Atlanta, GA
Yash, John, Atlanta, GA

BE&K Engineering
Keane, Jim, Birmingham, AL

Boise Cascade
Blaylock, Tommy, Jackson, AL
Bryant, Sylvester, Jackson, AL
Erickson, Leonard, Boise, ID
Holmes, Don, Wallula, WA
Logdahl, Roger, International Falls, MN

Buckeye Technologies
Streit, David, Perry, FL

Buckman Laboratories
Borsje, Henk, Duxbury, MA
Cui, Marta, Memphis, TN
Graham, James, Memphis, TN
Olavessen, Len, Memphis, TN

CNA Risk Control
Walker, Billy, Apex, NC

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

Clement Consulting
Clement, Jack, Akron, OH

CORR System, Inc.
Ruiz de Molina, Eladio, Birmingham, AL

Diamond Power
Adams, Jason, Lancaster, OH
Kaminski, Bob, Lancaster, OH
McAllister, Phil, Lancaster, OH

Domtar
Gore, Chris, Bennettsville, SC

DTE Energy Services, Inc.
Dietel, Chris, Atlanta, GA

Registered for the meeting were:

Envirocare International
Rundqwist, Magnus, American Canyon, CA

Fluor Corp.
Lewis, John, Greenville, SC

FM Global
Hoffman, Daryl, Prosper, TX
Parrish, David, Norwood, MA
Polagye, Mike, Norwood, MA
Beaulieu, Andre, Montreal, QU
Chuchro, Dan, Richmond, VA
Cooke, Craig, Oconomowoc, WI
Cooper, Mark, Stockholm, Sweden
Judge, Chris, Manchester, UK
Lang, Dave, Plano, TX
Lemay, Brian, Thornhill, ON
Matarrese, Rick, Alpharetta, GA
Morgan, Rick, Plano, TX
Onstead, Jimmy, Plano, TX

Fossil Power Systems
Donahue, Mark, Dartmouth, NS
Stott, Tim, Dartmouth, NS

GA Dept. of Labor
Everett, Earl, Atlanta, GA
Welch, Paul, Atlanta, GA

GE GAP Services - Swiss Re
Franks, James, Somerville, TN
Rawls, Lynn, Perkinston, MS
Sides, Michael, Ocoee, FL

GE Water
Whittaker, Scott, Bedford, NH

General Reinsurance Corp.
Freeman, Stuart Jr., Atlanta, GA

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

Georgia-Pacific
DeCarrera, Robert, Atlanta, GA
Morency, Karl, Atlanta, GA
Tenbrunsel, Robert, Atlanta, GA

Glatfelter Co.
Gentzler, William, Spring Grove, PA
Snyder, Steve, Spring Grove, PA

Global Risk Consultants
Jackson, Christopher, Beaverton, OR
Smith, Andy, Atlanta, GA

GP Cellulose/Brunswick Cellulose
Lane, Terry, Brunswick, GA

Graphic Packaging International
Dickerson, Randall, West Monroe, LA
Harlow, Todd, West Monroe, LA

Hartford Steam Boiler
Garfield, Michael, Lowell, ME
Ledlow, Larry, Loxley, AL

Hercules
Durham, Virginia, Philadelphia, PA

HSB Group
Hess, Ron, Buckhead, GA

Indigo Technologies
Shanahan, Dennis, Pittsburgh, PA

International Paper
Christian, Phillip, Riceboro, GA
Clay, Dean, Loveland, OH
Coleman, Hamilton, Savannah, GA
Fuhrmann, Dave, Loveland, OH
Kiper, Mike, Loveland, OH
MacIntire, Wayne, Loveland, OH
Phillips, Pete, Savannah, GA
Pitts, Keith, Riceboro, GA
Sargent, Mark, Loveland, OH

Registered for the meeting were:

Interstate Paper Corp.
Smith, Joe, Riceboro, GA

Jacobs Engineering
Rickard, John, Greenville, SC

Jansen Combustion/Boiler Technologies
Dye, Ned, Kirkland, WA
Verloop, Arie, Kirkland, WA

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

Kapstone Paper & Packaging
White, Ben, Roanoke Rapids, NC

K-Patents, Inc.
Gronowski, Eric, Naperville, IL
Hamalainen, Arto, Naperville, IL
Pyorala, Keijo, Naperville, IL

Lewis B. Bringman
Bringman, Lewis, Baltimore, MD

Lincoln Paper & Tissue
Davis, Tim, Lincoln, ME
LaFlamme, Alan, Lincoln, ME

Liquid Solids Control
Sweeney, Michael, Upton, MA

Longview Fibre
Berg, Greg, Longview, WA
Gregory, L. Jay, Longview, WA

Lumbermen's Underwriting Alliance
Correa, Tony, Boca Raton, FL

Matrix Risk Consultants
Hayes, Michael, Miamisburg, OH

MeadWestvaco
Andrews, John, Charleston, SC
Manion, Jamison, Glen Allen, VA
Mohr, Andrew, N. Charleston, SC

Metso Power
Abrams, Larry, Charlotte, NC

Metso Power
Brunetti, Louis, Charlotte, NC
Christiansen, Gene, Charlotte, NC
Cross, Tom, Charlotte, NC
Hughes, Riley, Charlotte, NC
Langstine, Bob, Charlotte, NC
Morgan, Preston, Charlotte, NC
Morris, Richard, Charlotte, NC
Nichols, Jody, Charlotte, NC
Wasson, Eric, Charlotte, NC
Weikmann, John, Charlotte, NC

Nalco
Totura, George, Naperville, IL

National Board of BPVI
Bynog, George, Columbus, OH

Neenah Paper
Fry, Robert, New Flasgow, NS

NewPage Corp.
Fornetti, Michael, Escanaba, MI

Packaging Corp. of America
Ferrell, Larry, Valdosta, GA
Parks, Kurt, Valdosta, GA
Stelling, John, Tomahawk, WI
Wurster, Jim, Tomahawk, WI

Power Specialists Assoc. Inc.
Haraga, Rudy, Somers, CT
Madersky, Tom, Somers, CT
Zawistowski, Bob, Somers, CT

Process Equipment/Barron Industries
Ray, Allen, Pelham, AL

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

Registered for the meeting were:

RiNan, Inc.
Pothier, Richard, Peabody, MA

RMR Mechanical
Roy, Bob, Cumming, GA

Rock-Tenn Company
Chambless, Tony, Demepolis, AL
Von Oepen, David, Demepolis, AL

sappi Fine Paper
Aderman, Craig, Westbrook, ME
Boudreau, David, Fairfield, ME
Dorko, Bob, Skowhegan, ME
Estment, Arthur, Johannesburg, So. Africa
Merriman, Nick, Johannesburg, So. Africa
Moran, Stephen, Skowhegan, ME

Savcor Consulting
Duda, Yurij, Vancouver, BC
Huttunen, Martti, Vancouver, BC

Simpson Tacoma Kraft Co.
Fay, Michael, Tacoma, WA

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

Smurfit-Stone Container
English, Phil, Jacksonville, FL
Lykins, Michael, Carol Stream, IL
Mills, Drexel, Missoula, MT
Pate, Jerry, Brewton, AL
Phelps, Bob, Hopewell, VA
Renwick, John, West Point, VA
Zeh, Jay, Hopewell, VA

Southeastern Mechanical Services
Moore, Ronnie, Trenton, GA

Southern Environmental
Hayes, Charles, Pensacola, FL
Shepherd, David, Pensacola, FL

Stora Enso
Burkhardt, Marty, Wisconsin Rapids, WI
Hanneman, Doug, Wisconsin Rapids, WI
Pasel, Dan, Wisconsin Rapids, WI

Team Industrial Services
Flynn, Thomas, Lakeland, FL
Rackley, Jack, Charleston, SC

Temple-Inland
Ja'arah, Majed, Orange, TX

Thilmany LLC
Glasheen, Mike, Kaukauna, WI
Szczepanik, Mark, Kaukauna, WI

Verso Paper
Taff, Paul, Norway, MI

Welding Services. Inc.
Yepez, Luis, Norcross, GA

Weyerhaeuser
Avery, David, Bennettsville, SC
Barreca, Cliff, New Bern, NC
Beder, Hank, Federal Way, WA
Burnette, Richard, Oglethorpe, GA
Cahoon, Kari, Plymouth, NC
Coyle, Wendy, Grande Prairie, Alberta
Knowlen, Bruce, Federal Way, WA
Slagel, David, Savannah, GA
Worsham, Jesse, Bennettsville, SC

Young Technical Services
Crone, Jim, Mempis, TN

Zampell Refractories
Barrett, Lynn, Tampa, FL
Heffernan, John, Warrington, PA

INTRODUCTION

BLRBAC's Chairman, Len Erickson, called the meeting to order at 8:00 a.m. on Wednesday, March 28, 2007

CHAIRMAN: This is the Main Business Meeting of the Black Liquor Recovery Boiler Advisory Committee. First of all, I'm Len Erickson. You voted me in as Chairman last fall.

We have a several votes to take care of today. As a matter of record, those members who have a red ribbon are the company representatives. When we take a vote we will ask them to stand and then they can raise their hands "aye" or "nay" at that time. Also as a matter of courtesy, if you have cell phones, either please put them in the "silent" position or turn them off. They were fairly disruptive during some of the meetings yesterday.

I would first like to introduce the Executive Committee. Starting with the Vice Chair, Scott Moyer; the Secretary, Mike Polagye; the Treasurer, Ron Hess; the Manufacturers' Representative, Jim Dickinson; the Owners' Representative, Dave Fuhrmann; and the Insurance Representative, Jim Onstead.

OLD BUSINESS

ACCEPTANCE OF THE SPRING 2006 MEETING MINUTES – Len Erickson

The Minutes from the fall 2006 meeting were posted on the Web site. Hopefully everyone has had a chance to review those. Are there any comments, corrections or additions to those Minutes? Would someone like to present a motion to approve the Minutes? Is there a second? All in favor say "Aye"? "Opposed"? Thank you. The fall 2006 Meeting Minutes were accepted and approved as written.

NEW BUSINESS

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

   BLRBAC received one application for new membership. It was from Savcor Consulting, Inc. They are located in Vancouver, BC. In their documentation to BLRBAC, Savcor indicated that they have expertise in the design and development of corrosion probes and have been involved in supporting the pulp and paper industry for more than 20 years. The Executive Committee voted to accept them as Associate Members.

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

NEW REGULAR MEMBERSHIP - none

NEW ASSOCIATE MEMBERSHIPS

Savcor Consulting, Inc.
Martti Huttunen is the designated Associate Representative
Duda Yurij is the designated Alternate Associate Representative

NEW CORRESPONDING MEMBERSHIPS - None

REGULAR REPRESENTATIVE CHANGES

Abitibi Conolidated
Larry Gustafson replaced Fred Hnatuk as designated Representative
Denis Berube replaced Dany Larochelle as designated Alternate Representative

Alabama River Pulp
Scott Moyer replaced Chris Needham as designated Representative
John Browning replaced Bruce Gornto as designated Alternate Representative

General Reinsurance Corporation
Per Hellstrand replaced Stuart Freeman as designated Representative
Daniel Forehand replaced Per Hellstrand as designated Alternate Representative

Longview Fibre Paper and Packaging, Inc.
Jay Gregory replaced Greg Berg as designated Representative

ASSOCIATE REPRESENTATIVE CHANGES

BE&K Engineering
Jim Keane replaced Don Beebe as designated Associate Representative
Barry Seidel replaced Billy Davis as designated Alternate Associate Representative

CORRESPONDING MEMBERSHIP CHANGES -None

MEMBERSHIP COMPANY NAME CHANGES

Clyde Bergemann Environmental Elements Corporation
(Clyde Bergemann EEC for short**)**
Previously did business as Environmental Elements Corporation

GP Cellulose, LLC
Previously did business as Koch Cellulose, LLC

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

Metso Power
Previously did business as Kvaerner Power

Team Industrial Services
Previously did business as Cooper Heat MQS

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

The Executive Committee met on Tuesday afternoon with all members present and went over a number of items. First we discussed archiving issues. Currently we have a storage area that we rent where we save old records, incident reports, many minutes, etc. We are going to review to see if we need a records retention policy. I'll be following up on that. There was a request apparently for some old Recommended Practices dating back to the '70's. The Executive Committee discussed this request and decided that we don't need formal archiving and it has not been our intent to have an archive of all past and present BLRBAC Recommended Practices. However this decision is subject to reconsideration based on the pending the review of the need for a policy.

There was extensive discussion the ESP Subcommittee brought up that in the event that you have a furnace pressure trip and your drum level falls, should there be an interlock that automatically puts the feedwater control to "manual" and shuts the valve, preventing a large amount of water from potentially entering the furnace in the event the upset was the result of a tube rupture in the furnace area, and forcing the operator to make the decision to manually open the valve. What we would like to do this morning is get an informal, non-binding, informal opinion by vote of the members on whether they think this is a thing that BLRBAC should be proceeding on. There has been a tremendous amount of discussion both in the Subcommittees and in the Executive Committee and we'd just like to get feedback from the operators on this subject. So will those who think this type of control situation is a good thing to explore and potentially include after due process, show hands. Those that think this is something beyond what should be considered and we should not be pursuing this, show hands. We have about an even split – seven in favor and eight saying not necessary. The Executive Committee will take your feedback under advisement and make a recommendation.

Last fall the ESP Committee formed a Stand-alone Committee to look at ESP systems, be they hard wired or logic. They made a recommendation that was forwarded to the ESP Subcommittee. There has been a tremendous amount of discussion. It was again discussed within the Executive Committee yesterday evening. The Executive Committee noted that the Stand-alone Committee had made their recommendation as they were chartered and had given that to the ESP Subcommittee to implement. We would like to see that process brought to a completion point before other options are considered.

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

At this point it is in the ESP Subcommittee's hands to implement that recommendation as the Stand-Alone Task Group chartered it for them and they will be working on language to conform with that recommendation from the task force.

AF&PA brought up to the Executive Committee the desirability of having a Water Treatment Subcommittee. Again we have had discussions within the industry and between ourselves. I am appointing a working task force to look at that issue, recommend if it should proceed forward and, if so, prepare an outline of what the goals of that subcommittee would be and what its structure would be. They will report back to the Executive Committee at the fall meeting and at that time we'll determine whether or not to establish a Water Treatment Subcommittee.

3. **TREASURER'S REPORT** – Ron Hess

For this meeting we had 156 Advance registrants and 37 At-Door. As was done last fall, Barbara of Said & Done was asked by the Executive Committee to send confirmation e-mails to all Advance registered attendees. Confirmation can only be sent to those who have clearly included their e-mail address on the Registration Form. So if you have sent your check in and you don't get an e-mail confirmation back from her, then around the registration date or just prior to the meeting you should be following up with her so you don't get surprised by having to pay the At Door registration fee. We have received feedback from a number of attendees that they like receiving the confirmation that the advanced registration has been processed and the check received.

The 193 registered attendees represent 28 paper companies; eight insurance companies; four manufacturers; 30 associate members, and three guests. We would also like to thank our overseas country attendees. This meeting we have representatives from Brazil, Colombia, France, Indonesia and South Africa. Again, we appreciate their attendance in traveling that distance to come here to participate.

On the financial side, we continue to have the two accounts that we maintain.

- Certificate of Deposit Account -- $13,500.00 approximately
- Checking Account -- $47,000.00 before we pay bills for this meeting

The Executive Committee has approved the 2007-operating budget. On the IRS side our 501C6 status as a not-for-profit organization has been renewed and all the forms have been submitted to the IRS. We have to do a tax filing each year to maintain that Not For Profit status. Lastly we renewed the contract with this hotel for 2008 and 2009. So we will be here through 2009. If anyone has any feedback on dealing with the hotel or issues like that or anything related to the financial side, please let me know. Every meeting I ask for a volunteer to learn how to do this job and nobody and nobody has stepped forward; so I'll be here for another meeting or two.

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

When scheduling BLRBAC meetings, we try to hold them Monday through Wednesday during the first week of April for the Spring Meeting and the first week of October for the Fall Meeting. However, as we did for this meeting, we vary from that when practical to avoid conflicts with religious days or public holidays. Looking forward, the next conflict is in 2010 when we will move the Spring Meeting to the second week in April (April 12-14, 2010) so that the meeting does not start on the day after Easter. But that's not until 2010. So, from our next meeting in October until then we will be meeting on our traditional weeks.

Barbara Holich received an unusual number of checks for this meeting directly from Finance Departments without an accompanying registration form. She then had to send an e-mail to the designated representative for that company and ask for their assistance in tracking down who the check was intended to cover and then getting those individuals to submit a completed registration form. In this day of reduced personnel and centralized check processing, it may be difficult for some of you to keep your registration and check together, but on behalf of Barbara, I request you do what you can. It makes things much easier for her when the registration form and check arrive together. If you know your finance people are likely to send the check out directly, please supply them with a completed registration form to accompany the check or you may wish to send an e-mail to Barbara with your registration form attached and a note that you expect the check to be arriving separately. You will know that she has received your check when she sends you the confirmation notification via return e-mail.

A few people have been having trouble when sending e-mails to Barbara. They don't get a failure to deliver message, and she doesn't get the e-mail. We suspect it may be the result of a very aggressive spam filter used by AOL. Barbara and Frank Holich will be checking into this after this meeting. It may be just a matter of going into the "spam addresses" for their account and removing legitimate ones from the list. In the meantime, if you send e-mail to Barbara, you are welcome to copy me and I will follow-up with her to confirm she has received it.

4.A 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.**

Anyone who wishes to be added or deleted from the BLRBAC e-mail list, please e-mail me (fhholich@aol.com) your intentions. Include your name, company and e-mail address.

4.**A SECRETARIAL SERVICES REPORT** (cont.)

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 address book.

Therefore, be sure that I have your current working e-mail address. BLRBAC notice of meetings and meeting minutes will only be sent via e-mail. If an e-mailed notice is returned to me as "undeliverable," that e-mail address will be deleted from the BLRBAC database after a second attempt has been made. 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. Despite the comment on the Registration Form not to fax me registration forms, before every meeting I received five or more faxed documents. Be advised that these faxed registration forms are of no use to me until the appropriate fees are paid. Therefore**,** please **DO NOT FAX REGISTRATION FORMS!!** The only exception would be when, as Mike stated in his report, you suspect your check may get mailed to me separately. In such cases, please include a cover page explaining why you've faxed the registration form to me.

5. **SUBCOMMITTEE REPORTS**

5.1 **AUXILIARY FUEL REPORT –** Dave Streit

The Auxiliary Fuel Subcommittee met in open session on Monday afternoon in the Hepburn Room. There were 5 members/alternates and 8 guests present at the meeting. One of the guests, Mr. Nick Merriman with Sappi Forest Products, requested, and was accepted as a member of the subcommittee.

No meeting of this subcommittee was held during the Fall 2006 meeting, therefore the "old business" on our agenda was to review and resolve any questions resulting from the proposed changes to our document posted on the BLRBAC web site.

5. **SUBCOMMITTEE REPORTS** (cont.)
   5.1 **AUXILIARY FUEL REPORT** (cont.)

The proposed changes to our document included approximately 11 items that all addressed making our document consistent with other BLRBAC documents, or to correct typographical errors or missing information. Six of the proposed changes were made to be consistent with the Fire Protection of Direct Contact Evaporators document, 2 changes were proposed to be consistent with the Instrumentation Check List, and 3 changes addressed typographical errors/ missing data from our document. In addition, 6 recommendations were forwarded to the Instrumentation Subcommittee proposing changes to their document for consistency and to bring it up-to-date.

One comment was received from the Executive Committee regarding the proposed changes to our document that requested better clarification for the application of the "High Precipitator Inlet Temperature" trip and alarm. And although their question specifically addressed the new high precipitator inlet trip and alarm, the same question actually applies to the existing high precipitator outlet trip and alarm as well.

Paragraph 6.1.6 on page 65 of our document (as posted on the website for review and comment) describes the applicability of the high precipitator inlet and outlet temperature trips and alarms. This paragraph clarifies these trips and alarms apply only to precipitators downstream of direct contact evaporators and to units with precipitators constructed of combustible material.

It was agreed by the subcommittee that for better clarification, a footnote will be added at the appropriate location(s) in Chapter 5 of our document that is referenced by the high precipitator inlet and outlet temperature trips and alarms. The footnote will state, "Applies only to direct contact evaporator units or units with precipitators constructed of combustible material". The foot note will be referenced in section 5.2, "Recommended Alarms for Auxiliary Firing", by items 20 "Precipitator Outlet Temperature High Trip", and 21 (new) "Precipitator Inlet Temperature High Trip". The footnote will also be referenced in section 5.3, "Other Audible Alarms and Visual Indicators", by items D 15 "Precipitator Outlet Temperature High", and D 16 (new) "Precipitator Inlet Temperature High".

There was discussion regarding a vote during the general session for approval of the posted recommended changes. It was agreed by the subcommittee that a vote should be called, as there were no questions and/or comments that would change the technical content of the proposed changes. The Executive Committee concurred at the Executive Committee/ Subcommittee Chairman's meeting Monday afternoon.

There were no more issues or concerns, therefore the meeting was adjourned. No meeting is planned for the Auxiliary Fuel Subcommittee at BLRBAC's next meeting in October, so the next meeting of the Auxiliary Fuel Subcommittee will be held in a year, during the spring 2008 BLRBAC meeting.

5. **SUBCOMMITTEE REPORTS** (cont.)

5.1 **AUXILIARY FUEL REPORT** (cont.)

Following the Auxiliary Fuel Report during the General Session, a vote was held for approval of the changes to the Auxiliary Fuel document as posted on the BLRBAC web site with the recommended changes as discussed above. All recommended changes were unanimously approved.

Following the vote, there was discussion regarding the value of carbon monoxide data being used as an operator verification step during the purge process. The concern expressed was most boilers have carbon monoxide instrumentation with a range suitable for environmental control purposes only. The upper limit of these instruments is typically around 1000 ppm, which is substantially less than the lower explosive limit of carbon monoxide (around 125,000 ppm). Therefore the information provided by this instrumentation is of little or no value to prove adequate purge. If this information is used, the purge time can be significantly increased.

The Auxiliary Fuel Document currently includes an operator verification step to evaluate oxygen and combustibles following a purge before lighting off the first burner. The third bullet item of 4.1 "Purge of Recovery Boiler" (page 21 in the document) states; "Purge air should be maintained for at least five minutes and until satisfactory level of oxygen is indicated by furnace instrumentation. If carbon monoxide or combustible instrumentation is provided, verify level is satisfactory".

The oxygen and combustibles verification step is not intended to be a hard interlock, but operators looking at available information for abnormalities. Carbon monoxide/combustibles instrumentation is not required, and if provided, each plant should determine if the data provided, based on instrumentation range, is meaningful relative to purge, and how and if the data should be used.

The Auxiliary Fuel Subcommittee is not scheduled to hold a meeting in the fall of 2007.

Further discussions regarding the carbon monoxide/combustibles will be continued at the next scheduled subcommittee meeting, which will be an "open meeting" in the spring of 2008 starting at 1:00 p.m.

5.2 **BLACK LIQUOR REPORT** – Mark Sargent

The morning meeting was convened at 8:30 AM with 9 members and approx. 20 guests. The afternoon session was convened at 1:00 PM with 7 members and approx. 20 guests.

AGENDA:

1. Reviewed the Fall 2006 meeting minutes.

2. Reviewed questions and/or clarifications received from member companies since the

5. SUBCOMMITTEE REPORTS (cont.)

5.2 BLACK LIQUOR REPORT (cont.)

Fall 2006 meeting or assignments to Subcommittee members:

- There was discussion from the Fall 2006 meeting as well as one question from an overseas consultant regarding purge requirements as it relates to combustibles/CO levels in the recovery furnace after a boiler trip. In conference with the Safe Firing of Auxiliary Fuel Subcommittee and the Insurance representative on the Executive Committee we feel that there is no justification to make changes to the permissive starting logic as it relates to combustibles/CO levels prior to initiating auxiliary fuel firing. There have been no reported recovery boiler incidents following a successful boiler trip and subsequent successful boiler purge. Both SFBL and SFAF agree that the operator check off for acceptable oxygen and combustibles levels is sufficient. See Chapter 4 of the Safe Firing of Auxiliary Fuel for further explanation on sufficient oxygen and safe combustibles levels.

- We have submitted language to the Executive Committee that will be posted on the BLRBAC Website that is consistent with recent changes to the document requiring proof of spout cooling water flow not low and adequate dissolving tank level prior to a black liquor header purge. The language to be posted on the BLRBAC Website for review and comment and to be voted on at the Fall 2007 meeting reads as follows:

- At the Fall 2006 meeting language was submitted to the Executive Committee and requested to be voted on regarding automatic purging of black liquor sub-headers. The vote to accept the recommended language failed to pass. The Safe Firing of Black Liquor Subcommittee has subsequently reworded the language and re-submitted it to the Executive Committee. The reworded language in the document advises owners and operators of recovery boilers of the possibility that unknown liquids can be contained in un-purged sections of the black liquor firing system and that proper operating procedures should be developed to address these concerns. Pending Executive Committee approval, the language to be posted on the BLRBAC Website for review and comment and voted on at the Fall 2007 meeting and reads as follows:

- The SFBL Subcommittee has discussed the need to add proof of satisfactory spout cooling water flow and proof of dissolving tank level as permissives to purge recovery boilers. The request (received from the Executive Committee) was made to determine if there was a need to ensure these permissives are met to avoid any potential of either overheating the spouts while on auxiliary fuel firing or allowing smelt to run off into an empty dissolving tank.

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

After much discussion within the Subcommittee and with the Subcommittee guests we felt that there was no compelling need to add these to permissive logic for boiler purge; the main reason being the lack of reported incidents that would show these permissives are needed. That being said we do not discourage mills and member companies from installing these permissives for boiler purge.

- We are continuing to investigate and explore recommendations for the preferred operator green liquor density testing frequency and methods, i.e.; baume vs. T.A. There are some thoughts that when solidity levels are high there is a separation of T.A. vs. baume. The SFBL Subcommittee will be actively pursuing and collecting more information from the industry at large. Chris Verrill (formerly of IPST) is working with IPST and potentially with AF&PA to see if the green liquor testing methods is a good research project for a joint IPST and AF& PA funded project. We will continue to monitor developments.

- The SFBL Subcommittee continues to look at our document to determine if there are any additional emergency procedures and/or guidelines that we can add that gives more specific guidelines for preventing smelt run-off and potential dissolving tank explosions. We will have more to report at the Fall 2007 meeting.

- There was some discussion regarding whether or not to lock open or "secure" dissolving tank low suction valves and spout cooling water isolation valves recognizing that the spout cooling water valves may need to be closed in an emergency situation such as a spout jacket leak. We will look at the language in the document to determine if additional guidance is warranted.

- The Subcommittee fielded a question from a member company regarding guidelines for "dry" spouts. We had some internal discussion and agreed to review the document to address sections that deal specifically with water cooled spouts and to see if there are any guidelines that are appropriate specifically for dry spouts.

- We are proposing adding language in Figure 2, Permissive Starting Logic for Black Liquor Firing as a permissive to purge the black liquor header. "Sufficient auxiliary fuel hearth burners in service" has been in the document for some time. We are proposing to add to this logic block; "boiler on line, stable firing established" for the purpose of clearly defining when it is appropriate to commence black liquor firing.

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

- A member company recently submitted an incident where a three-way solenoid failed and black liquor diverted. The steam flow stayed above 30%, black liquor flow also stayed above 30% because the flow meter was located upstream of the divert header valves. The operators were able to startup auxiliary fuel burners although technically there should have been an MFT when liquor was diverted. Our document does not specifically address these types of component failures. We will be reviewing the document for gaps in the logic steps and addressing the issue of single point of failures in the safe firing system.

The SFBL Subcommittee had two volunteers join the Subcommittee, which will bring us up to a full complement of owner/operators, vendors, and OEM's. For any comments or questions please contact Mark Sargent @ mark.sargent@ipaper.com or by phone at (513) 248-6086.

5.3 **EMERGENCY SHUTDOWN PROCEDURE (ESP) SUBCOMMITTEE REPORT** – John Andrews

The ESP Subcommittee met in closed session on Monday March 26th with 12 of 13 members represented. Bo Oscarsson has resigned from the Subcommittee because his job is now focused on utility boilers. Jack Clement was selected to fill the seat for the Consultant representative. The Subcommittee met in open session on Tuesday morning March 27th with 12 of the 13 members represented and about 160 guests. During the open session, the Subcommittee reviewed 28 incident reports from North America and 4 international incident reports from South Africa. Of the 32 incidents, there were no boiler explosions or dissolving tank explosion reported this meeting. Of the North American incidents, 9 of the leaks were classified as critical incidents and 18 were non-critical incidents. An ESP was performed in 7 of the incidents including 5 of the critical incidents representing 56% of the critical incidents reported. This percentage is below the recent history of 60 – 67%. There was one spout leak reported that was classified as a Critical Incident because there was evidence that water had entered the bed from the spout leak. One ESP was reported with no leak found on subsequent inspection.

The current definitions of Explosions, Critical Incidents and Non-Critical Incidents were 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).

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

Critical Incidents: All cases where water in any amount entered the recovery unit forward of isolating baffles (and therefore would be a similar criterion to the need to perform an ESP). This includes leaks of pressure parts of all sizes. Since small leaks often wash adjacent tubes to failure, this category is important to our learnings. 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 incidents reported before 1999 were classified as explosions, but with no discernable damage or injury. Also, 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.

Incident Locations

The general locations of the leaks for boilers in North America are shown in Figure 1, which displays a typical boiler, not representing any particular style or model. The yellow marks are the non-critical incidents and the red were listed as critical incidents. The leaks locations are summarized as follows:

- 15 – Economizer
- 5 – Superheater
- 0 – Boiler Bank
- 2 – Furnace Screen
- 3 – Wall Tubes
- 1 – Floor Tubes
- 1 – Smelt Spout
- 1 – ESP w/ no leak

Root Cause

The determination of the root cause is somewhat of a subjective determination by the Subcommittee based on information in the reports. The summary of root cause for this meeting's incidents is as follows:

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

- 7 – Fatigue
- 1 – Thermal Fatigue
- 5 – Thinning
- 11 – Weld Failure
- 3 – Stress Assisted Corrosion or Corrosion Fatigue
- 1 – Overheat

How Discovered

Operator observations during boiler walkdowns continue to be the prevalent method of detecting leaks and accounted for identification of 18 of the leaks (64%). Seven (7) of the leaks were identified by the control room indications, and Leak Detection Systems identified 3 of the leaks.

Leak detection systems were installed on units in 15 of the incidents (54%), which is a higher percentage than in past meetings. The mills reported that the leak detection system provided the initial indication of the leak in 3 of the incidents and in one, the leak was found to be an economizer leak even though typically those leaks were so small they are normally below the sensitivity of most leak detection systems. To be effective, leak detection systems need to be properly maintained and calibrated. Mills should consider dedicating maintenance personnel to their calibration and repair.

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 this time ranged from one minute to three days. The median time of the seven incidents that reported an ESP was three minutes, which is actually pretty good. The three incidents with an indication of a large problem or large leak initiated the ESP within 3 minutes. Looking for leaks after low drum level trips with high furnace pressure should continue to be emphasized in training.

Incident Review

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

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 to see what happened to your report.

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

Figure 2 shows the critical incidents reported each year. The 9 Critical Incidents shown for 2007 represents half a year but appears to be a decrease from the past several years. Hopefully this represents we are doing things better.

Figure 3 shows that there has been a significant reduction in the reported boiler explosions with no reported explosions since 2002 and only four boiler explosions in the last 10 years. Even with several close calls of late, this trend is encouraging. The absence of Auxiliary Fuel and Black Liquor Pyrolysis Gas explosions since 1992 indicates the positive impacts made through the implementation of the BLRBAC Safe Firing Guidelines.

We received information from the Durango incident in 2002. Our database had been listing as the explosion type as "Other." The updated information on the incident indicates that the incident was a smelt water explosion so the cause of the explosion has been updated accordingly.

Figure 4 shows the history of dissolving tank explosions and there were none reported so far this year. 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.

Figure 5 is a plot of explosion history per 100-boiler operating years. The smelt water explosion experience is continuing to trend down over time and is now just under 0.5 explosions per 100 boiler operating years, but the total explosions, which includes dissolving tank, pyrolysis gas, and fuel-air explosions, had been holding steady but is now starting to drop slightly is just under 0.9 explosions per 100 boiler years. The Total Explosions is being driven by the recent dissolving tank explosions. 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 the making the efforts to try to keep that trending down. Effort should be focused in developing better procedures to handle heavy smelt runs and plugged spouts.

Learnings

There were at least three incidents reported that were very close calls and it was fortunate that a smelt water explosion did not result. There were two screen tube leaks reported. It is interesting that in both cases, the leak detection systems provided the first indication of the leak although in one case it took three days to confirm the leak. It is human nature to try to find other explanations for problems such as leaks. It is important to continue to emphasize leak detection and leak identification in operator training.

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

In one of these incidents, the mill discovered that the furnace draft transmitter had excessive dampening in the draft signal so that it reduced the effectiveness of furnace draft changes as an indicator of tube leaks. Mills should review their furnace draft instrumentation to make sure that while damping may be needed for ID fan draft control, the indication of draft for the operators should not have excessive dampening.

The third close call was a floor tube leak that occurred after partially covering the floor with refractory. The refractory was installed because of problems with dents and depressions in the floor. This incident also highlights that dents or depressions in floors can cause steam blanketing and rapid corrosion.

Clarification of "Dedicated Stand –Alone"

The Subcommittee is in the process of reviewing the expected actions that should be initiated during an ESP and to develop recommendations on how those actions should be initiated, either by direct action from the ESP system or if they can be initiated by sending an "ESP" signal to another system that performs the action. An example would be sending an ESP command to the DCS that would then position fan dampers to the appropriate ESP setting.

List of Operating Boilers

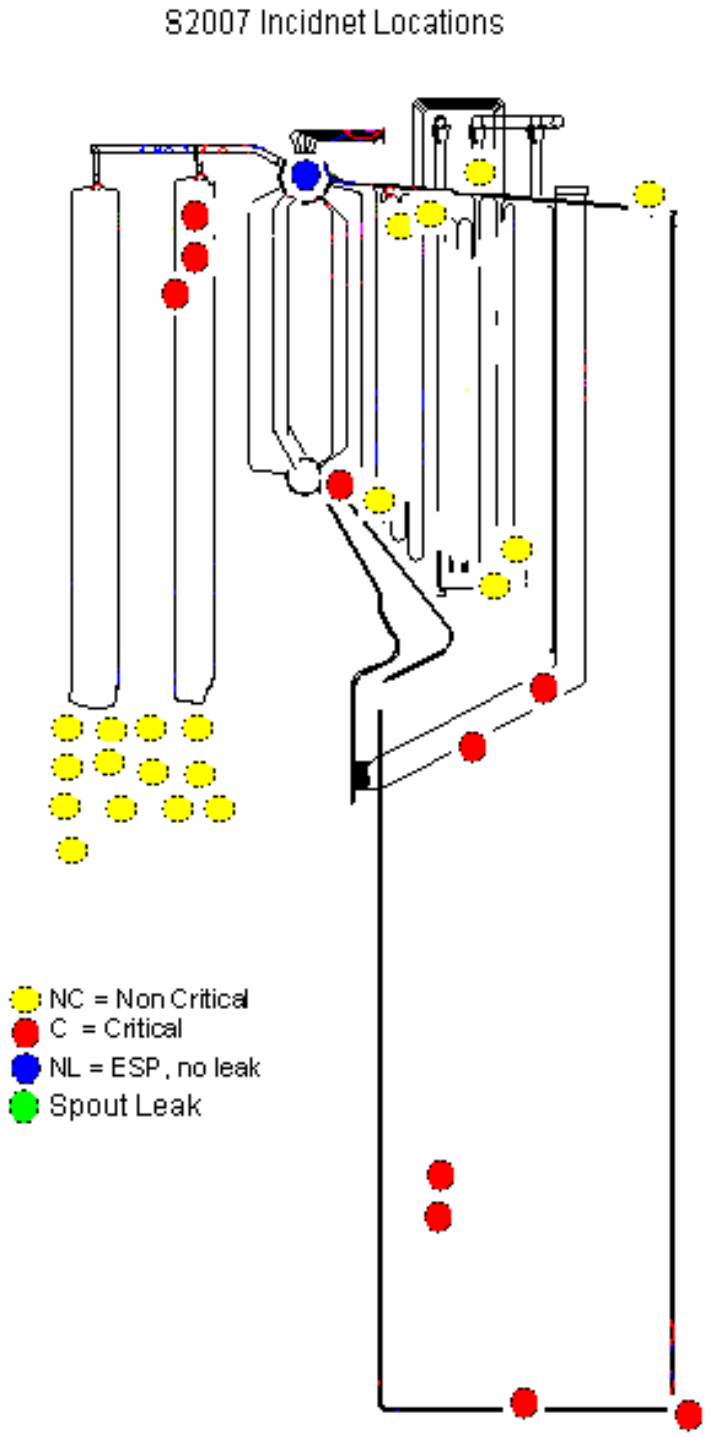
The list of Operating Boilers in the USA is posted on the BLRBAC Website and will continue to be updated by Jack Clement. We will soon post the list of Operating Boilers in Canada. That list is being updated with information provided by Greg Manzulenko

Note

Following the meeting, Rick Spangler gave notice that he will no longer be able to serve as Secretary of the Subcommittee. Until a replacement has been selected, submit incident reports to me at:

John Andrews
MeadWestvaco
P. O. Box 118005
Charleston, SC 29423
Jda6@meadwestvaco.com

Figure 1


S2007 Incidnet Locations
NC = Non Critical
C = Critical
NL = ESP, no leak
Spout Leak

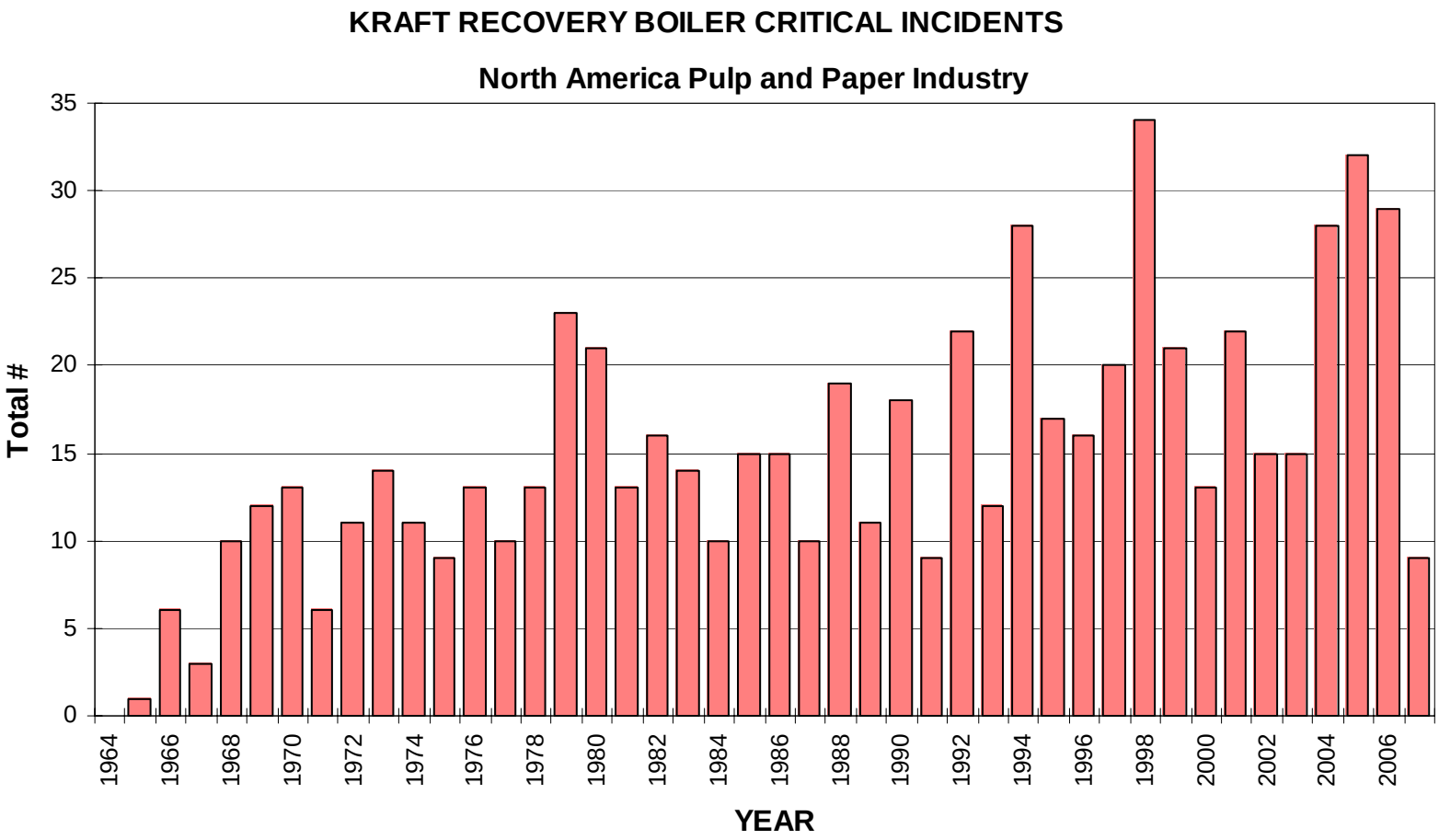


Figure 2

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

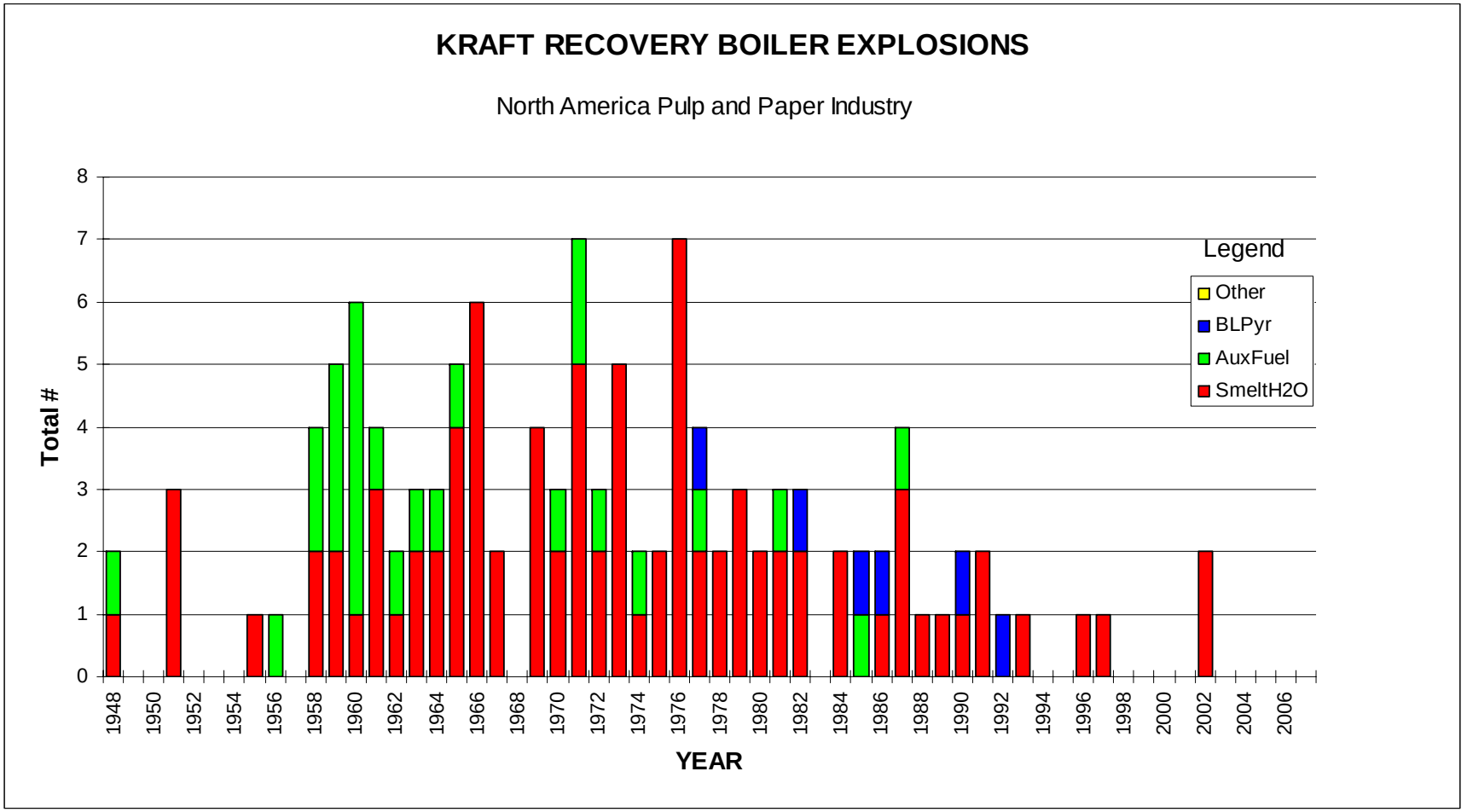

KRAFT RECOVERY BOILER EXPLOSIONS
North America Pulp and Paper Industry
Total #
YEAR
Legend
Other
BLPyr
AuxFuel
SmeltH2O
0
1
2
3
4
5
6
7
8
1948
1950
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006

Figure 3

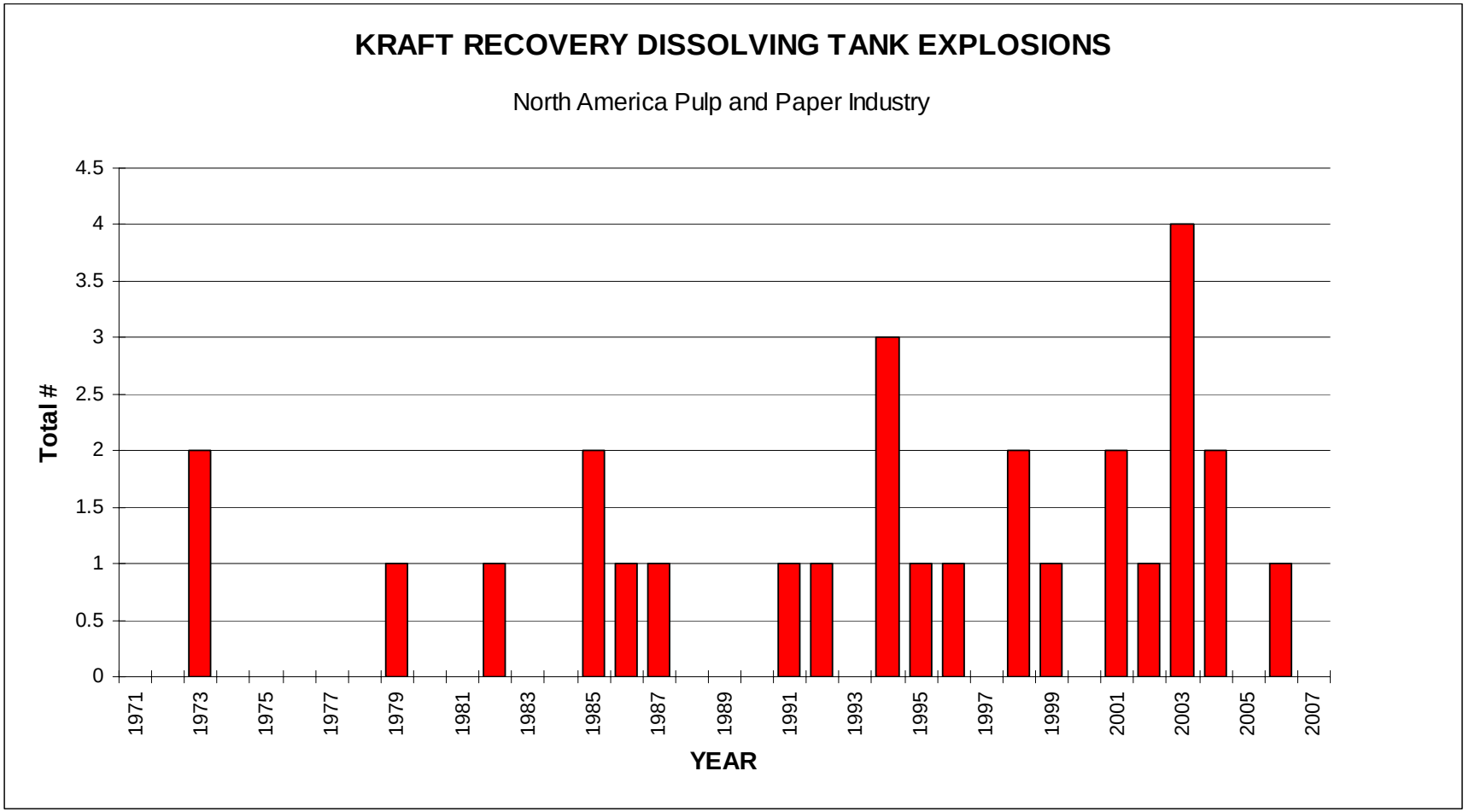

KRAFT RECOVERY DISSOLVING TANK EXPLOSIONS
North America Pulp and Paper Industry
Total #
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
YEAR

Figure 4

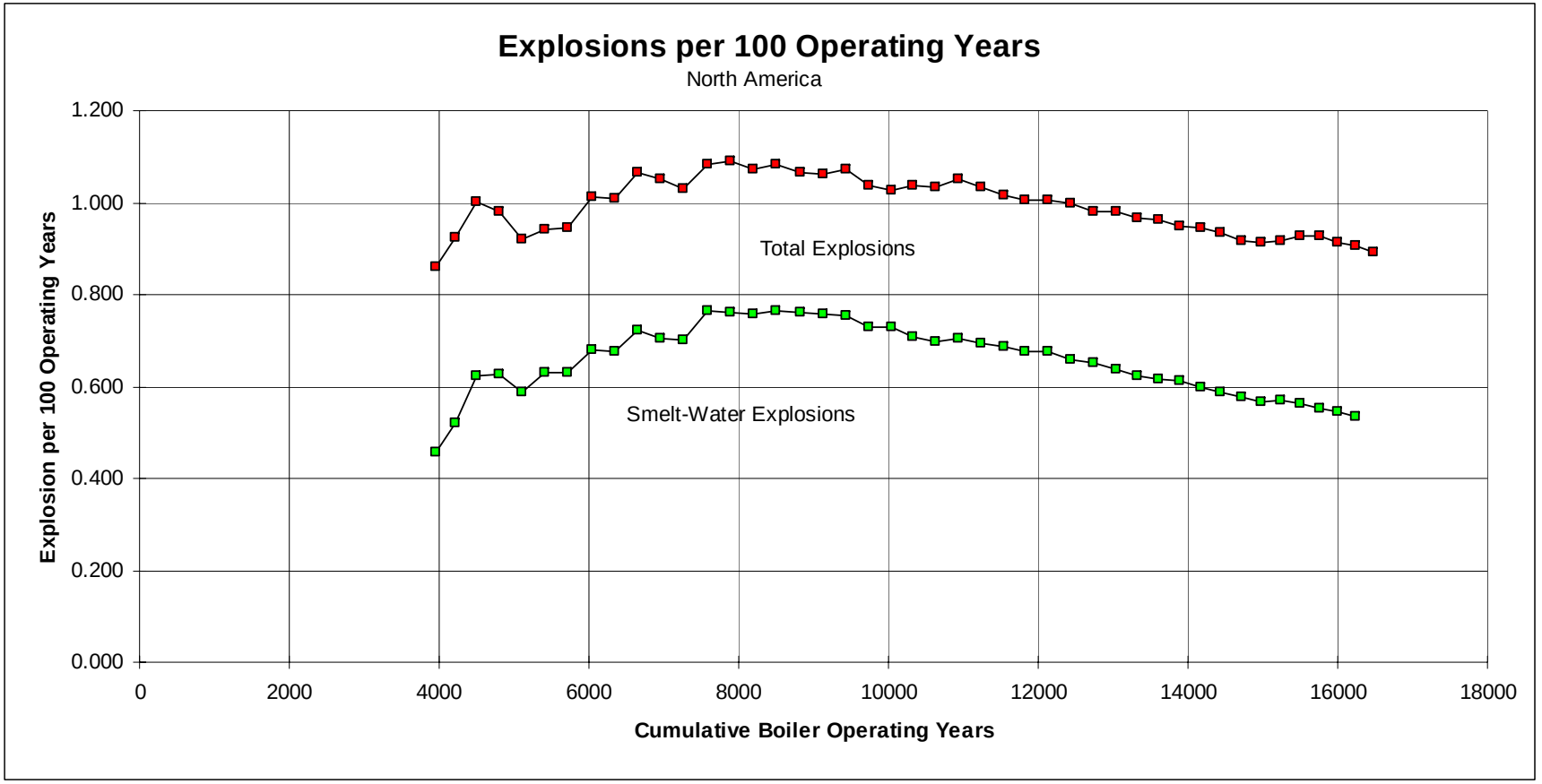

Explosions per 100 Operating Years
North America
Explosion per 100 Operating Years
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Total Explosions
Smelt-Water Explosions
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
Cumulative Boiler Operating Years

Figure 5

5. **SUBCOMMITTEE REPORTS** (cont.)

CHAIRMAN: Next we have the Fire Protection In Direct Contact Evaporators Report. They did not meet, but Chris Jackson will give us a summary of the changes that have been posted on the BLRBAC website for review and comment and then we will open the floor for discussion. Following that there will be a vote.

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

As Len said, we did not hold a meeting of Fire Protection in Direct Contact Evaporators this spring. Since the last meeting in October, we received no Incident Reports. I always like to point out that that doesn't mean there were no incidents, it just means there were no incidents reported. We look forward to holding our next meeting in October. If there are any questions for the committee, if there are any incidents, or if there are any near misses, we would be happy to see them or hear about them to see if our document can be improved based on what is learned from the incidents. There are two things I would like to mention which happened since October. I received a question, which I forwarded to the subcommittee members about the appropriate setting for the high-high trip, and I believe we provided useful guidance to the mill involved. We also had our document used as the basis for improvements for an existing cyclone protection scheme that really did not meet our guidelines. The mill is acting to upgrade their system based on the document.

We did post changes on the BLRBAC website for your review. I received no comments on those. The Subcommittee does not believe these are substantial changes, but let me go through the changes quickly and then I will ask for a vote on them.

Under Operator Checks in Paragraph 3.5 we have a bulleted list of items, which are offered as suggested operator checks during normal operation. Based on discussions of a fire in Africa, it was suggested by a Subcommittee member that we add a check, especially in the start-up phase of the boiler, to assure that the flow box bypass/ cascade low level drain was assured to be closed at start-up. So we added a bullet that said, "verify that flow box bypass (cascade low level drain valve) is closed." Under Fire Emergency Response, Section 5.4, we deleted paragraphs referring to bed cooling. These are really outside the scope of our document, so we didn't think it was appropriate to keep those comments in it.

Where we did not already have metric equivalents, we added them. And finally, we added the word "of" in Chapter 6 to make a sentence understandable that was previously incomprehensible.

Those are the list of changes. Are there any questions? Concerns? If not, I'll ask Len to manage a vote here on the changes.

5. SUBCOMMITTEE REPORTS (cont.)

CHAIRMAN: First I would like to open the floor for comments. Are there any comments from the floor on the changes? The floor is closed for comments. Would the voting members please stand. Those in favor of the proposed changes? Those opposed? The vote passed unanimously for the changes to the DCE document.

5.5 INSTRUMENTATION REPORT – Dave Avery

The instrumentation subcommittee met in open session on Monday morning with 12 out of fourteen members and 5 guests. Our session began with introductions of members and guest continuing on with a review of October's minutes. The minutes were accepted as posted in BLRBAC's October '06 Meeting Minutes.

The subcommittee was updated on Rotork's efforts to address the application of their intelligent actuated valve as rapid drain valve.

Rotork Actions to date:

1) A paper "Rotork Actuators on Black Liquor Recovery Boilers" was written and posted place on the BLRBAC website. This paper recommends wiring hook ups and settings for the actuators.
   It should be noted: That Rotork has not modified actuator's hardware or software subsequent to the Fall 2005 report of problems with retaining settings with loss of power and a low battery.

Instrument subcommittee Actions to date:

1) Chris Warnett, Vice President of Rotork After Sales has been contacted and will address the Instrument subcommittee during the Fall 2007 Meeting.
2) Chris also plans to make a technical presentation after the Main Committee meeting on Wednesday (Oct. 3rd) that will address potential problems, limitations, and proper installation of the Rotork actuators in recovery boiler rapid drain valve service.
2) The Instrument Committee will give Chris a list of topics they would like to have covered in the paper.

Proposed List of Topics:

1) Review of Potential Problems
   - ♦ Preliminary review of the potential problems with different Rotork Actuators in Rapid Drain valve applications.
   - ♦ Include specific examples of potential problems with specific valves and experience.

2) Battery
   - ♦ Expected Life.
   - ♦ Testing and Predicting Battery Life.
   - ♦ Indications of Low Battery.
   - ♦ Replacement of Battery.

5. SUBCOMMITTEE REPORTS (cont.)

5.5 INSTRUMENTATION REPORT (cont.)

3) Memory
- What settings are volatile with loss of power and battery?
- Can settings be stored in a non-volatile device or ease of reprogramming?
- How to check settings on valve on-line and off-line.

4) Torque Limits
- Setting Limits.
- Bypassing Limits.

5) Security of Settings
- Recommendations to prevent changing of settings.
- Discuss potential inadvertent actions that could change settings.
- What settings would be changed?

This discussion on smart actuators along with having scanned the other "Recommended Good Practices" led the subcommittee to realize that a basic application specification for rapid drain valve and other motorized valve requirements is needed.

The subcommittee drafted language for the use of intelligent actuators in a rapid drain valve and other motorized valve applications. We are submitting to the ESP subcommittee the following suggested language to be incorporated in "Emergency Shutdown Procedure (ESP) and Procedure For Testing ESP System For Black Liquor Recovery Boilers" section 13.3 – Valves.

"13.3.5 Valve Programming and Wiring
The actuators on rapid drain valves, and all other valves that operate during an ESP, should be arranged to move to their appointed ESP position regardless of any external interlocks, internal wiring and/or logic. Additionally, detailed attention is needed in the initial set up, programming, functional testing and maintenance of programmable actuated valves."

The next item of business addressed updating the checklist to stay current with Safe Firing of Auxiliary Fuels. The draft changes resulting from this effort are as shown in the following tables.

5. SUBCOMMITTEE REPORTS (cont.)

5.5 INSTRUMENTATION REPORT (cont.)

A. FEEDWATER AND STEAM SYSTEMS

October-06

	Instrument or Control System	Major Function	Operating Modes or Techniques	I	II	Comments
23.	Floor thermocouples	Monitor floor tube metal temperature for thermal damage after an ESP.	Indicate Record	X X		Recording and indicating of metal temperatures is required only during ESP.
26.	ESP Rapid Drain Valves	Automatically open to drain to 8 ft. level.	Indicate Open Indicate Closed	X	X	Refer to ESP Good Practice
27.	Other ESP System Automatic Valves	Automatically operate to prevent water, steam or any fuel entering boiler.	Indicate Operating Position Indicate ESP Position	X	X	Refer to valves required under ESP Good Practice

B. COMBUSTION AIR CONTROL SYSTEMS

October-06

	Instrument or Control System	Major Function	Operating Modes or Techniques	I	II	Comments
3a	Upper Level Combustion Air	Measure & control combustion air flow above liquor guns including secondary (where applicable) and tertiary (or higher, if used)	Auto Manual Indicate Record	X X X		Quantity and location of flow measuring devices depends on boiler design
3b	Lower Level Combustion Air	Measure & control combustion air flow below liquor guns including primary and secondary (where applicable)	Auto Manual Indicate Record Low Flow Alarm MFT (if <30% of BL MCR Airflow) Purge Permissive (if not < 30% of BL MCR Airflow)	X X X X X X		Airflow below liquor guns is measured against total combined MCR airflow of all FD fans while burning black liquor and must be at least 30% of that value.

5. SUBCOMMITTEE REPORTS (cont.)
5.5 INSTRUMENTATION REPORT (cont.)

C. FURNACE DRAFT SYSTEM

October-06

	Instrument or Control System	Major Function	Operating Modes or Techniques	I	II	Comments
11.	ID Fan Speed	Measures ID Fan Speed	Indicate Low Alarm		X X	.

I. AUXILIARY FUEL AND BURNER SYSTEM

	Instrument or Control System	Major Function	Operating Modes or Techniques	I	II	Comments
14.	Burner airflow low		Alarm Interlock	X X		
15.	NCG stream isolated from furnace		Indicate Interlock	X X		
16.	ESP activated		Alarm Interlock	X X		
17.	Manual actuation Master Fuel Trip		Alarm Interlock	X X		
18.	Manual actuation Auxiliary Fuel Trip		Alarm Interlock	X X		
19.	Soot Blower water wash spoolpiece		Indicate Start up permissive Interlock	X X		

5. SUBCOMMITTEE REPORTS (cont.)
5.5 INSTRUMENTATION REPORT (cont.)

We also added a new section, "J" General systems, to account for the common items. This provides a home for items that were incorporated in other sections even though they really didn't fit.

J. GENERAL SYSTEMS

October-06

	Instrument or Control System	Major Function	Operating Modes or Techniques	I	II	Comments
1.	Instrument air pressure low	Monitor instrument air pressure	Alarm	X		
2.	Mill air pressure low	Monitor mill air pressure	Alarm		X	
3.	Burner system energized		Indicate Interlock	X X		

5. SUBCOMMITTEE REPORTS (cont.)
5.5 INSTRUMENTATION REPORT (cont.)

The afternoon session had 12 members (one substitute) with 6 guests present.

Discussion focused on reviewing assigned checklist sections for "Recommended Good Practices" for updates that need to be incorporated in the checklist. The assignments were in varying stages of completion with different depths of understanding as to what their scope was.

We decided to continue this effort with the group focusing on Checklist section C "Furnace Draft." We plan to individually scope it out and with e-mails over the next six months, reconcile any differences. A similar review will then follow for the other sections.

Finally, the instrumentation sub-committee extends a challenge to everyone who would like to take it up: stop by at one of our meetings; see what we are doing; and learn our secret way of answering questions with logic and discipline that leaves others asking the question, "What did they say?"

We would like to think we are accessible and easy to communicate with, but the only way we will find out is for you to give us a try.

5.6 MATERIAL & WELDING REPORT – David Fuhrmann

The Materials and Welding Subcommittee met in morning session on March 25, 2007 with nine of 22 members present (one alternate), five members excused, and one guest.

Jim Young of CIMS tendered his resignation from the subcommittee.
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
c. NBIC – George Bynog
d. B&W Plant Services Bulletins – Steve Osborne
e. AF&PA – Dave Fuhrmann
f. Alstom Power Bulletins – Dennis Hollenbach
g. Welding Manual – Jesse Worsham

One question was placed before the group to be presented during the open meeting regarding the use of shear wave inspection for recovery boiler tube butt weld acceptance.

5. SUBCOMMITTEE REPORTS (cont.)
5.6 MATERIAL & WELDING REPORT (cont.)

The subcommittee reviewed status of the current Materials and Welding document and approved the welding flow chart changes.

The acid clean criteria bulletin was tabled until George Bodman could be present.

Fabian Henriques will work on a draft of the Pressure Boundary repair procedure to be presented to the group at the next session.

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.

The subcommittee reviewed a draft document for 2 additional procedures which was tabled pending closed meeting adjournment:

a. Corrosion Protection Weld Overlay
b. Weld overlay repair of Pressure Boundary tubes

The afternoon session met in an open meeting with 12 members present (one alternate) and eight guests.

1. A question was placed before the group regarding the use of shear wave inspection for recovery boiler tube butt weld acceptance, inspector certifications, and certification procedures. One attendee responded that a few customers of his group use the technique for recovery boiler butt weld acceptance. No other comments were received.

2. A presentation was given on Hand Hole Caps (see Appendix B). The presentation illustrated the design differences between the B&W cap and the Alstom cap and the different installation techniques.

3. A draft Forward for Temporary Repairs was reviewed. Spirited discussion occurred concerning recommendations for how long a temporary repair could be left in service before a permanent repair is required.

4. The meeting adjourned at 3:30 pm

Plans for the next meeting include, but may not be limited to:

1. Review material references

2. Update status on Individual and Task Team assignments

3. Continue draft reviews and get subcommittee approval

5. SUBCOMMITTEE REPORTS (cont.)

5.6 MATERIAL & WELDING REPORT (cont.)

4. 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)
   e. Tube coatings (cold side) – Ron McCarty, Dan Phillips

5. Additional Technical Bulletins and Procedures will be developed, approved and inserted into the document as completed.

6. Consider another survey for other materials issues.

7. Presentations of experiences that may be of interest to this group.

5.7 PERSONNEL SAFETY REPORT – Robert Zawistowski

The Personnel Safety Sub-committee met in an "open" session on Monday, March 26, 2007. There were 12 members (out of 18) and 8 guests in attendance during the meeting.

Representation at our meeting by regular members and guests included original equipment manufacturers Babcock & Wilcox, GE Water, and Metso Power. Representation from insurance and insurance service companies included AXA Corporate Solutions, FM-Global, and Swiss Re Global Asset Protection. Operating company representation was present at this meeting with representatives from Boise Cascade, Domtar, Longview Fiber, MeadWestvaco, Neenah Paper, Packaging Corporation of America, Smurfit-Stone Container, and Thilmany LLC. Water treatment representation included Buckman Labs. Consultant representation included Power Specialists Associates, Inc.

There were some changes in membership to our sub-committee since the last meeting. We welcome to the subcommittee Art Thompson of Domtar, Jamie Manion of MeadWestvaco, Robert Fry of Neenah Paper, and John Stelling of Packaging Corporation of America.

No requests for clarifications with regard to the Personnel Safety Document have been received since the last meeting.

One of the primary topics of our meeting was to perform one more review of the recently developed water wash guidelines. We had received some additional information with regard to inspecting the furnace for smelt accumulations prior to initiating a water wash. This additional language was added during our meeting on Monday. The guidelines minus this recent change have been posted on the website this past winter.

5. SUBCOMMITTEE REPORTS (cont.)
5.7 PERSONNEL SAFETY REPORT (cont.)

The edited document was resubmitted to the Executive Committee for review and it was decided to post the changes one more time on the website for review and comment. Assuming there are no significant changes, this guideline will be presented to the membership for a vote in the fall.

A second topic discussed during the meeting was with regard to Personal Protective Equipment (PPE). It was noted in a search of our document that little is said about safety equipment. We will start to draft a section dealing with guidelines for PPE, specifically for use in areas such as the spout deck.

An attendee asking for some additional information with regard to escape respirators raised a question. Within the Personnel Safety document there is a statement that there should be one escape respirator for each occupant riding in an elevator. There was much discussion around the effectiveness of escape respirators and the time it may take to evacuate personnel from an elevator that is stuck or has shutdown due to a fire. It was felt that the risk is relatively low and, while an escape respirator may not protect a person under every circumstance, it may provide additional time for people in a building time to evacuate. We elected not to change the language in the document.

A discussion was held about high pressure water washing of boilers and the possible need for guidelines. Following the discussion, it was concluded that a relatively small number of locations are using this method of cleaning and that the contractors involved would implement their own safety practices. It was also felt that the water wash guidelines currently under development adequately cover the safety issues. No further action is planned on this topic.

We are interested in hearing about “near misses” with respect to personnel safety. “Near misses” may provide an opportunity for us to be pro-active in addressing operator safety issues. We will explore different methods of obtaining information to promote further discussion on this topic for future Personnel Safety Subcommittee meetings. Methods to be considered may include using some time during the Operating Problems session or possibly having a form accessible from the website.

Some comments were made about Standard Operating Procedures and Emergency procedures. It was noted by one member that he has seen a number of formats used, some brief and to-the-point and others that were “wordy.” We discussed the idea of adding language to our document suggesting a more concise wording of procedures. After discussion it was decided that no changes would be made.

In the Executive Committee meeting it was discussed that there is a pre-firing checklist for black liquor firing but none for boiler startup. The Personnel Safety Subcommittee was asked to consider developing a generic checklist to be included in our document.

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

5. SUBCOMMITTEE REPORTS (cont.)

5.8 PUBLICITY & NEWS REPORT – Craig Cooke

I'm very pleased to report that 100% of my subcommittee membership attended our meeting! The key function of News and Publicity Release is to provide a basic summary of BLRBAC activities to pulp and paper publications, newsletters and magazines. Most importantly having our future meeting dates placed in these publications. With my last release I provided a brief article giving the background and history of BLRBAC. So far that article has been published once.

5.9 WASTE STREAMS REPORT – John Rickard

On March 26, 2007 the Waste Streams Subcommittee met in closed session at 8:00 AM with 12 members and one visitor present and in open session at 1 PM with 10 members and eight visitors present.

The final draft of Chapter 7, Guidelines For Thermal Oxidation Of Liquid Waste Streams In Dedicated Burners, was reviewed. This guideline establishes three categories of waste streams for dedicated burners:

- Class A waste streams: those that can be fired without a continuous igniter.
- Class B waste streams: those that require a continuous igniter to be fired.
- Class C waste streams: all other liquid waste streams that cannot be fired in a dedicated burner.

Chapter 7 refers to the auxiliary fuel guidelines for fuel firing specifics. There were a few issues discussed during the meeting . The required boiler load of 50% MCR was discussed and the subcommittee agreed that this limit was important during shut down to get waste streams out of the boiler early. If a particular mill wants to change that limit, they can use a "management of change" procedure to establish their own limit. This chapter will be presented to the Executive Committee for review.

Revisions to Chapter 4 to include thermal oxidation of dissolving tank vents were reviewed and a few additional changes were made. These revisions will be presented to the Executive Committee for review.

An Excel format questionnaire for NCG incidents was also reviewed. By using Excel, filling out the form will be fast and we will be able to sort the information easily. The form will be presented to the Executive Committee for their review.

5. SUBCOMMITTEE REPORTS (cont.)

5.9 WASTE STREAMS REPORT – John Rickard

Once the form is posted on the BLRBAC website the subcommittee will be requesting that anyone who has had an incident involving waste stream incineration in the past, even if it did not occur in a recovery boiler, spend a few minutes filling out the form to help us understand the problems that have been encountered.

Scott Crysel agreed to compile the different minimum boiler loads that are used as permissives in our guidelines and will report on them during our fall meeting.

Chip bin NCG (CBNCG) IS presently covered as a DNCG. In recent BLRBAC meetings our subcommittee discussed the risks of this stream and agreed a separate chapter with specific guidelines for incinerating CBNCG as a separate waste stream were needed. During this meeting we had the first review of the new Chapter 8, Guidelines For Thermal Oxidation Of Chip Bin NCG.

The principle problem with CBNCG is that, although normally a dilute stream, it can increase in combustible content until it is in the explosive range (above the LEL). Each continuous digester with a presteaming chip bin has unique characteristics and risk factors that affect is ability to become explosive. Chapter 8 has a list of risk factors to help the user decide the best transport and boiler injection method. The pulp mill has the responsibility to provide CBNCG only when it is below the LEL.

The chapter discusses three choices for handling and incinerating CBNCG:

- Separately using a steam ejector
- Separately using a fan
- Combining CBNCG with DNCG

Interlocks are provided for the separate systems. The combined system is covered in Chapter 4, DNCG.

When direct injecting CBNCG into a furnace, a minimum design velocity must be maintained to avoid combustion traveling back through the piping. This design value was discussed in detail with good input also provided by our visitors. The issue is still being researched.

Another point of discussion involves the value of an LEL meter and if it should be a permissive for safe injection of CBNCG.

Development will continue on permissives for CBNCG.

Work will continue on Chapter 8, on revisions to Chapter 4 for CBNCG, and on additions to the appendix. These will be reviewed again during our fall meeting.

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

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

Membership

Currently, we have 34 companies in the Program including 8 non-AF&PA member companies. The current member's production of sulphate pulp represents 99% of the total produced in the U. S. There are still a few companies operating recovery boilers that are not in the Program. We continue to encourage them to join with the current members in the cooperative efforts for the safe operation of recovery boilers and research to improve their reliability. All companies operating recovery boilers gain directly from the benefits of the Program.

Currently, there are 119 mills operating 173 recovery boilers in the U. S. They produce about 45% 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.

Explosion Monitor

Mr. Rich Spangler is the new AF&PA explosion monitor. He replaced Jack Clement who resigned this position as of December 31, 2006. Jack will be missed for all the excellent work that he has done for the industry. Rick also replaced Jack as secretary of the BLRBAC ESP Subcommittee.

Operational Safety Seminars

AF&PA is continuing to sponsor three Operational Safety Seminars each year. With a decrease in attendance during the past few years, we surveyed the members to identify reasons for the decrease. The survey showed continued interest, but also the need to change the format to help reduce companies' travel costs. Each seminar will be held for a one and half day session to review and discuss the AF&PA training material and BLRBAC guidelines in addition to the usual discussion of explosions. Formerly, we had two half-days for discussion of actual explosions. This year one seminar was held in Portland OR and the other two will be held in Atlanta. Dr. Tom Grace and Ron Mc Carty are the moderators for the discussion with the attendees of the reported explosions and critical incidents along with review of the AF&PA and BLRBAC guidelines. Attendees continue to feel that they get a lot from the dialogue among the attendees and moderators, whom they feel are outstanding. The responses to last year's survey favored continuation of the seminars in the new format of one and a half days. We had 34 attendees at the seminar recently held in Portland. Registrations for the two seminars scheduled in Atlanta are going slowly. I am in contact with the mills to remind them that the time is approaching for these important training sessions.

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

Training Program

The AF&PA Recovery Boiler Computer-Based Training (CBT) Program is available through Power Specialists Associates (PSA)). Information may be found on the AF&PA and PSA websites. PSA may also be reached to arrange 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 new information. They are also attempting to put the manuals onto CDs to make them more available at the mills. The Committee expects to complete this project by the end of the year.

Non-Destructive Technologies for Detecting Water-Side Deposits

Phase II of the study for Non-Destructive Technologies for Detecting Water-Side Deposits sponsored by the AF&PA R & D Subcommittee is underway. In this part of the study, we will be looking at the following four technologies:

- UT
- Low level radiography
- Flash thermography with TSR
- Heat Flux measurement.

The team members have assembled a set of tubes with different deposits that are being tested under the supervision of BWXT on several outside providers' instruments. In addition to the four technologies mentioned, the Advisory Group is also investigating the Aptech "Kyushu" method. It is expected that Phase II of the project will be completed by the end of this year.

Study for Analysis of Economizer Tube Failures

The Economizer Tube Failures study which focused on failures related to design and operation was completed earlier this year and was distributed to each member company's representative and the boiler manufacturers who participated in the study. The investigators analyzed reported incidents to identify the major types and locations of these leaks and has also attempted to identify the root causes for these leaks. Based on the study, two stand-alone documents were prepared, "Guidelines for Specification and Construction of Recovery Boiler Economizers" and "Operating and Maintenance Practices Impacting Economizers." The recommendations developed are being considered for incorporation into the AF&PA document "Guidelines and Checklist for Specification and Construction of New Black Liquor Recovery Boilers."

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

Study of Superheater Failures

This study of superheater failures sponsored by AF&PA, similar to the Economizer Tube Failure study, is in progress. The objectives are to understand the causes of superheater problems and degraded performance and to develop guidelines for superheater design, maintenance and operation to minimize their occurrence. Phase I of the project, which dealt with data acquisition and initial analysis, was recently completed. This was intended to scope out the problems for more thorough analysis in Phase 2, which is now underway. The final Phase is the preparation of guidelines for superheater design, maintenance and operation. The project is expected to be completed by the end of the year.

Other Research Projects Under Review

The Committee is considering having the results of the Economizer Study (and Superhearter Study, when completed), as well as earlier studies on Floor Tubes and the Behavior of Furnace Corners in Explosions, put into the form of TAPPI TIP Sheets for greater access and distribution. The Committee is also considering a study for causes of smelt spout cracking and failures on chemical recovery boilers; welding problems; and smelt spout restrictors; in addition to several others.

Annual Meetings and Conference

AF&PA's annual Recovery Boiler meetings and Conference were held in Atlanta February 13th and 14th. 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 the remainder of the recovery boiler community as well. We hope that many of you will plan to attend next year's Conference, which will be held in Atlanta.

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

Since the last meeting of this group, it has been an especially busy time for the National Board. Our restructuring efforts as far as the NBIC is concerned are progressing well. The three parts, (1) Installation; (2) Inspection; and (3) Repairs and Alternations, have been balloted through committees. They will go out for public review on April 20th. That will be posted on our WEB site for a period of 60-days. I would encourage anyone in the audience to make sure you visit the WEB site. It is part of the ANSI process and we do appreciate comments. Any feedback we received as a result of the public comment period will be discussed and hopefully resolved at the next meeting of the NBIC that will occur in July. That meeting will be held in Columbus, Ohio. If you have an opportunity to attend, I would certainly recommend it.

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

We will submit the three parts of to ANSI for final approval on October 15th. Once it is submitted to ANSI, the final publication date will be December 31, 2007. Because of the restructuring and the three parts, we are going to obviously have new binder covers and a new way of packaging, but the cost is going to remain very competitive to what it is now. You will be able to purchase the particular parts of the book that you desire or need or you may purchase the entire package.

The 2007 edition will also include our metrics policy. Primarily it is a "soft" or exact conversion, rounded to the degree of precision required for a "hard" conversion.

The second thing I would like to report on is training. In late summer or early fall of this year, we will start construction of a new Training Facility in Columbus at our Headquarters devoted primarily to practical hands on training. As most of you are aware there is an acute shortage of inspector candidates from traditional sources, such as the military and this type of training will assist the jurisdictions and industry in general in maintaining competent inspection staffs.

The annual out-of-town meeting between the ASME and National Board will take place in May in Grapevine, Texas. It is always a good time to go out and meet some of the other industry representatives. For anyone having the opportunity I would certainly encourage attendance.

In October of each year we bring our Membership, about 63 now, to Columbus, Ohio, for four days. One or two days for a business meeting and the last two days are devoted to technical subjects. We call it our Members Technical Seminar. What I'm looking for, Mr. Chairman, is a volunteer speaker who wants to address a technical topic peculiar to recovery boilers.

With that, Mr. Chariman, I would like to formally request a volunteer from this organization All they have to do is call me and I will be more than happy to arrange it, furnish the dates and work everything out.

On a final note with the NBIC, when the 2007 edition is published, we have completed negotiations with representatives from China and the NBIC will be translated into the Chinese language. That is part of our continuing efforts to promote the NBIC internationally

CHARIMAN: If there is someone who is interested in giving a presentation on our behalf, please bring this to my attention or to one of the other Executive Committee members and then we will have a discussion. We hope to find someone who is a good public speaker.

8. **TAPPI RECOVERY BOILER SUBCOMMITTEE OF STEAM & POWER REPORT** – Jim Dickinson (See Appendix C for a copy of the slides used during the report.)

9. **WESTERN CANADA BLRBAC REPORT** – Greg Manzulenko

The fall Canada Western BLRBAC meeting was held in Vancouver, BC, on November 7th and 8th at the Crowne Plaza Hotel with 18 of our mills sending representation. We had 85 people attending the conference.

There were a total of nine incidents submitted for review from the attending mills. All incidents have been reviewed here in Atlanta at BLRBAC. I presented the ESP Subcommittee Report that was presented here last fall. Boiler manufacturers and suppliers gave updates on what was new and items they are working on. I think we are going to see some of that here this morning.

An Operation and Trouble Shooting Session has been added to our meetings with very good success. There are good discussions happening here.

Our next meeting is scheduled for April 17th and 18th in Prince George, BC. Again I will be taking the information presented here and presenting it to the Western Branch.

10. **ACTIVITIES OUTSIDE NORTH AMERICA REPORTS –** None given.

11. **OPERATING PROBLEMS SESSION REPORT** – Len Erickson

The operating problems session was held on Tuesday afternoon with approximately 160 people present. The session took the entire 2 hours scheduled. Participation by the audience was very good.

After the session, a technical paper was presented by REH on a near infrared (NIR) green liquor analyzer.

1. **What are mills using for green liquor density measurement?** K-Patents on discharge of green liquor pumps have had good success. Also used bubble tubes, nuclear, and near infrared is a new technology, water column on outside of dissolving tank.

2. **What is the best way to verify % solids to boiler?** Operator test should be verified at least weekly against the TAPPI test. Operator test every 2 hours if under 70% solids and up to every 8 hours for over 70%. Hand-held refractometer has had good experience in sugar industry, but the opinion of SFBL and instrumentation is that an alternative method should be used when doing operator test to prevent the same error from appearing due to items such as soap in liquor. Nuclear densiometers have had good experience in Europe.

3. **How are BL samples taken on units with liquor solids above 80%?** Manual tests can present personnel safety and test accuracy problems due to flashing. No response.

11. **OPERATING PROBLEMS SESSION REPORT** (Cont.)

4. **Use of digital radiography or shear wave on butt welds in lower furnace**. Shear wave used as a screening device, but still use radiography for permanent record – finds problem welds more quickly. Shear wave used in superheater and walls, but requires proper calibration piece; not suitable for composite or weld overlay tubes. Shear wave is addressed in ASME Code. Digital radiography is believed to also be in Code in Section V. Uses a less powerful source so smaller evacuation area required.
5. **Cold side corrosion inspection**. Frequency depends on type of construction and how carefully dry-out is done after water washing. Should not exceed 5 years when no problems are observed. Water washing followed by an extended outage is the most severe for cold side corrosion. Dryout can be done with gas aux burners raising pressure on unit to 100 psi. Can also use air heaters – only choice for oil firing.
6. **Composite vs. all stainless steel membrane sections on waterwall repairs**. Stainless steel coefficient of expansion is very different than carbon steel and will cause cracking between membrane and tube. Solid Inconel bar has been used successfully, but is more expensive and harder to weld.
7. **Spout life following shutoff off of cooling water due to a known spout cooling water leak**. BLRBAC recommends plugging spout. No guidance offered on spout burnout time. On B&W insertable spouts, even if leak is near discharge end and spout is plugged, it would still be good to isolate spout cooling water line. Caution: Once burn through occurs, smelt can plug cooling water lines. Failure to inspect/flush this area can cause later failure.
8. **Orbital welding on large tube/pipe sizes.** Has been used on boiler bank tubes; has no experience, but no reservation about using it on larger bore tubes. It's somewhat complicated to set up in the field. Clearance of 2 1/2" OD on 5" centerlines.
9. **What temperature should sootblower steam be?** 100 °F superheat recommended, ideally at point of supply. Want to avoid condensate formation in piping.
10. **What is the proper hand hole cap repair procedure**? 3 styles, B&W, Alstom, European weld-on nipple. European design is easiest to maintain and repair. Manufacturer guidance is available on the other two. This guidance will be part of the M&W guidelines. A leaking weld should not be repaired. Remove, dress header, and can reuse the cap. Also can find procedures on B&W website as a plant service bulletin.
11. **Does anyone have dampening on their furnace draft indication**? As highlighted in one incident, this can mask conditions in the furnace to operator. In this there was dampening in both the transmitter and DCS, which resulted in no high furnace pressure trip and no indication in the control room that a furnace spike had occurred. The high-pressure trip should have no dampening. Dampening on ID fan draft control loop is the only place where its okay. Volume dampening may be an alternative to time delay/time averaging. The raw number is noisy, but should be available in control room.

11. **OPERATING PROBLEMS SESSION REPORT** (Cont.)

12. **Are Quarter turn valves for ESP rapid drain valves acceptable**? No experience offered. ESP RP doesn't define the type of valve that should be used. Speed of opening could be an issue, so as not to provide a sudden flow into drain line.

13. **When do you energize the precipitator with oil fired auxiliary burners**? Energize precipitator before firing oil is required for environmental reasons (some states – see your environmental guidelines for your mill). May not be all fields – depends on allowable emissions. One location has precipitator energized as a starting permissive for purge. There is concern of precipitator fires from oil soot. Also, once oil soot coating has occurred, the precipitator collection efficiency can go "way down."

14. **Is anyone seeing floor damage from slag falls**? One location replaces dents when deflection is "considerable." These were about ½ diameter deflection. Another was more than one ID and boiler was not returned to service until section was replaced. Work with soot-blower suppliers to determine best modifications to soot-blower system to prevent large slag build-ups. Additional soot-blowers may be require along with relocating furnace draft pressure tap(s). One location had reduced buildups following an air system upgrades. Can increase the number of floor beams. Experience with decanting floors is that none are level after unit has been in operation → inherent denting.

15. **What pressure do you hydro your boiler to after repairs?** Hydrotest pressure after repair governed by NBIC, but is usually somewhere between design and 1 ½ design pressure. NBIC has no specific requirements – hydro must verify the integrity of the repair. Alternatively, if the repair is subjected to 100% NDE, NBIC does not require hydro, but this is not imposed on jurisdictions. Most hydros are done at operating pressure following routine repair & some between the operating and design pressures. The higher pressure may be able to better find weepers. BLRBAC has no recommendation.

16. **What is your chemical cleaning frequency with good boiler water quality**? 5 – 7 years done by some on a time basis. Others don't have a fixed time interval, but based on waterside deposit analysis.

17. **What is the recommended number of spouts and the basis for it?** 1 spout/ million # dry solids/day is typical rule of thumb value for design. Dry spouts may have a lower "loading." Boiler manufacturer's strongly discourage operating at maximum boiler rate with a plugged spout.

18. **What are mills recent experience with dry spouts?** Life seems to be about two years in most applications.

19. **What is the impact of low boiler pressure on the ESP rapid drain system**? At low pressure the boiler will take longer than 20 minutes to drain. Flash to sky method is not recommended because of the potential for a low pressure ESP. Where used, an alternate drain to flash tank is recommended. One calculation showed that at 150 psi residual pressure, a rapid drain to the eight foot level will require about 40 minutes.

11. **OPERATING PROBLEMS SESSION REPORT** (Cont.)

20. **What are recent leak detection system success and failures?** Acoustic has been pretty good for economizer and upper furnace; but totally inadequate for the floor area. Acoustic leak diction systems are subject to false leak indications due to soot blowing, safety valve leaks, etc. Chemical based and mass balance based are also used. None of the systems are perfect, but they do provide an additional tool. In one locations, an acoustic gave a 3 day "heads-up" on a screen tube leak. Any system needs a "champion" to understand and maintain it. Operators also need to be trained to understand the limitations of the leak detection system and how to recognize leaks even when not detected by leak detection system. For example, a chemical based system will not detect a sudden large leak nearly quickly enough. Detecting a large leak has to be a learned and have a ready response. This is an important training issue.

21. **Shear wave weld examination**. Used routinely for superheaters and external circuits, but not waterwall.

22. **What are the minimum spouts that need to be open as a function of # solids/day?** There needs to be a plant policy on the minimum number of spouts that need to be in operation and action to take if the required number are not available. There is a hazard of smelt rushes and dissolving tank explosions if policy is not in place and enforced.

23. **Does anyone have in place interlocks for dissolving tank liquor level prior to starting liquor firing?** No one reported doing, but the requirement has been in SFBL for a couple of years.

24. **Is there any data / experience with green liquor tank crystallization?** TAPPI has a paper that discusses this.

25. **Do Mills perform a black liquor cook-off following liquor trip?** – all reported doing it.

26. **How long can you run following a leaking spout?** Should start down when that happens.

27. **Have any mills installed an interlock to close feedwater control valve if there is high furnace pressure and low drum level?** One mill has done this and places the valve in manual and requires an operator decision to reopen valve. Another mill has also done this. The signal runs through DCS. This gives the operator "time to think" and keeps the control system from automatically driving the feedwater control valve to wide open.

28. **Where should you set your high furnace pressure trip?** A high furnace pressure trip is typically set at 4" for personnel protection. Experience at one mill proved 7" was too high – too many burned cable trays and transmitters.

29. **Are there guidelines on weld push through on decanting floors?** One location uses 1/16 in. regardless of sloped or decanting floors. This is addressed in Section I and is quite conservative. Guidance also in some recently re-issued TAPPI TIPs.

11. **OPERATING PROBLEMS SESSION REPORT** (Cont.)

30. **Are mills using PLCs for the ESP system?** Some are.

31. **Are mills performing a routine attemperator inspection?** B&W recommends a 5-year interval. Leak through can cause superheater failure. Two issues: the control and shutoff valves and the attemperator itself. Except for sweetwater condensers, there should be a tight shutoff valve in addition to the control valve. The control valve should be closed for during an ESP regardless of the source for the attemperator water.

32. **Are mills using the DCS to perform burner management functions?** Follow NFPA 85 requirements.

33. **How do you control access to recovery boiler building?** Use strict sign-in/sign-out procedures. There is some guidance in the Personnel Safety document.

34. **Are any mills finding corrosion under insulation on blowdown and drain lines?** This has been found and was extensive. Once the insulation gets wet, there is nothing to dry it out and the lines "rot." Found at more than one mill. It is easy to get water behind the insulation in partially insulated lines. Equipment exists today that can check for corrosion without removing the insulation.
Note: Lockout/tagout has resulted in the addition of valves in some drain lines. A caution is that if a valve is left closed it is possible to pressurize the drain line up to the full operating pressure. Make sure that the section of line upstream of added valves is rated for the boiler design pressure.

35. **What are mills using for refractory on decanting floors?** One mill has used Mag-shot. Alstom has a refractory tile that is pre-cured. This has been recommended to customers who have experienced corrosion at the sidewalls and floor. Main reason for use has been to prevent smelt leaks. There was no experience reported of it being used to prevent tube thinning and/or overheating.

CHAIRMAN'S CLOSING COMMENTS:

Following this we have the Technical Sessions. Part of what the Task Group that met several years ago to analyze the membership survey recommended to help participation at BLRBAC meetings was to link with the TAPPI Spring meeting. This is being done and the TAPPI Steam & Power/Energy Management Committee Spring meetings will immediately follow BLRBAC at this and future spring meetings. We would encourage those who can, to attend and participate in TAPPI.

Is there any other new business that anyone would like to bring forward?

RICK SPANGLER: I would just like to make a clarification. Yesterday at the end of the ESP Subcommittee open meeting, I offered to share my Power Point presentation available to others for the purpose of assisting with operator training. I was immediately reminded that that this material is the property of the ESP Subcommittee and is not approved to be released to the general public or to our

attendees. So I apologize. Maybe over time we can overcome some of those obstacles so that that materials can be further disseminated. There is some valuable information that the mills could use for on-going training.

NEXT MEETING: October 1, 2, & 3, 2007, at the Crowne Plaza Hotel, Atlanta GA.

ADJOURNMENT: I'd like to adjourn the meeting. Again, the Technical Presentations will start up right after a short break. Everyone have a safe trip home.

TECHNICAL SESSIONS:

"Drum Tube Removal" by Bob Kaminski of Diamond Power
"Spout Rodders" by Wade Blaser of Babcock & Wilcox

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS

Spring 2007—1	
Location:	**Weyhaeuser Co. (Domtar), Johnsonburg, PA**
Unit:	RB1, 1993 Tampella (90132) 1 drum, large economizer
Size:	2.8 M#/d (1270 metric t/d); 1600 psig (110 bar) design; steam flow 400 mpph (50 kg/s); operating @ 1250 psig/900F (86 bar/482C).
Incident Date:	10/25/06
Leak/Incident Loc:	**Economizer**—At the lower tube-to-inclined header weld (element 7, tube 12) of Eco 1 (cold). This area had been the site of 20 previous leaks over the last 7 years, although this was the first leak in ~ 1 ½ years.
Downtime hrs. due to leak/total:	29 hours
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Operator walkdown**—found wet ash in the ash conveyor.
Leak detection:	No
Sequence of events:	The boiler tripped as liquor was being removed for maintenance work. An operator noticed wet ash and moisture in the Eco. 1 ash hopper conveyor. A tube leak in Eco. 1 was suspected as there had been several previous leaks in this area. The boiler was shut down in an orderly fashion. After water washing the economizer, the leak was located.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Ground out crack and weld repaired.
Root cause:	Probable cause is **stress assisted corrosion**.
Future prevention:	
Last full inspection:	4/06; Chemical cleaned at 1993 start-up.

Spring 2007—2	
Location:	**Weyhaeuser Co. (Domtar), Johnsonburg, PA**
Unit:	RB1, 1993, Tampella (90132) 1 drum, large economizer
Size:	2.8 M#/d (1270 metric t/d); l600 psig (110 bar) design; steam flow 400 mpph (50 kg/s); operating @ 1250 psig/900F (86 bar/482C).
Incident Date:	10/30/06 (5 days after Incident #1)
Leak/Incident Loc:	**Economizer**—At the lower tube-to-inclined header welds: element 13, tube 6; element 28, tube 3; element 33, tubes 3 & 4; element 56, tube 4. The lower Eco 1 inclined header area has been the site of 21 previous leaks.
Downtime hrs. due to leak/total:	30 hours
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Operator walkdown**—found wet ash in the ash conveyor.
Leak detection:	No
Sequence of events:	Four days after starting up following the repair of a previous economizer leak, the operator again noticed wet ash and moisture in the Eco 1 ash hopper ash conveyor. The boiler was shut down in an orderly fashion.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	5 cracks ground out and weld repaired.
Root cause:	**Weld porosity and stress corrosion fatigue cracking** caused by a combination of thermal expansion and the cantilever effect of the lower inclined header/tube configuration. Metallurgical analysis of past failures has identified **poor shop welds** as the root cause of failures.
Future prevention:	
Last full inspection:	4/06; Chemical cleaned at 1993 start-up.

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—3	
Location:	**Smurit-Stone Container Corp., Fernandina Beach, FL**
Unit:	RB4, 1970 B&W (PR-126), 2-drum, large economizer (replaced in 2003 with B&W economizer).
Size:	3.0 M#/d (1360 metric t/d); 1000 psig (69 bar) design; steam flow 496 mpph (62 kg/s); operating @ 870 psig/825F (60 bar/440C).
Incident Date:	7/24/06
Leak/Incident Loc:	**Economizer**—Hand-hole cap weld leak in lower economizer header.
Downtime hrs. due to leak/total:	29 hours
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Operator saw water** draining out of the ID fan duct drain.
Leak detection:	Yes. Nalco RBLI-Trasar/Mass Balance. Did not detect leak.
Sequence of events:	The **operator saw water** coming out of the ID fan duct drain: the bed was burned out and a normal shutdown conducted.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Ground out leak and rewelded.
Root cause:	**Porosity in shop weld of hand-hole cap.** Have experienced 5 other economizer hand-hold cap leaks within the last year.
Future prevention:	
Last full inspection:	3/06—Chemical clean 1998.

Spring 2007-4	
Location:	**Smurit-Stone Container Corp., Fernandina Beach, FL**
Unit:	RB4, 1970 B&W (PR-126), 2-drum, large economizer (replaced 2003 with B&W economizer).
Size:	3.0M#/d (1360 metric t/d);1000 psig (69 bar) design; steam flow 496 mpph (63 kg/s); operating @ 870 psig/825 F(60 bar/440C).
Incident Date:	10/24/06 (3 months after Incident #3 leak)
Leak/Incident Loc:	**Economizer**—Hand-hole cap weld leak in lower economizer header.
Downtime hrs. due to leak/total:	37 hours (~1 ½ days)
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Operator saw water** draining out of the ID fan duct drain.
Leak detection:	Yes, Nalco RBLI-Trasar/Mass Balance. Did not detect leak.
Sequence of events:	The operator saw water coming out of the ID fan duct drain: the bed was burned out and a normal shutdown conducted.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Ground out leak and rewelded.
Root cause:	Believed to be **porosity in shop weld.** This is the 6th lower economizer hand-hold cap leak within the last year.
Future prevention:	
Last full inspection:	3/06—Chemical clean 1998.

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—5	
Location:	**Longview Fibre, Longview, WA**
Unit:	RB22, 1992 ABB (89102); 1 drum, large economizer
Size:	3.7 M#/d (1678 metric t/d), 1065 psig (73 bar) design; steam flow 623 mpph (78 kg/s); operating @ 800 psig/750F (55 bar/400C).
Incident Date:	11/3/06
Leak/Incident Loc:	**Economizer**—At center lower supply header gamma plug weld. Have experienced one other leak at an upper economizer gamma plug weld.
Downtime hrs. due to leak/total:	96 hours (4 days)
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Operator observed water** dripping out of center economizer hopper.
Leak detection:	Yes, Hercules; did not confirm leak.
Sequence of events:	During normal rounds, helper noticed water dripping from the center economizer ash hopper; checked furnace draft, feedwater:steam difference, opacity, etc. and verified no boiler leak; fired RB19; Proceeded with normal shutdown.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Ground out crack and weld repaired.
Root cause:	**Poor weld on gamma plug** at erection.
Future prevention:	Inspect all hand-holes and gamma plug at next outage.
Last full inspection:	Unknown; Chemical clean 2005.

Spring 2007—6	
Location:	**Longview Fibre, Longview, WA**
Unit:	RB22, 1992 ABB (89102); 1 drum, large economizer
Size:	3.7 M#/d (1678 metric t/d), 1065 psig (73 bar) design; steam flow 623 mpph (78 kg/s); operating @ 800 psig/750F (55 bar/400C).
Incident Date:	1/3/07
Leak/Incident Loc:	**Economize**r—Pin-hole leak in FW supply line to cold economizer lower header
Downtime hrs. due to leak/total:	97 hours (~4 days)
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Helper found wet ash** in the rear economizer ash hopper.
Leak detection:	Yes, Hercules; did not confirm leak.
Sequence of events:	Helper found wet ash in the rear economizer ash hopper; a very small leak was observed at a feedwater supply tube; a normal shutdown was taken.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Replaced sections of the first 4 feed tubes.
Root cause:	**Tube thinning from flow accelerated corrosion.**
Future prevention:	UT inspection of all feed tubes at next outage.
Last full inspection:	Unknown; Chemical cleaned 2005.

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—7	
Location:	**MeadWestvaco, Covington, VA**
Unit:	RB2, 1991 Gotaverken (612530);1 drum, large economizer
Size:	5.0 M#/d (2268 metric t/d), 1840 psig (127 bar) design; steam flow 769 mpph (97 kg/s); operating @ 1550 psig/950F (107 bar/510C).
Incident Date:	7/13/06
Leak/Incident Loc:	**Economize**r—Lower 3rd tube from front at the tube-to-horizontal header weld, 37th element from right.
Downtime hrs due to leak/total:	28 hours
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Economizer 1 ash drag conveyor stopped.**
Leak detection:	No
Sequence of events:	The cold economizer ash chute plugged and the drag conveyor stopped; operators noticed water in the hopper. The boiler load was being reduced to prepare for a normal shutdown. At the request of the Powerhouse, the boiler's steam was being removed from the T-G and transferred to PRV's. Testing of the T-G trip upset the steam header, tripping the boiler on drum level. The boiler was left down for the economizer repair.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Ground out leak and rewelded.
Root cause:	Original **manufacturing weld defect**.
Future prevention:	Plan to remove an economizer lower bottle header for further testing.
Last full inspection:	7/05; Chemical cleaned 2003 (HCl).

Spring 2007—8	
Location:	**MeadWestvaco, Covington, VA**
Unit:	RB2, 1991 Gotaverken (6125300); 1 drum, large economizer
Size:	5.0 M#/d (2268 metric t/d), 1840 psig (127 bar) design; steam flow 769 mpph (97 kg/s); operating @ 1550 psig/950F (107 bar/510C)
Incident Date:	7/17/06 (4 days after previous leak, Incident #7)
Leak/Incident Loc:	**Economize**r—Lower 3rd tube from front at the tube-to-horizonal header weld, 31st element from left.
Downtime hrs due to leak/total:	30 hours
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Operator noticed water** in Economizer 1 ash drag conveyor.
Leak detection:	No
Sequence of events:	Assistant operator noted water in Economizer 1 ash drag conveyor (similar to leak discovered 4 days earlier); removed the liquor and took a normal shutdown.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Ground out leak and rewelded. This was the 3rd leak in the Economizer: 1st leak was in element #45 during 1st construction hydro (1991); 2nd leak, 4 days earlier.
Root cause:	Original **manufacturing weld defect.**
Future prevention:	
Last full inspection:	7/05; Cleaned 4/03 (HCl).

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—9	
Location:	**Weyerhaeuser Co., Grand Prairie, Alberta, Canada**
Unit:	RB1, 1973 CE (CA-70129), 2 drum, large cross-flow economizer
Size:	4.2 M#/d (1905 metric t/d), 1050psig (72 bar) design; steam flow 670 mpph (84 kg/s); operating @ 900 psig/800F (62 bar/427C).
Incident Date:	12/2/06
Leak/Incident Loc:	**Economizer**—Two 1/8" diameter pin-hole leaks in lower cold economizer. There were 5 economizer leaks in the 1990's; began shear-wave UT for 5 years, starting in 1997; identified and repaired 5 other tubes before failure; after 3 years with no leaks UT testing was discontinued.
Downtime hrs due to leak/total:	49 hours (2 days)
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Increase in steam:feedwater differential.**
Leak detection:	No
Sequence of events:	Control room operator noticed an increase in the steam:feedwater differential; checked blowdown valves, chemical concentration and other process trends; walked boiler down checking for leaks. Found water in economizer hopper. Prepared for a normal shutdown for repair.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Weld overlay
Root cause:	**Internal pitting of economizer**. Pitting is believed to be caused by **water quality issues in 1970's.**
Future prevention:	Reinstitute shear-wave UT in lower economizer.
Last full inspection:	4/06; Chemical cleaned 1990 (EDTA)

Spring 2007—10	
Location:	**Boise Cascade, Jackson, AL**
Unit:	RB2, 1974 CE (24272); 2 drum, DCE (1984 Foster-Wheeler economizer replacement).
Size:	2.3 M#/d (104 metric t/d), 750 psig (52 bar) design; steam flow 300mpph (38kg/s); operating @ 650psig/700F (45 bar/371C).
Incident Date:	12/26/06
Leak/Incident Loc:	**Economizer**—Lower header hand-hole cap weld crack.
Downtime hrs due to leak/total:	15 hours
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Triple 5 Acoustic sensor alarmed** at right lower economizer.
Leak detection:	Yes—Triple 5 Acoustic Leak Detection System; 1st indication of leak.
Sequence of events:	Acoustic sensor at right lower economizer showed an increasing noise trend; then alarmed; no leak was found. Following 4 days of closely monitoring trends and frequent walkdowns, an operator found water dripping from the rear economizer casing. A normal shutdown was taken for repairs.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Ground out crack in hand-hole weld and rewelded.
Root cause:	**Crack in hand-hole cap weld.**
Future prevention:	PT lower economizer hand-hole cap at next outage.
Last full inspection:	10/06; Chemical cleaned 1984.

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—11	
Location:	**International Paper, Texarkana, TX**
Unit:	RB1, 1972 B&W (PR-144) 2 drum, large economizer (1985 B&W)
Size:	2.3 M#/d (1179 metric t/d); 775 psig (53 bar) design; steam flow 408 mpph (51 kg/s); operating @ 650 psig/750F (45 bar/399C).
Incident Date:	11/19/06
Leak/Incident Loc:	**Economizer**—Hand-hole cap in center lower header of the cold economizer.
Downtime hrs due to leak/total:	36 hours (1 ½ days)
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Lower economizer ash hopper plugged**; operator saw water while unplugging the hopper.
Leak detection:	No
Sequence of events:	The boiler process tender was having trouble keeping the south secondary economizer ash hopper open; as the hopper was being opened, water was seen running down the hopper wall. The process manager was notified and an orderly shutdown and char bed burn out was conducted.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Gouged out hand-hole cap, repaired the seat and welded in new cap.
Root cause:	**Unknown—bad hand-hole cap weld?**
Future prevention:	
Last full inspection:	4/06; Chemical cleaned 2000

Spring 2007—12	
Location:	**International Paper; Franklin, VA**
Unit:	RB5, 1970 CE (21868); 2 drum DCE w/1993 ABB economizer replacement.
Size:	1.75 M#/d (794 metric t/d); 700 psig (45 bar) design; steam flow 279 mpph (35 kg/s); operating @ 600 psig/750 (41 bar/399C).
Incident Date:	10/07/06
Leak/Incident Loc:	**Economizer**—1/8" diameter hole at tube-to-header weld in upper economizer row 6, tube 73: washed 3/8" diameter hole in row 5, tube 72, and thinned row 5, tube 73.
Downtime hrs due to leak/total:	48 hours (2 days)
ESP?	No
Classification:	**CRITICAL** (The leak high in the economizer *could* have allowed water to enter the furnace cavity)
How discovered:	**Control room operator noticed B.L. solids dropped** from 65% to 62%; outside operator investigated and saw steam and water coming from 6th floor economizer door.
Leak detection:	Mass balance—did not confirm leak.
Sequence of events:	The control room operator noticed a 3% drop in B.L. solids; asked the outside operator to investigate; steam and water was noticed coming from an upper economizer door; liquor was pulled and a controlled shutdown was performed.
Bed cooling:	No
Wash adjacent tube:	Yes; washed a hole in an adjacent tube and thinned another.
Repair procedure:	Ground out and weld repaired the original leak in the tube-to-header weld (row 6, tube 73); plugged the two tubes washed in row 5.
Root cause:	This economizer has experienced previous leaks on the south side. This was the first leak or the north side. The leak was thought to have been caused by **localized exterior corrosion from years of improper cleaning.**
Future prevention:	Inspected tubes adjacent to the previous leaks on the south side and UT performed to ensure no other washouts had occurred.
Last full inspection:	Inspected 5/06; Chemical cleaned 2006 (HCl).

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—13	
Location:	**Georgia Pacific, Toledo, OR**
Unit:	RB1, 1957, CE (15656) 2 drum, DCE
Size:	1.05 M#/d (476 metric t/d); 700 psig (48 bar) design; steam flow 174 mpph (22 kg/s); operating @ 600 psig/750F (41 bar/399C).
Incident Date:	1/3/07
Leak/Incident Loc:	**Economizer**—1/8" circumferential crack at upper rear center tube-to-buckstay attachment weld. There have been 3 similar leaks within the last year.
Downtime hrs due to leak/total:	17 hours
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Routine walkdown**; **saw water** on buckstay.
Leak detection:	Yes (no additional information provided).
Sequence of events:	The operator during a routine walkdown, noticed a small amount of water accumulation on buckstay at the rear of the economizer; checked for other indications of a leak (steam:feedwater imbalance, low dilution water flow to DCE) and found none; pulled liquor and looked inside economizer; saw a dark spot near the rear center. The boiler was shut down in an orderly fashion for repairs.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Leak was ground out and pad-welded.
Root cause:	**Mechanical stress at a buckstay the attachment weld.**
Future prevention:	Investigating economizer replacement.
Last full inspection:	11/06; Chemical cleaned 1996.

Spring 2007—14	
Location:	**George Pacific, Toledo, OR**
Unit:	RB2, 1962, CE (15959) 2 drum, DCE; the economizer was manufactured by PSF Mechanical and installed in 2006.
Size:	1.05 M#/d (476 metric t/d); 700 psig (48 bar) design; steam flow 174 mpph (22kg/s); operating @ 600 psig/750F (41 bar/399C).
Incident Date:	2/19/07
Leak/Incident Loc:	**Economizer**—1/4" circumferential crack at tube-to-lower header weld, 4th tube from front, 3rd tube from the rear toward the center of the economizer (manufactured by PSF Mechanical, installed 2006).
Downtime hrs. due to leak/total:	41 hours (~1 ¾ days)
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Operator saw water dripping** onto the top of the cascade evaporator.
Leak detection:	Alert Systems Recovery Boiler Advisor; did not detect or confirm leak.
Sequence of events:	During a routine walkdown, an operator noticed water dripping from beneath the economizer inlet header onto the cascade evaporator; the liquor was removed from the boiler and an inspection door opened, revealing a small amount of water running over the lower economizer header. A normal shutdown was taken for repairs.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	The tube was plugged at the lower header and ~ 4 ' above the header. A second tube was also cut out to gain access and plugged. The plugged tubes will be replaced in March 2007.
Root cause:	This is a new economizer; the old economizer had several leaks prior to replacement. The leak **may have been caused by stress resulting from improper preheating of the header during manufacturing.**
Future prevention:	
Last full inspection:	2006; Chemical cleaned 1996.

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—15	
Location:	**Verso Paper, Jay, ME**
Unit:	RB1, 1965, CE (2564); 2 drum, large economizer
Size:	2.35 M#/d (1065 metric t/d), 1050 psig (72 bar) design; steam flow 296 mpph (37 kg/s); operating @ 900 psig/825F (62 bar/440C).
Incident Date:	11/3/06
Leak/Incident Loc:	**Economizer**—3" x 2" door opening at left sidewall adjacent to sootblower 22A.
Downtime hrs. due to leak/total:	58 hours (2 ½ days)
ESP?	**Yes**, Δt (1st indication to ESP) = 1 minute. Post ESP wait time policy=4hours.
Classification:	**CRITICAL** (The leak high in the economizer *could* have allowed water to enter the furnace cavity)
How discovered:	**High furnace pressure trip and high steam:feedwater differential alarm.**
Leak detection:	No
Sequence of events:	Operator noticed blow-back at the liquor gun ports as the high furnace pressure alarm activated; control room operator also noted that ID fan speed had increased; 20 seconds later the boiler tripped on high furnace pressure and a high steam;feedwater differential alarm activated; operator reported water on the upper floors at the rear of the boiler. The boiler was ESP'd within 1 minute of the initial indications.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Ruptured tube was plugged.
Root cause:	**Steam/water impingement from adjacent sootblower.**
Future prevention:	Added orifice plate around the sootblower header drain traps 5/06; investigation economizer replacement.
Last full inspection:	5/06; Chemical cleaned 2006 (HCl).

Spring 2007—16	
Location:	**Verso Paper, Jay, ME**
Unit:	RB1, 1965, CE (2564); 2 drum, large economizer
Size:	2.35 M#/d (1065 metric t/d), 1050 psig (72 bar) design; steam flow 296 mpph (37 kg/s); operating @ 900 psig/825F (62 bar/440C).
Incident Date:	12/5/06 (~1 month after ESP, Incident #15).
Leak/Incident Loc:	**Superheater**, stitch weld crack @ upper primary SH; also found 2 leaks in nose arch tubes at mud drum and 1 leak at an external rear wall attachment weld.
Downtime hrs due to leak/total:	95 hours (~4 days).
ESP?	No
Classification:	**CRITICAL** (Nose arch tube leaks were within the furnace cavity.)
How discovered:	**Steam:feedwater differential alarm**
Leak detection:	No
Sequence of events:	The high steam:feedwater differential alarmed twice; performed a boiler walkdown; no leak was found. Eight hours later, 3 more high steam:feedwater alarms; stopped sootblowing and heard the SH leak; pulled the liquor and performed an orderly shutdown.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	SH: ground out and pad-welded; Nose arch tubes: cut out and replaced; Wall attachment: cut out and replaced.
Root cause:	**SH stitch weld design; near drum corrosion; external attachment design + 4 water washes and 1 annual outage washing per year.** (ESP Sub.—**Perhaps the leaks were caused by stresses from the ESP 1 month earlier.**)
Future prevention:	Investigation upper furnace replacement with membrane design in 2008.
Last full inspection:	5/06; Chemical cleaned 2006 (HCl).

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—17	
Location:	**Canfor Pulp Limited Partnership, Prince George, B.C., Canada**
Unit:	RB1, 1968, B&W (6150), 2 drum, large economizer (1991 B&W SH replacement).
Size:	3.2 M#/d (1451 metric t/d); 680 psig (47 bar) design; steam flow 491 mpph (62 kg/s); operating @ 600 psig/710F (41 bar/377C).
Incident Date:	9/26/06
Leak/Incident Loc:	**Superheater**—1½" crack @ HAZ of tertiary SH tube-to-high crown seal box @ rear of element 15 from the right.
Downtime hrs due to leak/total:	24 hours
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**During walk down with SB's off, operator heard noise** at 9th floor.
Leak detection:	No
Sequence of events:	At 0200 operator heard a hissing sound coming from the boiler @the 9th floor. The boiler was taken off liquor and a SH leak confirmed. Since there was no threat of water entering the furnace, the bed was burned out and the boiler was shut down in an orderly fashion; the fire was removed at 1300. The unit was cooled, washed, and scaffold for repairs by 2300.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Ground out and weld repaired.
Root cause:	**Failed SH "D" clip** allowed the SH platen to move excessively with sootblowing; causing a crack at the HAZ of seal weld to the high crown sealbox.
Future prevention:	Inspect all SH "D" clips at next outage.
Last full inspection:	Spring 2006/ Never chemically cleaned since start-up.

Spring 2007—18	
Location:	**Alberta-Pacific Forest Ind., Boyle, Alberta, Canada**
Unit:	RB1, 1993 B&W (P-3605C); 1 drum, large economizer
Size:	6.1 M#/d (2766 metric t/d, 115 psig (79 bar); steam flow 850 mpph (107kg/s); operating @ 900 psig/850F (62 bar/454C).
Incident Date:	11/14/06
Leak/Incident Loc:	**Superheater**—Lower secondary (front) adjacent to SB#9, element 1; pinhole leak at hinge-pin connection caused from stresses from sootblower lance interferences due to SH element misalignment.
Downtime hrs. due to leak/total:	52 hours (2 ¼ days)
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Operator heard noise during walkdown with SB's off.**
Leak detection:	No
Sequence of events:	During walkdown with the SB's off, the operator heard an unusual noise coming from the west side of the boiler. The sootblowing steam was isolated; noise was still heard. More investigation revealed a leak in the SH by SB#9. The boiler was taken off liquor for a normal shutdown.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Cut out and replaced SH tube section at the hinge-pin leak area.
Root cause:	**Misalignment of superheater element.**
Future prevention:	SB's in areas of SH misalignment locked out until realignment can be accomplished.
Last full inspection:	Spring 2006; Chemical cleaned at 1992 start-up.

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—19	
Location:	**International Paper Ticonderoga, NY**
Unit:	RB1,1969, B&W (PR-131), 2 drum, large economizer
Size:	2.0 M#/d (912 metric t/d); 975 psig (62 bar) design; steam flow 300 mpph (38 kg/s); operating @ 875 psig/825F (60 bar/440C).
Incident Date:	7/18/06
Leak/Incident Loc:	**Superheater**—circumferential crack ¾ around tube in secondary SH, platen 40 (1st from south) at roof penetration of refractory seal.
Downtime hrs due to leak/total:	73 hours (~ 3days)
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Feedwater:steam differential increased to 50 mpph.**
Leak detection:	No
Sequence of events:	Operational trends showed an increasing feedwater:steam differential; shut SB steam off and conducted walkdown; heard leak @ 4th floor, south side; no leak was visible and no drum level problems; decided that the leak was in the SH, not roof; proceeded into an orderly boiler shutdown for repair.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Replaced top SH loop and about 3' of tubing on either side of the loop; repaired broken SH tie at rear wall screen.
Root cause:	**Failure of SH tie support** at rear wall screen.
Future prevention:	Will perform quarterly inspections for SH movement with IR camera.
Last full inspection:	5/06; Chemical cleaned 2005 (HCl).

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—20	
Location:	**Temple Inland, Orange, TX**
Unit:	RB2, 1967, B&W (PR-108B) 2 drum, DCE
Size:	1.7M#/d (748 metric t/d); 975 psig (67 bar) design; steam flow 256 mpph (32 kg/s); operating @ 850 psig/825F (59 bar/440C).
Incident Date:	1/19/07
Leak/Incident Loc:	**Upper wall**: attachment weld crack at cold side of LHSW; **Superheater**: primary loop, 1st platen from right, outside loop + 3rd platen from right, 2nd loop; **Collection pipe**: from left front sidewall header.
Downtime hrs due to leak/total:	119 hours (~5 days)
ESP?	**Yes**, for SH leak; Δt (1st indication to ESP)=3 minutes; Δt (boiler trip to ESP) ~1 minute Post ESP wait policy=4 hours.
Classification:	**NON-CRITICAL**
How discovered:	Upper wall attachment weld—**operator saw water on 6th floor.** Superheater—**high furnace pressure trip.** Collection pipe—**operator saw steam blowing from 9th floor east wall.**
Leak detection:	Trasar did not confirm leaks.
Sequence of events:	Fri. (1/19): 0810—Liquor removed from boiler to wash liquor system. 1115—Operator on rounds found leak @ 6th floor on cold side of LHSW; boiler was shut down for repairs. 2215—Repairs complete and hydro test good. 2315—Began boiler start-up. Sat. (1/20): 0515—Boiler online. 0650—Liquor firing began. 0714—Outside operator noticed and reported positive pressure on boiler. 0716—Boiler tripped on high furnace pressure. 0717—Operator initiated ESP—ESP functioned properly. After 4 hour wait period, found 2 ruptured primary SH's. 1530—Began bed cooling with sodium bicarbonate. 2305—Bed temps all <800F; began water washing the boiler. Sun. (1/21): 1600—Completed hand washing and began repair to SH's. Mon. (1/22): 1900—SH repairs complete. 2355—Good hydro Tues.(1/23): 0400—Began boiler start-up. Wed. (1/24): 0800—Outside operator noticed steam blowing from the 9th floor, LHSW; Found crack in collection pipe from the top front left sidewall upper header; began normal shutdown of the boiler. 1500—Repair complete. 1600—Hydro revealed a pin-hole leak on the collection pipe from the front RHSW upper header. 1830—Began repair. 2200—Hydro test was good. 2330—Began boiler start-up. Thurs.(1/25): 0530—Boiler on line. 0845—Began liquor firing.
Bed Cooling:	Sodium bicarbonate; began injection on bed 8 hours after ESP for 7½ hours; saved 1 day cooling to<800F.
Wash adjacent tube:	No
Repair procedure:	Attachment weld—ground out crack and weld repaired. Superheater—replaced one SH loop; plugged and removed one SH platen. Collection pipes—ground out cracks and weld repaired.
Root cause:	**Attachment weld crack—cold side stress corrosion cracking.** **Superheater—not clearing SH at start-up.** **Collection pipe—thermal fatigue.**
Future prevention:	Plan to replace lower/mid furnace and the removed superheater platen 10/07; revise start-up procedures including the use of SH vent valve to clear the SH's during start ups.
Last full inspection:	12/06; Chemical cleaned 1989.

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—21	
Location:	**Georgia Pacific, Monticello, MS**
Unit:	RB2, 1968, CE (20765), 2 drum, DCE
Size:	2.4 M#/d (1088 metric t/d); 1035 psig (71 bar) design; steam flow 402 mpph (51 kg/s); operating @ 875 psig/825F (60 bar/440C).
Incident Date:	11/11/06
Leak/Incident Loc:	**Smelt spout—**Leak in spout water jacket @ a tack weld to attach expanded metal refractory reinforcement.
Downtime hrs due to leak/total:	79 hours (~3 ¼ days)
ESP?	**Yes**, Δt (1st indication to ESP) = 2 hours; Δt (water suspected to ESP) = 1 minute; Post ESP wait policy = 6 hours
Classification:	**CRITICAL** (Water from the spout leak entered the furnace cavity.)
How discovered:	**Outside operator noticed a glowing red spot on a smelt spout wall box**.
Leak detection:	Nalco Trasar/Mass Balance System (spout cooling water system is not part of system).
Sequence of events:	At about 1 P.M. the supervisor and 2nd utility operator asked the superintendent to inspect the left rear smelt spout. A glowing red spot was noticed on the spout wall box, indicating that the refractory seal was failing. Auxiliary fuel was added, the liquor removed, and the building entry alarms were turned on at 1:10 P.M. By 2:40 P.M. the char bed was burnt out and the spouts stopped running. The spout wall box was again inspected. The box had burnt through below the spout. The doghouse shower water was turned off to better inspect the area. Looking through a liquor gun port, a dark spot was seen in front of the spout. The cooling water to the spout was isolated. A dark spot was noticed between the tube opening and the spout. Since it was not clear if there was a spout leak or a pressure part leak, an ESP was initiated @ 3 P.M. All ESP functions operated correctly.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Replaced all six smelt spouts.
Root cause:	**Welding refractory reinforcement to the spout water jacket.**
Future prevention:	Will not tack weld expanded metal refractory reinforcement to the smelt spout water jackets.
Last full inspection:	4/06; Chemical cleaned 2004 (HCl).

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—22	
Location:	**International Paper, Franklin, VA**
Unit:	RB4, 1963, CE (1263) 2 drum, DCE
Size:	1.75 M#/d (794 metric t/d); 700 psig (48 bar) design; steam flow 274 mpph (35 kg/s); operating @ 600 psig/750F 41 bar/399C).
Incident Date:	4/10/06
Leak/Incident Loc:	**Lower furnace sidewall (external)**—Right wall, tube 22~17' above floor @ the manway door frame-to-tube attachment weld (cold side).
Downtime hrs due to leak/total:	98 hours (~4 days)
ESP?	**Yes**. Time from 1st indication to ESP=? Post ESP wait policy = 4 hours.
Classification:	**CRITICAL** (Water *could* have entered the furnace cavity due to tangent-tube type wall design.)
How discovered:	**Outside operator saw steam** exiting from the 3rd floor right side manway door casing.
Leak detection:	Yes, internally developed mass balance; did not detect leak.
Sequence of events:	The outside operator noticed steam exiting the casing around the 3rd floor manway door; inspected and could not determine the source of the steam. The area manager was contacted and liquor was pulled from the boiler. When further inspection could not determine the source of the steam, the boiler was ESP'd.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Replaced failed tube section with 4' dutchman.
Root cause:	**Improper attachment weld** of the vertical suppot of the manway door seal box. The side bar of the seal box should have been welded to the interior casing, not to the pressure part. The failure occurred at a "start-stop" point of the stitch weld.
Future prevention:	Plan to install new manway door assemblies in 2007. The new design should eliminate this type of failure.
Last full inspection:	3/06; Chemical cleaned 2004 (HCl).

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—23	
Location:	**International Paper, Franklin, VA**
Unit:	RB4, 1963, CE (1263) 2 drum, DCE
Size:	1.75 M#/d (794 metric t/d); 700 psig (48 bar) design;steam flow 274 mpph (35 kg/s); operating @ 600 psig/750F (41 bar/399C).
Incident Date:	9/30/06 (5 ½ months after the previous incident #22.)
Leak/Incident Loc:	**Lower furnace sidewall (external)—**right wall, tube 32~17' above floor @ the manway door frame-to-tube attachment weld (cold side).
Downtime hrs due to leak/total:	48 hours (2 days)
ESP?	No
Classification:	**CRITICAL** (Water *could* have entered the furnace cavity due to tangent-tube type wall design.)
How discovered:	**Operator noticed water dripping** around the right side primary air duct.
Leak detection:	Yes, internally developed mass balance; did not detect leak.
Sequence of events:	The operators noticed water dripping around the right side primary air duct. Liquor was removed and the 150# steam was isolated from the SCAH; no change in the leak. The 150# steam was re-admitted and the 60# SCAH steam was isolated; again no change in the leak. The oil fire was removed and the leak was located near the right side manway door on the cold side of the tube (similar to a leak on the manway door seal box 5 ½ months earlier).
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Replaced failed tube section with 4' dutchman.
Root cause:	**Improper attachment weld** of the vertical support of the manway door seal box. The side bar of the seal box should have been welded to the interior casing, not to the pressure part. The failure occurred at a "start-stop" point of the stitch weld.
Future prevention:	Both similar tubes were replaced on the left manway door opening during this outage. Manway door opening replacements are planned for the 4/07 outage. These replacements will also be applied to RB5.
Last full inspection:	4/06; Chemical cleaned 2004 (HCl).

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—24	
Location:	**Alberta Pacific Forest Industries, Boyle, Alberta, Canada**
Unit:	RBI, 1993 B&W (P-3605C), 1 drum, large eco.
Size:	6.7 M#/d (3039 metric t/d), 1150 psig (79 bar) design; steam flow 850 mpph (117 kg/s); operating @ 900 psig/850F (62 bar/454C).
Incident Date:	5/13/06
Leak/Incident Loc:	**Floor**—Approximately 20' from spouts; pin hole leaks in 7 tubes; replaced 14 floor tubes.
Downtime hrs due to leak/total:	168 hours (~7 days)
ESP?	No
Classification:	**CRITICAL** (Water entered the furnace cavity from the floor tube leaks.)
How discovered:	**Noticed a drop in boiler water concentration + an increase in steam:feedwater differential.**
Leak detection:	No
Sequence of events:	Noticed a drop in boiler water concentration + an increase in steam:feedwater differential; walked down the boiler with SB's off; no indications. Took the boiler off liquor and burned out the bed (~3 hours); still no indication. Once the spouts stopped running, the SB's were turned off again and another walkdown conducted. At this time a loud noise was heard and looking through the liquor gun ports, steam was seen blowing from the floor. Since there was no char bed present, the boiler was not ESP'd. A normal shutdown was conducted for repairs.
Bed cooling:	No
Wash adjacent tube:	Yes
Repair procedure:	Replaced failed and thinned tube sections (14 total).
Root cause:	The leaks were caused by **accelerated tube wastage from smelt running off floor refractory. The upper ½ of the studded sloped floor was refractory** covered for dent protection. (ESP Sub.—**Possible steam-blanketing from floor tube dents**.)
Future prevention:	Do not install refractory protection on only ½ of slopped floor; plan to replace floor and add 2 more floor beams—2007.
Last full inspection:	5/06; Chemical cleaned @ 1993 start up.

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—25	
Location:	**International Paper, Courtland, AL**
Unit:	RB2, 1979, B&W (PR-180), 2 drum, DCE
Size:	4.0 M#/d (1814 metric t/d); 550 psig (38 bar) design; steam flow 550 mpph (63 kg/s); operating @ 450 psig/550F (31 bar/288 C).
Incident Date:	12/22/06
Leak/Incident Loc:	**Furnace screen tube**—8th tube down, 5th platen from left side @ site of previous leak and ESP 7 months earlier on 5/31/06. (Fall 2006 Incident #22).
Downtime hrs due to leak/total:	49 hours (~2 days)
ESP?	**Yes**; Δt (1st indication to ESP)~24 hours; Δt (identified leak to ESP) = few minutes. Post ESP wait policy = 4 hours.
Classification:	**CRITICAL** (Water entered the furnace cavity.)
How discovered:	**Mass balance leak detection alarmed**.
Leak detection:	Mill developed mass balance system first detected the leak.
Sequence of events:	Evening of 12/21 level 2 (of 3) leak alarmed; boiler walkdown conducted with no indication of leak; alarm was reset. 12/22: 0800—- Another walkdown without indication of leak. 1300-1320—Pulled liquor from boiler; walked down boiler again, opening access doors to better inspect; found leak @ screen tubes. 1320— ESP'd the bolier.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Installed dutchman and realigned the tube.
Root cause:	**Out-of-alignment screen tube** may have made the tube more of a target for falling saltcake.
Future prevention:	Maintain screen tube alignment and review of sootblowing frequency to see if large saltcake falls can be reduced.
Last full inspection:	9/05; Chemical cleaned 2001.

Spring 2007—26	
Location:	**Mead Westvaco (NewPage), Luke, MD**
Unit:	RB2, 1958 B&W (PR-42), 2 drum, DCE
Size:	1.6 M#/d (726 metric t/d); 700 psig (48 bar) design; steam flow 204 mpph (26 kg/s); operating @ 600psig/720F (41 bar/382C).
Incident Date:	11/1/04
Leak/Incident Loc:	**ESP—No leak**
Downtime hrs. due to leak/total:	48 hours(2days)/68 hours (~2 ¾ days)
ESP?	**Yes**, Δt (1st indication to ESP) = <1 minute. Post ESP wait policy = 8 hours.
Classification:	**NO LEAK**
How discovered:	**Control room operator observed rapid changes in steam flow, feedwater flow, and drum level indications.**
Leak detection:	Acoustic
Sequence of events:	Control operator noticed a sudden drop in steam flow (170 mpph→20 mpph); an increase in feedwater flow (160 mpph→400 mpph) and drum level drop (-2" → -14"), all within 30 seconds. An ESP was initiated. The boiler cooled for 24 hours; then the bed further cooled with steam lances. A hydro test showed no leaks.
Bed cooling:	Yes—10 hours using steam lances until bed ≤ 500F (260C).
Wash adjacent tube:	N/A
Repair procedure:	N/A
Root cause:	**Pinched line on steam flow transmitter caused a false flow signal, upsetting multi-element drum level control.**
Future prevention:	
Last full inspection:	7/04; Chemical cleaned 1995.

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—27	**International—1**
Location:	**SAPPI, Ngodwana, South Africa**
Unit:	RB1, 1966 B&W (56/80841), 2 drum, large cross-flow economizer
Size:	1.3 M#/d (590 metric t/d); 2000 kPa (290 psig, 20 bar) design; steam flow 191 mpph (24 kg/s); operating @ 1500 kPa/ ?F (218 psig, 15 bar/ ?C).
Incident Date:	1/20/07
Leak/Incident Loc:	**Economizer**—pin-hole leaks in tube #1, row 14 & in tube #2, row 17 ~2m above the bottom header. The leaks were just above the 1999 lower economizer replacement section and just below the lower flow baffle, near a 2004 failure on tube #2, row 16.
Downtime hrs. due to leak/total:	60 hours (~2 ½ days)
ESP?	No
Classification:	
How discovered:	**During walkdown, operator noticed water leaking out of economizer casing.**
Leak detection:	No
Sequence of events:	Operator walking past the economizer noted water dripping out of the economizer hopper. A normal shutdown was conducted for repairs.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Leaking tubes were removed and the headers plugged.
Root cause:	Previous operating conditions led to **low temperature dew-point corrosion in the lower economizer**. The leaks were in the original tubing just above the replaced portion of the economizer and near the cross-flow baffle which could have contributed to the exterior tube erosion.
Future prevention:	Operate the boiler at loads sufficient to eliminate the low temperature dew-point corrosion and maintain stable operating conditions.
Last full inspection:	11/06; Chemical cleaned 2003.

Spring 2007—28	**International—2**
Location:	**SAPPI, Ngodwana, South Africa**
Unit:	RB1, 1966 B&W (56/80841), 2 drum, large cross-flow economizer
Size:	1.3 M#/d (590 metric t/d); 2000 kPa (290 psig, 20 bar) design; steam flow 191 mpph (24 kg/s) operating @ 1500 kPa/ ?F (218 psig, 15 bar/ ?C).
Incident Date:	1/25/07
Leak/Incident Loc:	**Economize**r—leaks in tube #1, row 13 & in tube #1, row 15 ~ 2m above the bottom header. The leaks were just above the 1999 lower economizer replacement section and just below the lower flow baffle, near a 2004 failure on tube #2, row 16, and the failures on tube #1, row 14 & tube #2, row 17 on 1/20/07(5 days earlier—International Incident-1.)
Downtime hrs. due to leak/total:	60 hours (~2 ½ days)
ESP?	No
Classification:	
How discovered:	**Operator noticed water leaking out of economizer ash conveyor.**
Leak detection:	No
Sequence of events:	Operator was walking past the economizer when he noticed water dripping out of the economizer hopper. A normal shutdown was conducted for repairs.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Leaking tubes were removed and the headers plugged. Additionally, tube #2 on rows 13, 14, & 15 were similarly removed and plugged since they were washed from the leaks on tube #1 on rows 13 &15.
Root cause:	Previous operating conditions led to **low temperature dew-point corrosion in the lower economizer**. The leaks were in the original tubing just above the replaced portion of the economizer and near the cross-flow baffle which could have contributed to the exterior tube erosion.
Future prevention:	Operate the boiler at loads sufficient to eliminate the low temperature dew-point corrosion and maintain stable operating conditions.
Last full inspection:	1/07 (5 days earlier); Chemical cleaned 2003.

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—29	**International—3**
Location:	**SAPPI, Usutu, Swaziland**
Unit:	RB2, 1971, ICAL(CE), (SB 130), 2 drum, DCE
Size:	1.1 M#/d (516 metric t/d); 725 psig (50 bar) design; steam flow 60 t/h (132 mpph/17 kg/s) operating @ 620 psig/ 770F (43 bar/ 410C).
Incident Date:	4/20/06
Leak/Incident Loc:	**Vent valve—**Upper screen header vent valve pin-hole leak (outside furnace).
Downtime hrs due to leak/total:	2 hours
ESP?	No
Classification:	
How discovered:	**During normal daily plant check (walkdown).**
Leak detection:	No
Sequence of events:	Operator noticed small leak at the screen upper header vent valve; the boiler load was reduced to ~50% for 2 hours for the contractor to install a temporary high pressure steam seal box around the leaking valve.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	A temporary high pressure steam seal box was installed. The leaking valve was replaced about 1 month later during a water wash.
Root cause:	**Corrosion on drain piping/valve.**
Future prevention:	Frequent checks of the screen vent valves/piping/lagging to eliminate corrosive conditions.
Last full inspection:	11/05; Chemical cleaned ???

Spring 2007—30	**International—4**
Location:	**SAPPI, Usutu, Swaziland**
Unit:	RB2, 1971, ICAL(CE), (SB 130), 2 drum, DCE
Size:	1.1 M#/d (516 metric t/d); 725 psig (50 bar) design; steam flow 60 t/h (132 mpph/17 kg/s) operating @ 620 psig/ 770F (43 bar/ 410C).
Incident Date:	11/17/06
Leak/Incident Loc:	**Superheater**—Cracks @ termination point of element alignment fillet weld on element 3, tube 27 & element 8, tube 3. **Wall tube**—Cracking in HAZ of butt weld RHSW, tube 3, elevation ???
Downtime hrs due to leak/total:	None
ESP?	No
Classification:	
How discovered:	**During shutdown hydro test.**
Leak detection:	No
Sequence of events:	1st hydro @ 36 bar (522 psig) revealed 2 SH leaks; element 3, tube 27 & element 8, tube 3; 2nd hydro @ 50 bar (725 psig) following SH repairs revealed a leak in the RHSW, tube #3 @ elevation???
Bed cooling:	N/A
Wash adjacent tube:	No
Repair procedure:	Superheaters—Ground out cracks and weld repaired; Wall tubes—Replaced tube #'s 3 & 4 with 14" tube section.
Root cause:	Superheater**—Tube cracking @ termination point of element alignment fillet weld.** Wall tubes**—Cracking at HAZ at butt weld.**
Future prevention:	Provide scaffold access for thorough SH inspection and thoroughly inspect all furnace butt welds.
Last full inspection:	11/05; Chemical cleaned???

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—31	
Location:	**Domtar, Windsor, Quebec, Canada**
Unit:	RB 1, 1987 CE (CA-84127), 2 drum, large economizer (2000 ABB replaced eco hand-hole caps).
Size:	4.65 M#/d (2109 metric t/d); 800 psig (55 bar) design; steam flow 645 mpph (81 kg/s); operating @610 psig/750F (42 bar/399C).
Incident Date:	11/16/06
Leak/Incident Loc:	**Economize**r—Lower hand-hole cap weld leak
Downtime hrs. due to leak/total:	38 hours (~1 ½ days)
ESP?	No
Classification:	**NON-CRITICAL**
How discovered:	**Economizer ash hopper conveyor tripped.**
Leak detection:	No
Sequence of events:	The economizer ash hopper tripped and alarmed; field operator investigated and found the drag converyor chain broken by an accumulation of hard saltcake; also noticed a small amount of water running down the middle section of the ash hopper. Liquor was removed in preparation for an orderly shutdown for repairs. While bring the boiler down, firing natural gas only, the exact location of the leak was confirmed.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Removed leaking hand-hole cap; cleaned opening, MT'd opening; new cap welded with 2 passes; MT'd after welding.
Root cause:	**Only 1 weld pass on hand-hole cap versus 2 weld pass procedure.**
Future prevention:	During the 4/07 outage, will MT/replace other hand-hole caps that were replaced in 2000.
Last full inspection:	5/06; chemical cleaned 2003.

APPENDIX A – SUMMARY OF RECOVERY BOILER INCIDENTS (Cont.)

Spring 2007—32	
Location:	**Boise Cascade, Wallula, WA**
Unit:	RB3, 1973 CE (23772), 2 drum, large economizer.
Size:	3.15 M#/d (1429 metric t/d): 710 psig (49 bar) design; steam flow 550 mpph (69 kg/s); operating @ 600 psig/700 F (41 bar/371 C).
Incident Date:	12/19/06
Leak/Incident Loc:	**Furnace Screen**—3 (1/4" dia. to 1/16" dia.) tube leaks on the lower screen tubes in platens 6 & 10 ~85' above the floor.
Downtime hrs. due to leak/total:	144 hours (6 days)/147 hours (6+ days).
ESP?	**Yes**, Δt (1st indication to ESP)~3 days; Δt (identified leak to ESP) = few minutes. Post ESP wait policy = 4 hours.
Classification:	**CRITICAL** (Water entered the furnace cavity.)
How discovered:	**Acoustic leak detection system alarm** followed by a drop in boiler water chemistry the next day.
Leak detection:	Yes—Triple 5, 1st identified leak.
Sequence of events:	Sat. 12/16 — Multiple sensor alarm from Triple 5 Acoustic Monitoring System; several walkdowns with SB's off; no leak identified or suspected, but noted higher than normal vibration on tertiary FD fan—possible source of alarms? Sun.12/17—Noted a drop in boiler water chemical concentration which coincided with some problems in the caustic make-down system; increased the caustic feed rate; no feedwater:steam differential of drum level indications. Mon.12/18—After caustic concentration returned to normal level, noticed the alkalinity level began to decay while continuing an elevated federate; the acoustic sensors were still in alarm; still no feedwater:steam differential or drum level indications. Tues.12/19—Analyzed acoustic signal levels under different operating conditions (on liquor w/SB's on; on liquor w/SB's off; on natural gas only w/SB's off) and determined that the elevated acoustic signal levels were internal to the boiler; visually confirmed screen tube leak during walkdown; ESP's the boiler at 1355.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Replaced 2 tube failures and 4 additional visually blistered lower screen tubes with new tube sections.
Root cause:	**Long-term overheat; internal deposit** DWD's ranged from 70-100g/sq. ft.; deposits consisted mainly of magnesium, calcium, and phosphorous; believed to have been caused by **inadequate post-chemical clean flushing of the screen's lower-most tubes.**
Future prevention:	Chemical cleaned ~ 1 month after the incident; plan to replace all lower & upper screen tubes during the next outage.
Last full inspection:	9/06; Chemical cleaned 2003.

Welded Header Hand Hole Caps

Basic Practices:
- Match Header – Cap Materials
  - SA-106
  - SA-105
  - SA-182 F11/F12
  - SA-182 F22

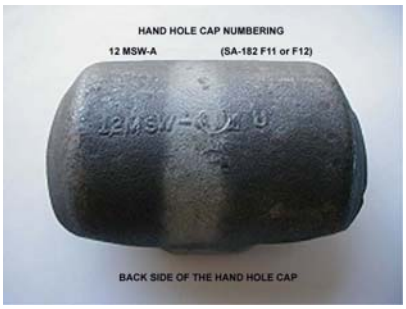
- Both Surfaces Thoroughly Clean & Restored.

- Electrodes Kept Dry, Stored in Portable Ovens. (250ºF).

- "Upset" Cap, MINIMUM (3) Locations.

Slide - 1

Match Header – Cap Materials



Slide - 2

Some Folks- "Upset" Along the Side of Caps

Slide - 3

3 Raised Points Along the Edge

Slide - 4

But Not Both Surfaces

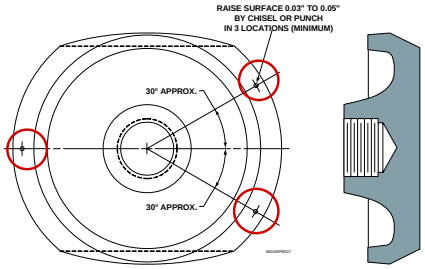
Slide - 5

Why "Upset" the Caps??

For Shrinkage Allowance of Weld Metal.

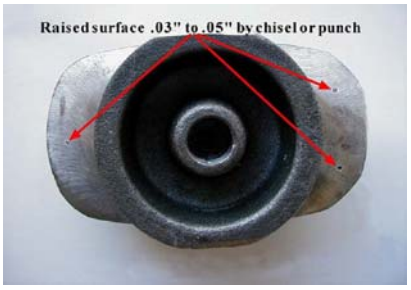
Slide - 6

TYPICAL HAND HOLE CROSS SECTION WITH CHISEL OR PUNCH "UPSET" LOCATIONS (3 MINIMUM)



Slide - 7

Most Common Upset on This Mating Surface



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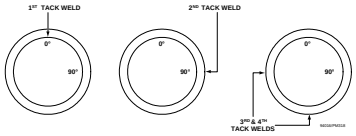
TACK WELDING SEQUENCE FOR WELDING HAND HOLES



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- B&W MHH plugs are available in carbon steel (SA-181-70) or 2¼Cr-1Mo (SA-182 F22 CL3)
  - Carbon steel MHH plugs are stamped 80MM, SM17, SM16 or SM70SI
  - 2¼Cr-1Mo MHH plugs are stamped 78MM, AM17, AM16 or AM70SI.
- Material selection should follow Table 1.

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Table 1
Electrode Material Selection and Preheat Temperature

Items		Carbon-Steel Header (P1)	1¼Cr-½Mo Header (P4)	2¼Cr-1Mo Header (P5)
Carbon-Steel MHH Plug	Electrode	E7015-A1 E7016-A1 E7018-A1	Unacceptable Header/Cap Material Combination	Unacceptable Header/Cap Material Combination
	Preheat Temperature	200°F Minimum		
2¼ Cr-1Mo MHH Plug	Electrode	E7015-A1 E7016-A1 E7018-A1	E8015-B2 E8016-B2 E8018-B2	E9015-B3 E9016-B3 E9018-B3
	Preheat Temperature	550° F +/- 50° F	550° F +/- 50° F	550° F +/- 50° F

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Installation procedure

- Repair any damage to the header, including any necessary weld repair and PWHT. Do not attempt any weld repair to the header while welding in the hand hole cap.
- Thoroughly clean the MHH plug shaft and seat, as well as the header seat, bore and welding surfaces by removing all weld spatter, debris, oxides, paint and preservatives.
- Install hand hole plug into header, align the MHH plug shear lugs with the axis of the header and pull the plug snugly against the header seat with a mechanical device.

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- Preheat the header and plug to the temperature listed in Table 1, and maintain preheated temperature during the entire welding process, including the time between passes. The base header material should be preheated for a distance of 3” in all directions from the MHH plug.
- Seal weld with three passes, checking the root pass visually for cracks before proceeding. Small tack welds are not advised due to the tendency for cracking. Do not remove the mechanical device until after completion of all filet weld passes.
- Immediately following welding, visually inspect and remove the mechanical device, cover the area with an insulating blanket, and allow to cool to ambient temperature

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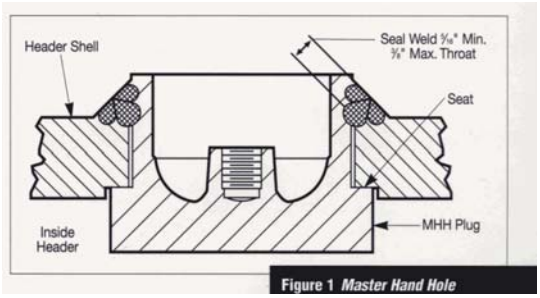

Figure 1 *Master Hand Hole*

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- This procedure eliminates the need for stress relieving the seal weld in any of the material grades and is the reason a seal weld, rather than a strength weld, is recommended. The maximum throat dimension of the seal weld is 3/8” to comply with the post-weld heat treatment exemptions listed in ASME Section I PW-39. A weld throat dimension in excess of 3/8” is possible, but this would violate the ASME Section I rules for exemption from post-weld heat treatment.

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The difference in the installation methods is due to the relationship of the top of the cap with the header. The Alstom cap, as shown in Figure 1, is not as tall as the B&W cap, as shown in Figure 2. As a result the seal weld between the cap and the header is located on the edge of the header. After the weld is completed and the welded area is cooled, shrinkage causes the cap to be pulled tighter to the header seat. The punch marks allow the cap to sit slightly off of the header seat. As the seal weld cools the gap created by the punch marks is closed up and the residual stress in the seal weld due to the shrinkage is minimized.

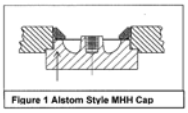
Figure 1 Alstom Style MHH Cap

The B&W style MHH cap is taller which positions the seal weld on the outside of the header. Due to the different location of the seal weld compared to the Alstom cap the effects of the weld shrinkage are different. In fact the cap movement after the seal weld has cooled is in the opposite direction of the Alstom cap. Since the seal weld shrinkage does not put any additional stress on the seal weld the use of punch marks or other means of leaving a gap between the cap and the header seat are not required.

For these reasons the B&W style welded MHH cap should not be punch marked during installation.

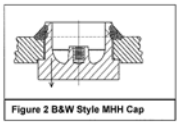
Figure 2 B&W Style MHH Cap

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TAPPI Steam & Power/Energy Management Committee

Officers:

- Chairman – Paul Conner – Southern Co.
- Vice Chair – Norris Johnston – Hercules
- Secretary – John Andrews – Mead-Westvaco
- Membership Chair – Jim Dickinson – B&W

Subcommittees:

- Recovery & Power Boilers – Andy Jones – IP
- Water Treatment– Mark Sargent – IP
- Energy– Tom Harriz – Jacobs
- Gasification – Dan Burciaga – Thermo Chem (temp. Chairman)

Slide 1

Membership:

88 members

- 20 Mill
- 17 Suppliers
- 23 Consultants
- 11 AE Firms
- 17 Other (University, Retired, Labs, etc.)

Subcommittee Breakdown:

Recovery & Power Boilers	48
Water Treatment	11
Energy	23
Gasification	6

Slide 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.

Activities:

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

Slide 3

Recovery Boiler – Current Activities:

- Recovery Boiler Performance Calculation Forms
  - Long Form – Being Published
  - Short Form – Updated (spreadsheet to be made available)
- Stripping of Kraft Pulping Process Condensates – Regulations, Design & Operations
  - Being updated
- Collection and Burning of Concentrated NCG's – Regulations, Design, Operation
  - Being updated

Slide 4

Recovery Boiler – Current Activities:

- Maximizing Recovery Boiler Thermal Efficiency
  - based on A. Jones presentation
- Sootblowers – The Basics
  - Alarick Tavares/Danny Tandra
- Guidelines for Replacement of Generating Bank Tubes with Expanded Joints in Two-drum Boilers
  - Fred Marcinek
- Guidelines for Specification and Construction of Recovery Boiler Economizers
  - Jack Clement

Slide 5

Power Boiler – Current Activities:

- Fluid Bed Database
  - Ed Mockridge
- Biomass Boiler Performance Test Procedure
  - Jack Clement

Slide 6

Recovery Boiler – Past/Recently Released TIP's

- 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
- Recommended Test Procedure for Black Liquor Evaporators
- Tube Rolling Procedures and Quality Guidelines

Slide 7

Water Treatment Subcommittee - Past Released TIP's

- Water quality and monitoring requirements for paper mill boilers operating on high purity feedwater
- Design engineers tree: paper mill boiler feedwater
- Response to contamination of high purity boiler
- Keys to successful chemical cleaning of boilers
- Water treatment-related opportunities for energy conservation in a paper mill powerhouse
- Evaluating reverse osmosis for treating makeup to the boiler feedwater in a pulp and paper mill

Slide 8

Energy Management Sub-Committee:

- Recently released Mill Area Energy Benchmarking spreadsheet
  - Contact Tom Harriz to obtain Tom.Harriz@jacobs.com
- Tracking global energy supply and depreciation, to anticipate pressure on and opportunities for Biorefinery options

Slide 9

Water Treatment Sub-Committee

- Organizing workshop at TAPPI Engineering, Pulping & Environmental conference this fall
  - Recovery boiler waterside inspection
  - Chemical cleaning frequency and condensate treatment/monitoring
  - Panel Q&A session.

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Meetings:

- Twice/year
  - Fall Technical Conference + Spring
    - Next Meeting – March 28, 2007 - Atlanta (TODAY - following BLRBAC)

2007 TAPPI Engineering, Pulping & Environmental Conference

- **October 20-24, 2007**
- **Jacksonville, FL**

Requirements to Join?

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

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