BLACK LIQUOR RECOVERY BOILER
ADVISORY COMMITTEE

OBJECTIVE

The objective of BLRBAC 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:	**Dean Clay** (new) International Paper P. O. Box 7910 Loveland, OH 45140-7910	Tel: 513-248-6564 Fax: 513-248-6679 **dean.clay@ipaper.com**
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Treasurer:	**Ron Hess** (new) HSB Forest Products Group 110 Cedar Cove Court Buckhead, GA 30625	Tel: 706-484-1723 Fax: 706-485-5267 **ronald_hess@hsb.com**

REGULAR MEMBERSHIP

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

ASSOCIATE MEMBERSHIP

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

CORRESPONDING MEMBERSHIP

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

* * * * *

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

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BLRBAC MEETING SCHEDULE

Spring	2003	--	April	7, 8 & 9
Fall	2003	--	October	6, 7 & 8
Spring	2004	--	April	5, 6 & 7
Fall	2004	--	October	4, 5, & 6

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

■ Past Chairman Lon Schroeder

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BLRBAC has created 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 and this is where they should obtain the following information for the BLRBAC meetings:

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 number, alternate hotel information, etc.
SCHEDULE	List of Subcommittee activities on Monday & Tuesday
AGENDA	Reports given to Joint BLRBAC Meeting on Wednesday
DELTA AIRLINE	Reduced rates and contact phone number, including discounted Avis rates for BLRBAC attendees.
QUESTIONNAIRE	Mail/e-mail completed questionnaires back to Said & Done. These will be given to the Operating Problems Subcommittee Chairman. He will see that your concerns are brought up and discussed during the Operating Problems session at the next meeting.

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BLRBAC Publications

The following is the current status of the BLRBAC publications. Most of these are available at the **BLRBAC INTERNET ADDRESS** :

www.blrbac.org

1. **Recommended Good Practice for Firing of Auxiliary Fuel in Black Liquor Recovery Boilers**, Revised October 2002

2. **Recommended Good Practice for Safe Firing Black Liquor in Black Liquor Recovery Boilers**, Revised October 2002

3. **Recommended Rules for Personnel Safety for Black Liquor Recovery Boilers**, Revised April 1997

4. **Recommended Emergency Shutdown Procedure (ESP) and Procedure for Testing ESP System for Black Liquor Recovery Boilers**, October 2002.

5. **Recommended Good Practice – Guidelines for Post-ESP Procedures for Black Liquor Recovery Boilers**, Issued October 2002

6. **Recommended Good Practice - Fire Protection in Direct Contact Evaporators and Associated Equipment**, Revised October 2002

7. **Instrumentation Check List and Classification Guide for Instruments and Control Systems Used in Operation of Black Liquor Recovery Boilers**, Revised April 2002

8. **Recommended Good Practice – Thermal Oxidation of Waste Streams in Black Liquor Recovery Boilers**, Revised April 2002

9. **Recommended Training Program Guidelines for Black Liquor Recovery Boilers and Associated Systems**, Issued April 1997.

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Jim Quandt Weyerhaeuser Company P. O. Box 275 Springfield, OR 97477 Tel: 541-741-5428 Fax: 541-741-5895 **jim.quandt** **@weyerhaeuser.com**	Ivan Semyanko, PE ABB Alstom Power, Inc. CEP Code 1017-2406 2000 Day Hill Road Windsor, CT 06095 Tel: 860-285-3953 Fax: 860-285-4020 **ivan.semyanko** **@us.abb.com**	

* = Attended 10/02 Meeting

SAFE FIRING OF BLACK LIQUOR SUBCOMMITTEE

Len Erickson, Chairman*
Boise Paper Solutions
P. O. Box 50
Boise, ID 83728-0001
Tel: 208-384-4933; Fax: 208-384-7637
lenerickson@boisepaper.com

Mark Sargent -- Co-Chair International Paper 6285 Tri-Ridge Blvd. Loveland, OH 45140-7910 Tel: 513-248-6086 Fax: 513-248-6679 **mark.sergeant @ipaper.com**	Larry Hiner* Babcock & Wilcox P. O. Box 351 Barberton, OH 44203-0351 Tel: 330-860-6525 Fax: 330-860-9295 **lahiner@babcock.com**	Majed Ja'arah* Inland Paperboard & Packaging 1750 Inland Road Orange, Texas 77632 Tel: 409-746-7315 Fax: 409-746-7249 **MJaarah@iccnet.com**
Brian Lemay* FM Global 165 Commerce Valley Dr. West, Ste. 500 Thornhill, Ontario L3T 7V8 Canada Tel: 905-763-5683 Fax: 905-763-5622 **brian.lemay @fmglobal.com**	Scott Moyer Alabama River Pulp P. O. Box 100 Perdue Hill, AL 36470 Tel: 251-743-8361 Fax: 251-743-8529 **scottm @ariver.com**	Doug Murch * GE GAP Services 1818 Market Street Philadelphia, PA Tel: 215-255-6835 Fax: 215-255-6850 **douglas.murch @gegapservices.com**
Arie Verloop* Jansen Comb. & Blr. Tech. 12025 115th Avenue NE, Ste. 250 Kirkland, WA 98034-6935 Tel: 425-825-0500 Fax: 425-825-1131 **arie.verloop @jansenboiler.com**	Richard Wiseman* Weyerhaeuser 100 Center Street Johnsonburg. PA 15857 Tel: 814-965-6223 Fax: 814-965-6413 **rwiseman @weyerhaeuser.com**	Rick Young * Alstom Power 1119 Riverfront Parkway Chattanooga, TN 37402 Tel: 423-752-2603 Fax: 423-752-2660 **frederick.young @power.alstom.com**

* = Attended 10/02 Meeting

WASTE STEAMS SUBCOMMITTEE

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

Craig J. Aderman* Sappi (S. D. Warren) P. O. Box 1600 Skowhegan, ME 04976-9512 Tel: 207-238-3177 Fax: 207-856-3675 **craig.aderman** **@sappi-na.com**	Joan Barna* Alstom Power 2000 Day Hill Road Windsor, CT 06095 Tel: 860-285-2217 Fax: 860-285-5078 **joan.barna** **@power.alstom.com**	Joe Barsin Coen Company 5500 Five Knolls Drive Charlotte, NC 28226 Tel: 704-236-8284 Fax: 704-544-9117 **Zechnocrats** **@aol.com**
John Caine Southern Environmental 6690 West Nine Mile Road Pensacola, FL 32526 Tel: 850-941-3001 Fax: 850-944-8270 **apasales** **@sei-group.com**	E. Scott Crysel Granite Park One Plano, TX 75024 Tel: 972-731-1658 Fax: 972-731-1820 **scott.crysel** **@fmglobal.com**	Ned Dye Jansen Combustion &Boiler Technologies 12025 115th Avenue N.E., Suite 250 Kirkland, WA 98034-6935 Tel: 425-825-0500, Ext. 125 Fax: 425-825-1131 **ned.dye** **@jansenboiler.com**
James Franks* Industrial Risk Insurers 855 Dogwood Road Somerville, TN 38068 Tel: 901-465-6645 Fax: 901-465-0771 **james.franks** **@industrialrisk.com**	Dwight Husband Inland Paperboard & Packaging P. O. Box 1551 Rome, GA 30162-1551 Tel: 706-236-5306 Fax: 706-236-5441 **dhusban** **@iccnet.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**

* = Attended 10/02 Meeting

WASTE STREAMS SUBCOMMITTEE (Cont.)

Olli Kujanpaa* Andritz, Inc. 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.lewi @fluordaniel.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**
Bo Oscarsson Fluor Daniel Forest Products 100 Fluor Daniel Drive Greenville, SC 29607-2762 Tel: 864-281-5010 Fax: 864-676-7630 **bo.oscarsson @fluordaniel.com**	Paul Seefeld* A. H. Lundberg Associates 4577 Pebble Brook Drive Jacksonville, FL 32224-7643 Tel: 904-223-4147 Fax: 904-223-4146 **Paul.seefeld @lundbergassociates.com**	Barry Seidel BE&K Engineering P. O. Box 12607 Birmingham, AL 35202-2607 Tel: 205-872-6438 Fax: 205-972-6300 **seidelb@bek.com**
H. Bentley Sherlock* Babcock & Wilcox 2302 Parklake Dr., NE, Suite 300 Atlanta, GA 30345 Tel: 770-621-3947 Fax: 770-621-3922 **hbsherlock @babcock.com**		

* = Attended 10/02 Meeting

Those registered for the meeting were:

A.H. Lungberg Associates, Inc.
Patel, Jean-Claude, Naperville, IL
Seefeld, Paul, Jacksonville, FL

Alert Systems, Inc.
Borsje, Henk, Duxbury, MA

Alstom Power
Barna, Joan, Windsor, CT
Barry, Mike, Charlotte, NC
Brown, Richard, Chattanooga, TN
Farmer, Robert, Beverly, MA
Gadai, David, Windsor, CT
Harbach, Paul, Charlotte, NC
Hennighausen, Rick, Charlotte, NC
Higgins, Vic, Dunwoody, GA
Hollenbach, Dennis, Windsor, CT
Kistka, Gerry, Jacksonville, FL
LeBel, Mark, Windsor, CT
Young, Frederick, Chattanooga, TN

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

Andritz, Inc.
Collins, Peter, Alpharetta, GA
Holm, Ral, Alpharetta, GA
Kujanpaa, Olli, Alpharetta, GA
Kvist, Marko, Alpharetta, GA
Phillips, John, Alpharetta, GA
Silva, Ageu, Alpharetta, GA
Sopanen, Jari, Alpharetta, GA

Aon Reed Stenhouse
McCloskey, Pat, Vancouver, BC

Appleton Papers
Decker, Walter, Roaring Spring, PA
Lezzer, Tom, Roaring Spring, PA

Aracruz Celulose S.A.
de Souze, Paulo Gouveia, Brazil, SA
Galdino, Elvecio Leoncio, Brazil, SA

Automation Applications, Inc.
McClain, Cliff, Exton, PA

AXA Corporate Solutions
Abel, Frederic, Lyon, France

Babcock & Wilcox
Alesandrini, John, Barberton, OH
Dickinson, Jim, Barberton, OH
Hiner, Larry, Barberton, OH
Kulig, John, Barberton, OH
Lance, Gail, Barberton, OH
Osborne, Steve, Barberton, OH
Pifer, Greg, Barberton, OH
Sherlock, H. Bentley, Atlanta, GA
Yash, John, Atlanta, GA

Bain & Associates LTD
Bain, Douglas, Hoffman Estates, IL

Blue Ridge Paper Products
Hennessy, Kevin, Canton, NC
Single, Steve, Canton, NC

Boise Cascade
Carter, Christopher, Jackson, AL
Erickson, Leonard, Boise, ID
Stuart, Kenneth, Jackson, AL
Zavadoski, Greg, St. Helens, OR

Bowater Newsprint
Bassett, Greg, Coosa Pines, ALB
Cambron, Tim, Coosa Pines, ALB
Conley, Clark, Coosa Pines, ALB
Crisp, Ralph, Catawba, SC
Griffitt, Frank, Coosa Pines, ALB
Porter, Jack, Thunom Bay, ONT

Those registered for the meeting were:

Buckeye Technologies
Streit, David, Perry, FL
Buckman Laboratories
Olavessen, Len, Memphis, TN

Carter Holt Harvey Ltd.
Jones, Michael, New Zealand

CBC Industrias Pesadas S.A.
Faria, Ronaldo Flavio, Sao Paulo, Brazil

ChemTreat
Bingham, Ron, Glen Allen, VA
Kanney, Mike, Richmond, VA

CIMS Ltd
Young, Jim, Richmond, BC

Clement Consulting
Clement, Jack, Akron, OH

Coen Company
Wadhwani, B.K., Burlingame,CA

Cooperheat – MQS
Leonard, Mike, Richmond, VA
O'Connor, Shawn, North Augusta, SC

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

D&G Machine Products, Inc.
Tanguay, Eric, Westbrook, ME

Delta Natural Kraft
Goss, Joseph, Pine Bluff, AR

Diamond Power
Bunton, Mark, Lancaster, OH
Kirch, Jerry, Charlotte, NC
Tavares, Alarick, Lancaster, OH

Domtar Papers
Sanders, Jim, Ashdown, AR

Eastern Paper - Lincoln Mill
LaFlamme, Alan, Lincoln, ME
MacEachern, Pat, Lincoln, ME
Sanborn, Dennis, Lincoln, ME

Environmental Elements
Brown, Mike, Jacksonville, AL
Campbell, Ken, Baltimore, MD
Holbrook, John, Baltimore, MD
Kercheval, Mark, Peachtree, GA
Shelton, Jeff, Jacksonville, AL

Fluor Daniel Forest Products
Lewis, John, Greenville, SC

FM Global
Burbaud, Michel, Montreal, QEB
Cowling, Stephen, Melbourne, Australia
Hoffman, Daryl, Bellevue, WA
Keyworth, Desmond, Dumdas, ONT
Morgan, Rick, Plano, TX
North, Rachel, Melbourne,Australia
Parrish, David, Norwood, MA
Polagye, Mike, Norwood, MA
Cooke, Craig, Oconomowoc, WI
Crysel, Scott, Plano, TX
King, Brian, Plano, TX
Labonte, Guy, Montreal, QUE
Lamb, Ron, Parsippany, NJ
Lemay, Brian, Thornhill, ONT
Matarrese, Rick, Alpharetta, GA
Onstead, Jimmy, Plano, TX
Stewart, Rick, Plano, TX
Ward, Ken, Atlanta, GA

Fuel Tech. Inc.
Nuttall, William, Charlotte, NC
Thornton, Dan, Newcastle Creek, NB

Those registered for the meeting were:

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

GE Betz
Robinson, James, Trevose, PA

GE GAP Services
Contino, Jamie, Greensboro, GA
DiLeonardo, Lino, Toronto, ONT
Franks, James, Somerville, TN
Hanna, Bryan, Toronto, ONT
Kanouse, Kurt, Vancouver, WA
Murch, Douglas, Philadelphia, PA
Sides, Michael, Alpharetta, GA
van den Hoek, John, Toronto, ONT
Wolters, Bodo, Alpharetta, GA

General Cologne Re
Freeman, Stuart Jr., Atlanta, GA

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

Georgia-Pacific
Durham, Rick, Atlanta, GA
Morency, Karl, Atlanta, GA
Smith, Roger, Atlanta, GA

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

Gulf States Paper
Tarpley, Donn, Demopolis, AL

Hartford Steam Boiler
Garfield, Michael, Lowell, ME

Heberer Consulting Services
Heberer, Norman, Augusta, GA

Hercules
Gaus, Jeff, Shreveport, LA

Inland Paperboard & Packaging
Burke, Tom, Rome, GA
Ja'arah, Majed, Orange, TX
Villarrubia, David, Bogalusa, LA

Inst. of Paper Science & Tech.
Verrill, Christopher, Atlanta, GA

International Paper
Aaron, Wes, Savannah, GA
Camp, Bill, Prattville, AL
Carroll, William, Roanoke Rapids, NC
Clay, Dean, Loveland, OH
Fuhrmann, Dave, Loveland, OH
Howard, Jeff, Roanoke Rapids, NC
Lisenby, John, Roanoke Rapids, NC
MacIntire, Wayne, Loveland, OH
McCarty, Ronald, Sandia Park, NM
Moore, Lloyd, Loveland, OH
Owens, Tom, Roanoke Rapids, NC
Sargent, Mark, Loveland, OH
Schools, Todd, Franklin, VA
Vuoso, Jerry, Memphis, TN
Williamson, Mark, Savannah, GA

International Technology Co.
Jonsson, Jan Erik, Portsmouth, NH
Teixeira, Jaoa Louis, Portsmouth, NH

Interstate Paper Corp.
Cox, Michael, Riceboro, GA
Crosby, Phillip, Riceboro, GA
Knoll, Andy, Riegelwood, NC
McKellar, Andy, Georgetown, SC

Irving Pulp & Paper
Hess, Ron, Buckhead, GA
Mott, Dan, Saint John, NB

Those registered for the meeting were:

Jacobs Engineers, Inc.
Rickard, John, Greenville, SC

Jansen Technologies
Drottar, Jerry, Kirkland, WA
Dye, Ned, Kirkland, WA
Verloop, Arie, Kirkland, WA

John Bottcher & Company
Bottcher, John, Constitucion, Chile

John E. Cover Engineering

Kellogg Brown & Root
Adams, Wayne. Mobile, AL

Kimberly-Clark
Kaufmann, Brian, Roswell, GA

K-Patents, Inc.
Pyorala, Keijo, Naperville, IL

Kvaerner Pulping
Barnes, Geoff, Charlotte, NC
Campbell, Craig, Charlotte, NC
Geedey, Jim, Charlotte, NC
Hansson, Berth, Charlotte, NC
King, Dave, Charlotte, NC
Morgan, Preston, Charlotte, NC
Sherrod, Hank, Charlotte, NC
Wasson, Eric, Charlotte, NC
Weikmann, John, Charlotte, NC

Liquid Solids Control
Sweeney, Michael, Upton, MA

Longview Fibre
Berg, Greg, Longview, WA

Longview Inspection
Cooper, Mike, Houston, TX
Gustafson, Jim,Oshkosh, WI

Marathon Pulp
Wilson, Tom, Marathon, ONT

Marsh Risk Consulting
Hyche, Dwight, Meridian, MS

Mead Westvaco
Andrews, John, Charleston, SC
Atkins, Ed, Phenix City, AL
Lindsey, Larry, Phenix City, AL
Thompson, Craig, Escanaba, MI
Will, Mike, Phenix City, AL
Williams, J. D., Phenix City, AL

National Board of BPVI
Sullivan, Robert, Columbus, OH

Norske Skog
Norton, Bob, Campbell River, BC

Ondeo-Nalco
Totura, George, Naperville, IL

P. H. Glatfelter Co.
Geiman, Dave, Spring Grove, PA
Gentzler, William, Spring Grove, PA

Packaging Corp. of Amer.
Butler, Jeff, Valdosta, GA
Farris, Mike, Counce, TN
Ferrell, Larry, Valdosta, GA
Hrabik, Tony, Tomahawk, WI
Pedron, Lester, Counce, TN
Stelling, John, Tomahawk, WI

Potlatch
Bliss, John, McGehee, AR
Hartley, Chuck, Cloquet, MN

Those registered for the meeting were:

Power Specialists Assoc. Inc.
Blaylock, Tommy, Somers, CT
Madersky, Lee Anne, Somers, CT
Madersky, Tom, Somers, CT
Popielnicki, Ted, Somers, CT
Zawistowski, Bob, Somers, CT

Process Equipment/Barron Industries
Nolen, Ken, Pelham, AL
Ray, Allen, Irondale, AL

Rayonier
Davis, Gary, Jesup, GA
Mallard, Wendell, Jesup, GA
Roberts, Willie, Jesup, GA
Thompson, Wayman, Jesup, GA

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

RiNan, Inc.
Pothier, Richard, Peabody, MA

Riverwood International
Harris, Duane, Macon, GA
Hazard, Joel, Macon, GA
Peak, Kenneth, Macon, GA
Vetter, Richard, Macon, GA

Sappi
Aderman, Craig, Skowhegan, ME
Merriman, Nick, Mandeni, So. Africa
Palsgraaf, Adri, Braamfontein, So. Africa
Segal, Mike, Cloquet, MN

Saucor Ltd.
Cousineau, Ray, Vancouver, BC

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

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

Smurfit Carton de Venezuela
Bello, Alfonso, San Felite,Venezuela
Ledezma, Nelson, San Felite,Venezuela

Smurfit-Stone Container
Blancheni, Eric, Brewton, AL
Dykes, Tommy, Panama City, FL
Golson, Cobb, Fernandina Beach, FL
Green, William, West Point, VA
Horth, Martin, New Richmond, QEB
Gaus, Jeff, Shreveport, LA
Morin, Nathalie, Latuque, QEB
Pate, Jerry, Brewton, AL
Phelps, Robert, Hopewell, VA
Quarterman, Jim, Fernandina Beach, FL
Shiflett, Kenneth, West Point, VA
Spry, Thomas, Carol Stream, IL
Stengel, Dave, Missoula, MI

SOMPO Japan Insurance Inc.
Terashima, Hisatoshi, Tokyo, Japan

Southern Environmental
Cotton, Rick, Pensacola, FL
Hayes, Charles, Pensacola, FL

St. Anne-Nackawic Pulp Co.
Lamey, Bernie, Nackawic, NB

Stasuk Testing & Inspection Ltd.
Stasuk, David, Burnaby, BC

Stora Enso North America
Wierzba, Gary, Wisconsin Rapids, WI
Wright, Dan, Wisconsin Rapids, WI

Those registered for the meeting were:

T. M. Grace Company, Inc.
Grace, Tom, Appleton, WI

Tembec
Batson, Jim, St. Francisville, LA
Beard, Elzie, St. Francisville, LA
Terrell, Carl, St. Francisville, LA

Temple Inland Forest Products
Baldwin, Ryan, Sugar Land, TX
Zenkner, John, Sugar Land, TX

Universal Dynamics Ltd.
Martin, Alan, Nanaimo, BC

Welding Services
Newton, Bruce, Norcross, GA

Weyerhaeuser
Avery, David, Bennettsville, SC
Barreca, Clif, New Bern, NC
Bogart, Steve, Longview, WA
Clarke, Carl, Hawesville, KY
Carter, Larry, Pine Hill, AL

Weyerhaeuser (Cont.)
Coyle, Wendy, Longview, WA
Dixon, Jim, Pine Hill, AL
Gore, Chris, Bennettsville, SC
Hache, Paul, Prince Albert, SK
Knowlen, Bruce, Federal Way, WA
Larrimore, Brad, Pine Hill, AL
May, J., Federal Way, WA
McCarty, Doug, Pine Hill, AL
McMahon, Bill, Springfield, OR
Pederson, Jerry, Federal Way, WA
Pile, Dave, Bennettsville, SC
Ponton, W., Federal Way, WA
Salacki, Len, Grande Prairie, ALB
Schultz, Matt, Hawesville, KY
Simpson, Rodney, Plymouth, NC
Taylor, Steve, Albany, OR
Viar, Kari, Plymouth, NC
Wade, Bob, Pine Hill, AL
Walker, Robert, Bennettsville, SC
Winner, Wid, Hawesville, KY
Wiseman, Richard, Johnsonburg, PA
Worsham, Jesse, Bennettsville, SC

INTRODUCTION

BLRBAC's Chairman, Wayman Thompson, called the meeting to order at 8:00 a.m. on Wednesday, October 9th.

CHAIRMAN: I'd like to welcome all of you to this fall meeting of BLRBAC. Glad to see all of you. Attendance has been very good and participation has been exemplary at the Subcommittee meetings.

OLD BUSINESS

ACCEPTANCE OF MINUTES OF SPRING 2002 – Wayman Thompson

The minutes were posted on the WEB site. I'm sure all of you read those in detail. Having said that, are there any additions or corrections to the Spring 2002 Minutes? If not, is there a motion to accept? Second? All those in favor, say "aye". The Minutes stand approved as submitted.

LINDA MONTGOMERY – DIRECTOR OF SALES FOR CROWNE PLAZA HOTEL
Good morning. Kelly Smith, our General Manager, whom many of you have met, wanted to be here this morning, but he was called away at the last minute. I'm a little sleepy because Ron Hess told me to be here at 6:45 a.m. because we were going to have a sunrise service in the tent, but I'm the only one who showed up for that.

At any rate, we at the Crowne Plaza have had a long-standing practice that we do every month, which is to recognize the Company of the Month. It took us probably less than 30 seconds to determine for this month of October who the Company of the Month was going to be. Actually in our hearts, BLRBAC is our Company of the Year. So this morning I have a plaque that I would like to present to Wayman and on behalf of the Crowne Plaza, we are more than grateful for the relationship, the loyalty and privilege that you have allowed us over the past 14 years. We are very, very proud to be a part of what you do here twice each year. We hope that relationship will continue for many years to come. Again on behalf of the Crowne Plaza, Wayman, we are happy to present this plaque to you as BLRBAC is the Company of the Month for this October.

CHAIRMAN: I really feel that Tim McGee should be the one who accepts this plaque on behalf of BLRBAC since he is the one who has always done all the arrangements and dealings with the hotel in the past. We do appreciate this and thank you very much.

NEW BUSINESS

1. NEW MEMBERS/REPRESENTATIVE CHANGES REPORT – Mike Polagye

The Executive Committee in its meeting yesterday reviewed four applications for membership to BLRBAC. They were all approved as follows:

NEW REGULAR MEMBERSHIP

AXA Corporate Solutions, a French property insurer/reinsurer accepted as an insurance company.

Fred Abel is designated as Representative
Ivan Annezer is designated as Alternate Representative

SOMOA Pacific Cellulose LLC, Somoa, California, was accepted as an operating company.

James Forman is designated as Representative
Homer Purcell is designated as Alternate Representative

NEW ASSOCIATE MEMBERSHIP

Cooperheat-MQS, Inc., a supplier of heat tracing and nondestructive testing services.

Mike Leonard designated as Associate Representative
Shawn O'Connor designated as Alternate Associate Representative

NEW CORRERSPONDING MEMBERSHIP

VISY Pulp & Paper from Australia was accepted as an off-shore operating company

John Crosher is designated as Corresponding Representative
Mike Watson is designated as Corresponding Alternate Representative

We welcome these new members to BLRBAC and we look forward to their participation in forwarding the safe operation of recovery boilers.

MEMBERSHIP COMPANY NAME CHANGES

GE Betz
Previously known as Hercules, Inc. (division spin off)

Inland Paperboard
Previously known as Gaylord Container (merger)

Weyerhaeuser
Previously known as Willamette (merger)

1. NEW MEMBERS/REPRESENTATIVE CHANGES REPORT – (Cont.)

NEW REGULAR MEMBER REPRESENTATIVE CHANGES

Inland Paperboard
Majed Jaarah replaces H. Haddock as Representative
David Villarrubia replaces Robert Jones as Alternate Representative

Simpson Tacoma Kraft
Michael Blixt replaces John Ronan as Alternate Representative

Stora Enso North America
Tom Kiefer designated as Representative
Matt Wouters designated as Alternate Representative

Tembec
Jim Batson replaces Tommy Blaylock as Alternate Representative

Weyerhaeuser
Chris Gore replaces Richard Burnette as Alternate Representative

NEW ASSOCIATE MEMBER REPRESENTATIVE CHANGES

A.H. Lundberg Associates, Inc.
Jean-Claude Patel replaces Dan Bloom Associate Representative

International Technology Company
Jan Erik Jonsson designated as Associate Representative
Joao Luis Teixeira designated as Alternate Associate Representative

The Finnish Recovery Boiler Committee
Sebastian Kankkonen replaces Markku Lehtinen as Associate Representative
Sebastian Kankkonen's position as Alternate Representative to be filled.

This being the 40th Anniversary of BLRBAC, it may be worthwhile taking a moment for people not familiar with the structure review the membership categories. BLRBAC was formed to have membership by the operating companies of recovery boilers; manufacturers of recovery boilers, and the insurance companies that insure recovery boilers. Those three categories make up the ***Regular*** membership of BLRBAC.

Every ***Regular*** member company that applies for membership must designate one voting representative and one alternate representative. That is why it is important to Barbara Holich that we keep track of who these representatives are. They are the only voting members of your companies.

1. NEW MEMBERS/REPRESENTATIVE CHANGES REPORT – (Cont.)

In addition, there are two other categories:

Corresponding members are either operating companies, insurance companies or manufacturing companies of recovery boilers that would qualify for full membership, but because of geography, usually being off-shore, outside of North America, are unable to attend regularly and receive Corresponding memberships. As Corresponding members, since they are not actively involved in every BLRBAC meeting, they do not have voting privileges, but they do maintain contact and are welcome to come to BLRBAC whenever they can.

Associate membership is open to companies that support the activities of BLRBAC and the operating companies through ancillary services, auxiliary supplies, etc. Associate members also have a representative and an alternate representative, but they have no voting privileges. Associate members are strongly encouraged to participate in the Subcommittee work of BLRBAC so that their expertise can be reflected in our Recommended Practices.

All other employees of a Regular, Associate or Corresponding member company are considered Additional Representatives and are also welcome to attend BLRBAC.

2. EXECUTIVE COMMITTEE REPORT – Wayman Thompson

Last night, as most of you know, a dinner was held under a tent in the Crowne Plaza Atlanta Airport Hotel parking lot to celebrate our 40th anniversary. The evening was pleasant and the crowd of 230 enjoyed the drinks, dinner, speakers and socializing.

As Chairman, I welcomed the diners to the celebration and introduced Joan Barna as the first speaker. Joan quickly walked us through some of the key events in BLRBAC history, starting with the first meeting in 1962. Norm Herberer, past Chairman, spoke next, sharing stories of key contributors in BLRBAC history, some quite humorous. Vic Higgins rounded out the evening with his recollections.

We would like to thank Joan Barna, Alstom Power, for taking the lead in organizing this event. Recognition is also given for support by Jennifer Pasquariello, Alstom Power, Preston Morgan, Kvaerner Pulping and Ron Hess, Hartford Steam Boiler.

2. EXECUTIVE COMMITTEE REPORT – (Cont.)

BLRBAC also gratefully acknowledges the financial support of the following companies for this event:

Alstom Power Inc.	Hartford Steam Boiler
Andritz	Hercules
Babcock & Wilcox	Jansen Technologies, Inc.
BTA Drayton	Kvaerner Pulping, Inc.
Clyde Bergemann, Inc.	Longview Inspection, Inc.
Environmental Elements Corp.	Ondeo Nalco Company
FM Global	Power Specialists Assoc., Inc.
George H. Bodman, Inc.	Process Equipment / Barron Ind.
Global Risk Consultants Corp.	Stasuk Testing

(Secretary's Note: In recognition of the 40th Anniversary of BLRBAC, a listing of all past BLRBAC Chairmen is provided as Appendix A and pictures taken during the evening are in Appendix B.)

We had a fairly brief Executive Committee meeting yesterday in light of the evening activities. We had some discussion about the finances of BLRBAC and Ron Hess will touch on that matter in his report. Also, we accepted some documents and others we reviewed and returned to the Safe Firing of Black Liquor Subcommittee for further revision. This morning we will have several revisions to some of the documents up for vote that have been accepted previously by the Executive Committee and have been posted on the WEB site for comment. We will get into that within the Subcommittee Reports.

Last meeting I announced that Ron Hess was temporarily handling the office of Treasurer in Tim McGee's absence. After many years of service to BLRBAC, Tim has decided to resign from that position. The Treasurer position is filled by appointment and not by nomination. After careful consideration of the potential candidate's skills and competency to conduct necessary financial and recordkeeping transactions, it is my pleasure to announce the appointment of Ron Hess by the Executive Committee as BLRBAC Treasurer.

3. TREASURER'S REPORT -- Ron Hess

For this Fall meeting we had 260 people register; 210 Advance Registration and 50 At Door Registrations. Represented in that group were 34 operating companies; four boiler manufacturers; nine insurers; 36 Associate member companies; and four guests. We also had some people attend the meeting from outside of North America and we would like to recognize those individuals. We had people from Australia, Brazil, Chile, Colombia, Japan, New Zealand and South Africa. We are glad they participated and extend them all an invitation to come back to participate just as they did this year.

3. TREASURER'S REPORT – (Cont.)

On the financial side, currently we have about $20,000 in the bank between a Money Market Fund and a small Checking Account that we maintain. That balance has decreased over the last several meetings. So at the Executive Committee session yesterday we elected to increase the registration fees for the next meeting. It was $75 and it will go to $100 for Advance registration and from $150 to $175 for At Door registrations. (The fees for this meeting were higher as they included the dinner and the celebration for last night.) We think the $25 increase will be enough to keep us ahead of expenses and inflation in the costs that we incur during the meetings.

CHAIRMAN: At this time we are honored to have our past Treasurer in our midst, Mr. Tim McGee. Tim served as Treasurer for approximately 16 years – since 1985 – a long time!! There was some discussion last fall when Tim said he was going to retire in the spring and there was a lot of discussion among the Executive Committee members asking, "Is Tim really going to do that?" Then in the spring he said, "I'm out of here!" and everybody was still saying, "Did he really do that? Is he really going to turn things loose?" Then about May there was an e-mail that was floating around and Tim was copied in on it. In his very diplomatic manner, he copied all of us back and he said, "I don't know why you are all sending me this. You need to send it to Ron Hess. I'm not messing with any of this anymore." But Tim, for all your many years of dedicated service, we do thank you and on behalf of BLRBAC, I'm privileged to present this plaque to you. Thank you very much. Do you want to say anything? As long as it's not more than five minutes, you're more than welcome to make a speech.

TIM McGEE: Well I just want to add that I think I started in 1979 representing my company. In 1985 I was the elected Treasurer. For many years I served with Frank Moulton, and Vic Higgins, who I understand was here last night. We served on the Steering Committee that guided us through becoming an Association and getting it right with the IRS. That turned out to be an interesting deal. It has been fun and I've enjoyed it. So, thanks a lot.

CHAIRMAN: We would also like to recognize Larry Chase. He was Secretary for BLRBAC from 1994 to 2001. He also was the Executive Committee Insurance Representative from 1991 to 1994. He couldn't be with us today, but we also have a plaque for him. Mike Polagye will be presenting that to him.

As we all know, this is a voluntary organization. It exists and survives because of the time and dedication of the volunteers like all of you who are here. Larry and Tim were exemplary in fulfilling the responsibilities of the positions they assumed. It has meant a lot to BLRBAC's continuation over the years. At this time I'm going to call on Mike Polagye, who is representing the Nominating Committee.

MIKE POLAGYE: BLRBAC By-laws require the election for the position of Chair and Vice-chair of BLRBAC and the three division representatives: the Operating, Manufacturing and Insurance Company Representatives, to the Executive Committee. The Nominating Committee was dually formed consisting of John Andrews, John Kulig and myself. We have a slate of members to present as our nominations for the positions:

- ❖ Chairman - Dean Clay
- ❖ Vice-Chairman - Karl Morency
- ❖ Manufacturing Company Representative - Joan Barna
- ❖ Operating Company Representative - Scott Moyer
- ❖ Insurance Company Representative - Jimmy Onstead

All these people have replied that their companies are willing to support them in these roles. They have all indicated their willingness to serve in these positions if elected. Before we hold the elections, I think we need to open the floor to any other nominations should anyone wish to nominate any other members for these positions? Seeing none, I'll call the nominations closed. Wayman would you conduct the election.

CHAIRMAN: Is there a motion to accept the slate of officers as presented? So moved. Seconded? Okay. All those in favor signify by saying "aye". Any opposed? That will be our new slate of officers for the next two years. I'd like to thank Mike and the other members of the Nominating Committee for their assistance in that task.

4. SECRETARY'S REPORT – Mike Polagye

I'll keep my comments brief. Just a reminder to all Presenters that a tape is being made of this morning's meetings and your presentations will be transcribed from the tape to create the Meeting Minutes, unless you submit a written report. Many of you have told me already whether you intend to submit a report or actually have given me the reports already. For those of the Presenters who have not, please indicate to me today whether you will be submitting a written report or whether we should transcribe your report from the tape.

4. SECRETARY'S REPORT – (Cont.)

The other item I have to report is if all things go as planned, over the next several months you should see some changes to the BLRBAC WEB site which we hope will make the site easier to navigate and easier to use when trying to find the different documents you are looking for. During this transition there may be some short periods, hopefully not more than an hour or two, where the WEB site is not available. So I request your patience and understanding if you do reach the WEB site at some point and receive a message back that "this page is not currently available". It's probably because one of the transitional phases is being undertaken. Come back later and it should be up and running for you.

SECRETARIAL SERVICES REPORT -- Barbara Holich

No changes are made to the database until written notification is received. I keep a file folder for each member company which 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 notices of Meetings and Minutes will only be sent via e-mail. If an e-mail address is not working properly, it will be discarded from the BLRBAC database.

CHAIRMAN: There was some discussion yesterday during the Executive Committee meeting about how you become a Subcommittee member. It is very simple. You should attend the meeting and make yourself known to the Subcommittee Chairman. All of the Subcommittees are seeking membership and active participation on their committees. They will be more than happy to welcome you. I'm sure they will be glad to put you to work.

5. SUBCOMMITTEE REPORTS

5.1 ESP SUBCOMMITTEE REPORT – John Andrews
(See ***Appendix* C** – Post-ESP Procedures and ***Appendix D*** – Incident List)

The ESP Subcommittee met in Closed Session on Monday October 7, 2002 with 12 of 13 members present. The Subcommittee met in Open Session on Tuesday October 8, 2002 with 12 of 13 members present and about 250 guests. In Open Session, the Subcommittee reviewed the 32 North American and 10 International incident reports that had been received since the previous meeting.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

Of the 32 North American reports, there was one smelt water explosion reported during the last six months. Although no report has been received, there was knowledge of an explosion at the Durango mill in St. Marys, GA. That incident can not be classified" until more information is available. One incident was classified as a dissolving tank explosion and one was an ESP with no leak. Nine of the incidents were classified as Critical Incidents and 20 were classified as Non-critical Incidents. The 10 international incidents were accepted for information, but they are not officially classified or included in the Subcommittee database. Fifteen of the leaks prompted an Emergency Shutdown Procedure by operations. An ESP was performed during six of the nine of the incidents listed as Critical Incidents and nine of the incidents listed as Non-Critical. A summary of the Incidents reported is in Appendix C

The smelt water explosion occurred at Weyerhaeuser in Plymouth, NC, which is the first explosion reported since 1997. Rodney Simpson of the Plymouth mill made an excellent presentation to the Open Session on the cause of the incident and the corrective actions by the mill.

The incident at Plymouth was on their No. 5 Recovery boiler that was a 1976 Alstom (CE) unit and was rebuilt in 2001 by B&W. The unit is rated at 2,600 t/d dry solids and operates at 61 Bar (885 psig) & 440 °C (825 °F). The leak was a boiler bank tube that sheared off at the steam drum from fatigue failure. The fatigue failure was due to a stuck sootblower that was partially inserted as a result of a failed component in the control system. Total outage to repair was 110 days. As a result of the failure, the mill has:

- Added high sootblower steam flow alarm to indicate if more than the normal blowers are operating.
- Added an alarm to indicate if any blower not in proper sequence.
- Instituted enhanced walkdown procedures that require operators to walk down the boiler every 8 hours with the sootblowers out of operation
- Improved leak detection training for the operators.

Leak Locations

The leak locations that were reported are listed below and are also shown on a typical boiler cross section in Figure 1.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

Critical Incidents

- 1 - Generating bank (Explosion)
- 1 – Generating Bank Screen
- 3- Screen Tubes
- 1- Wall Tubes
- 1 – Roof Tube
- 3 – Economizer

Non-Critical Incidents

- 7 - Superheater
- 8 – Economizer
- 1 – Inside Nose Cavity
- 2 – External to Furnace
- 1 Smelt Spout

Root Cause

The root causes of the leaks reported can be summarized as:

- Cracking
  - -- 8 - Fatigue
  - -- 5 - Corrosion Fatigue
  - -- 2 - Weld Failure
- Pin Holes
  - -- 2 - Corrosion
  - -- 4 - Weld Quality
- Rupture
  - -- 5 - Corrosion
  - -- 2 - Overheat
  - -- 2 - Erosion
  - -- 1 - Stress Corrosion Cracking

How Discovered

The breakdown of how the leaks were discovered once again shows the importance of routine operator walkdowns. The use of leak detection systems is increasingly being reported in the incident reports and this time more that half of the incidents reports noted leak detection systems installed. However, experience has generally shown that they do not take the place of operator observations but serve as an added tool for detecting and/or confirming tube leaks.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

- 21 - Walkdown or Field Observation
- 8 - Control Room Instrumentation
- 2- Leak Detection System
  - 20 - Incidents with Leak Detection Installed
  - 6 – Confirmed Leak

Figure 2 shows the number of Critical Incidents reported to BLRBAC each year. With 15 critical incidents reported at this meeting, the number of Critical Incidents is running about the same over the years.

Figure 3 shows the four explosions that have been reported this year, two dissolving tank, one smelt water and the St. Marys explosion listed as "Other". This has caused the trend in Figures 4 and 5 to level off and maybe show a slight increase.

The Subcommittee greatly appreciates the effort that is put into filling out the Incident Questionnaires and would urge that the mills continue to support this valuable effort. It is especially valuable to include all pertinent information such as boiler diagrams showing leak locations and any reports of failure analysis to help the Subcommittee in their incident evaluation. The Subcommittee will continue to use diagrams and photos as visuals in presenting the incidents to the membership at the Open Session.

The most recent edition of the Incident Questionnaire is available on the Internet at the BLRBAC web site www.blrbac.org. When possible, please send completed questionnaires at least one month prior to the BLRBAC meetings since it takes a few weeks to compile the working list and get it published so it can be included in the meeting handouts.

Send all Incident Questionnaires, including the boiler side view drawing or sketch with the leak well marked, to:

Jack Clement, Clement Consulting Inc.
563 Beaverbrook Drive
Akron, OH 44333-2818
Tel: 330-865-9779
Fax: 330-865-6960
clemetcon@cs.com

5. SUBCOMMITTEE REPORTS – (Cont.)

5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

The Subcommittee is in the process of revising the Incident Questionnaire to simplify the form and make it easier and faster for the mills to fill in. We will be looking to make the format more interactive so that the person filling out the form will be directed to fill in only the appropriate sections of the Questionnaire, depending on the nature of the incident being reported. If anyone has suggestions or comments, they should contact Jack Clement at the address listed above.

Eight-Foot Level: The Subcommittee has been continuing to work on evaluating the eight-foot level for ESP valves. The objective is to minimize lower furnace damage in recovery units by ensuring that the eight-foot level is adequate to provide proper tube cooling during and after an ESP. Lloyd Moore will be taking over this activity from Preston Morgan. The Subcommittee maintains the position that, based on the current data available, there is no reason to change the 8 ft. level. The Incident Questionnaire attached to the minutes has been revised to include a request for data on water level and any trend data from floor tube thermocouples following an ESP. The Subcommittee will continue to review the data as it is received.

Recommended Changes to ESP Document: The Subcommittee submitted four items of revised language for the "Emergency Shutdown Procedure and Procedure for Testing ESP Systems for Black Liquor Recovery Boilers" to the General Membership for approval. The Executive Committee approved the revised language last meeting and it has been out for comment since the last meeting. No comments were received during the period so the Chairman put the items before the General Membership for a vote of approval. The vote of the Membership was unanimous in favor of the revisions. The approved changes are listed below and will be included in the next revision of the ESP document.

Change the heading of the section titled **ADDITIONAL ITEMS TO CONSIDER** to **OPTIONAL ITEMS TO CONSIDER** on Page 4.

Insert the following two sections after the section titled **RAPID DRAIN VALVE LOCAL SELECTOR SWITCH** on Page 4:

> **RAPID DRAIN VALVE ALTERNATIVE ACTUATION.** The following are acceptable means for complying with the requirement for an alternative means of actuating rapid drain valves:
>
> - A switch or group of switches in the control room;
> - A boiler control PLC (independent of the ESP system) providing an independent signal to each rapid drain control relay;

5. SUBCOMMITTEE REPORTS – (Cont.)

5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

- Manual actuation of the individual rapid drain relays; or
- Manual actuation of the individual valve operator motor starters.

When individual switches are provided in the control room, they can serve the dual function of testing rapid drain valves as well as the alternate means of actuation. When manual actuation of the relays or motor starters is chosen , the relays or starters must be in a location that is designated safe and accessible during an ESP and the boiler operators must be trained to locate and actuate them.

RAPID DRAIN ALTERNATE POWER. Historically, power supply to rapid drain valve operators has been sufficiently reliable that an alternate power supply is not a recommendation. Care should be taken in selecting and protecting the reliability of the power source to these valve operators.

Replace the section titled **ATMOSPHERIC VENT** on Page 5 with the following:

ATMOSPHERIC VENT. Experience in North America has demonstrated flash tank systems permit draining of the boiler even if the ESP is initiated after boiler pressure has been significantly or completely lost. Provision of a flash tank rapid drain system is recommended for all new installations. Atmospheric vent (flash-to-the-sky) rapid drain systems may not drain the boiler as quickly as flash tank systems under reduced pressure conditions and may not permit any draining in some cases. Existing atmospheric vent systems should have some means to drain the boiler to the 8 ft. level under low or no pressure conditions (no specific drain time). This alternate drain does not have to be a part of the automated ESP system and may be an operator initiated action.

Post-ESP Procedures: The Subcommittee has submitted a Guideline for Post-ESP Procedures, approved last meeting by the Executive Committee for membership review. No comments were received during the period so the Chairman put the items before the General Membership for a vote of approval. The vote of the Membership was unanimous in favor of new Guidelines. The new Guideline is included as Appendix C and will be posted on the web site.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

Clarification on the Function of Two Rapid Drain Buttons

The ESP Recommended Procedure says:

> "The recommended embodiment for initiation requires only one operator action to initiate the entire ESP (such as pushing two buttons simultaneously), rather than individual steps."

It is believed that the intent when written was to emphasize the recommendation that the complete shutdown sequence be initiated and completed from a single operator action. With the passage of time, the language could be interpreted as not permitting a two button, sequential shutdown initiation as is practiced in Scandinavia, and on several USA boilers installed using Scandinavian technology.

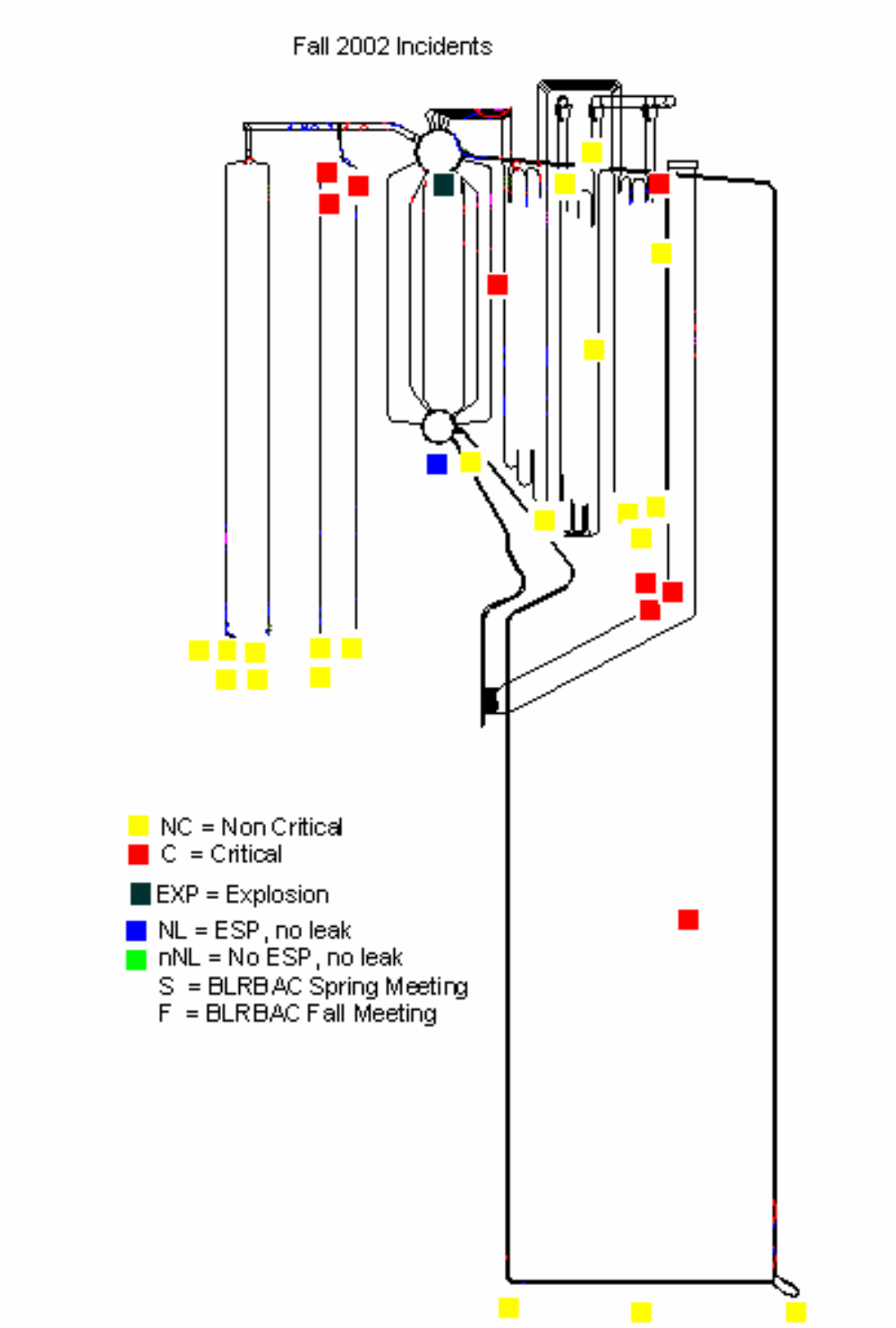
The Scandinavian two buttons are understood to be for button No.1 to shutdown the boiler without opening the rapid drain valves and button No. 2 to initiate the ESP. A scheme was explained during the meeting to be:

# 2	# 1	
	O	This button shuts down the boiler
O	O	Pushing both buttons initiates an ESP
O		Push this button and nothing happens

The ESP button is interlocked so it will not energize unless the other 'shut down' button is also pushed. The Subcommittee accepted this arrangement as meeting the intent of the Recommended Procedure.

5. SUBCOMMITTEE REPORTS – (Cont.)
5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

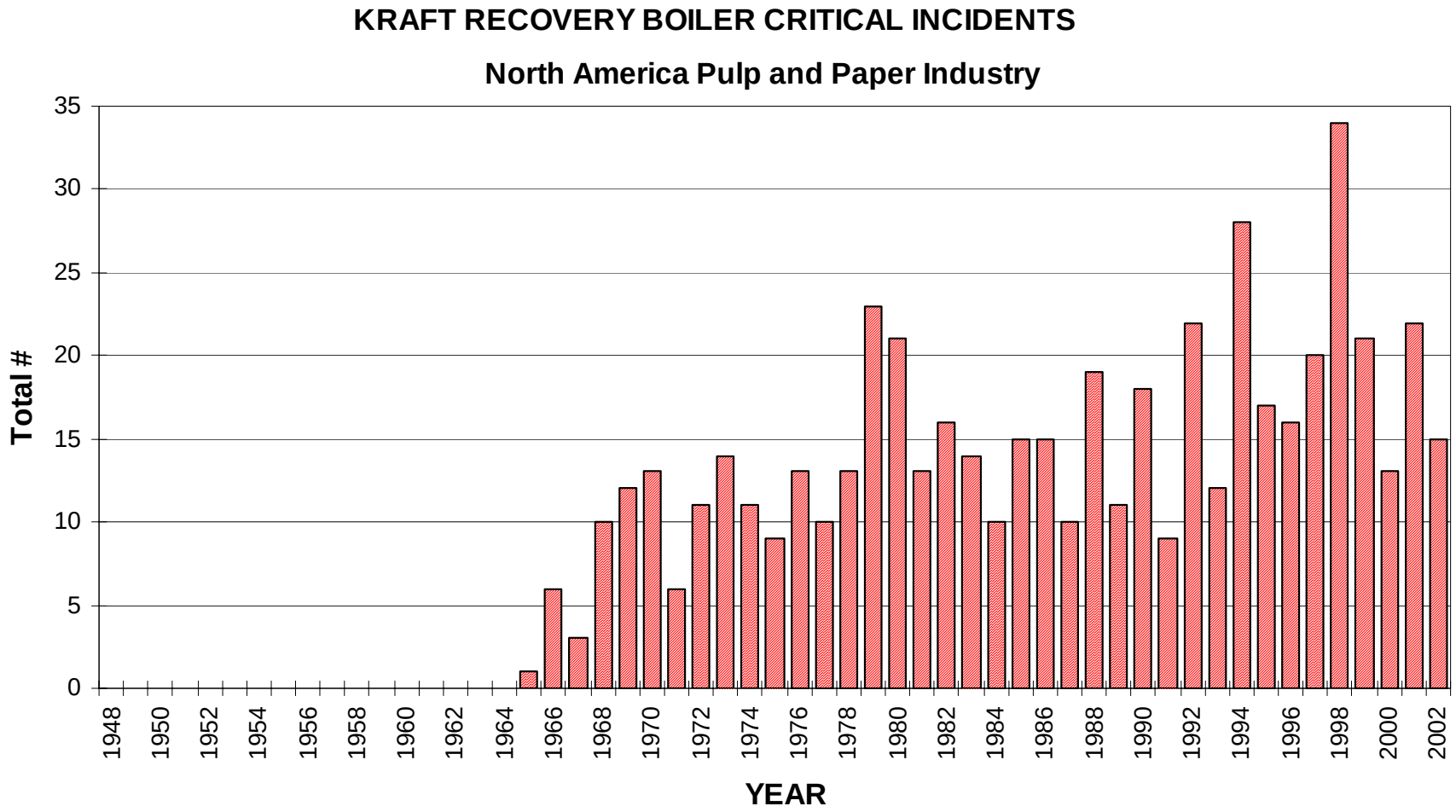
Figure 1



5. SUBCOMMITTEE REPORTS – (Cont.)

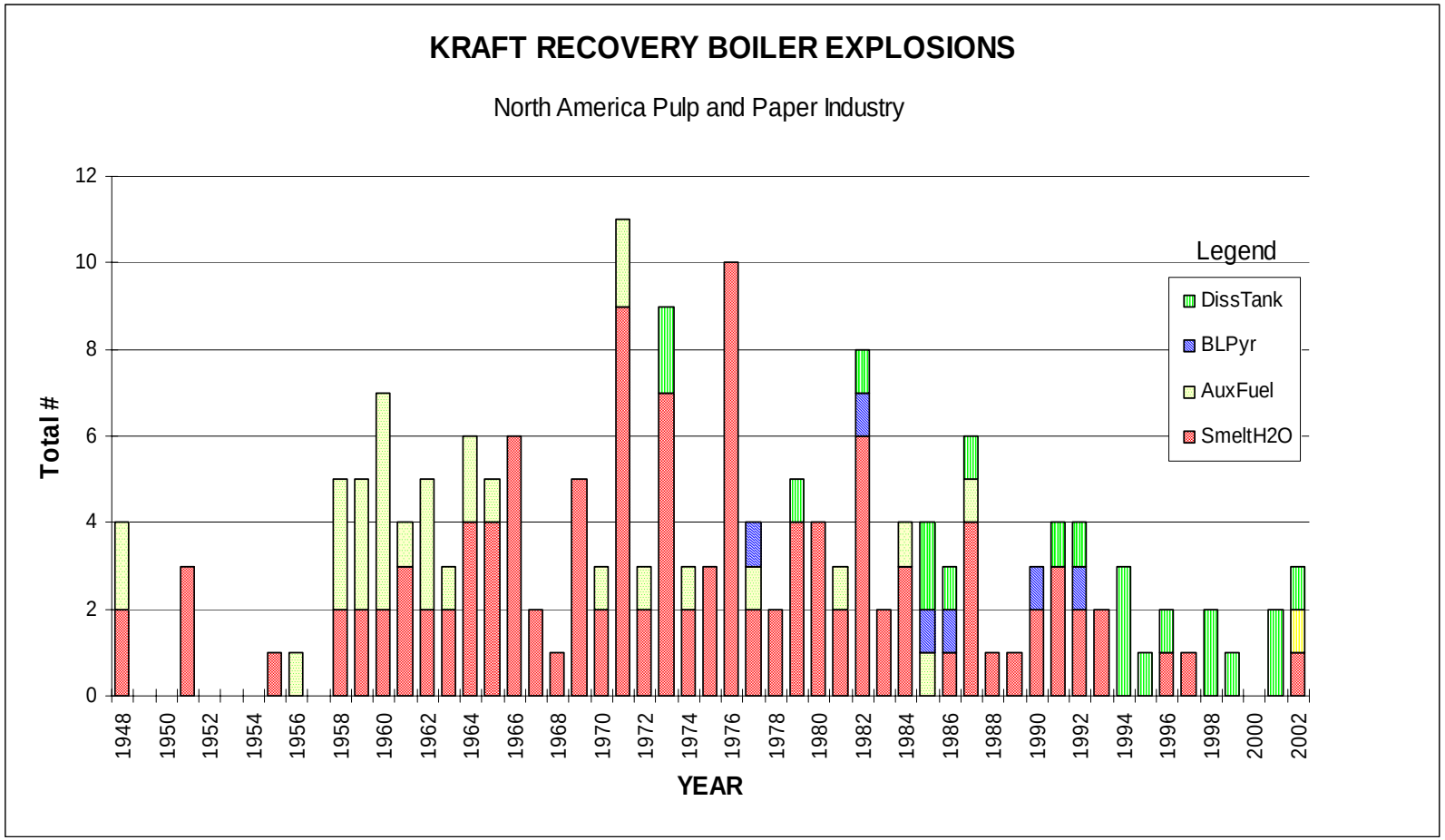
5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

Figure 2



5. SUBCOMMITTEE REPORTS – (Cont.)
5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

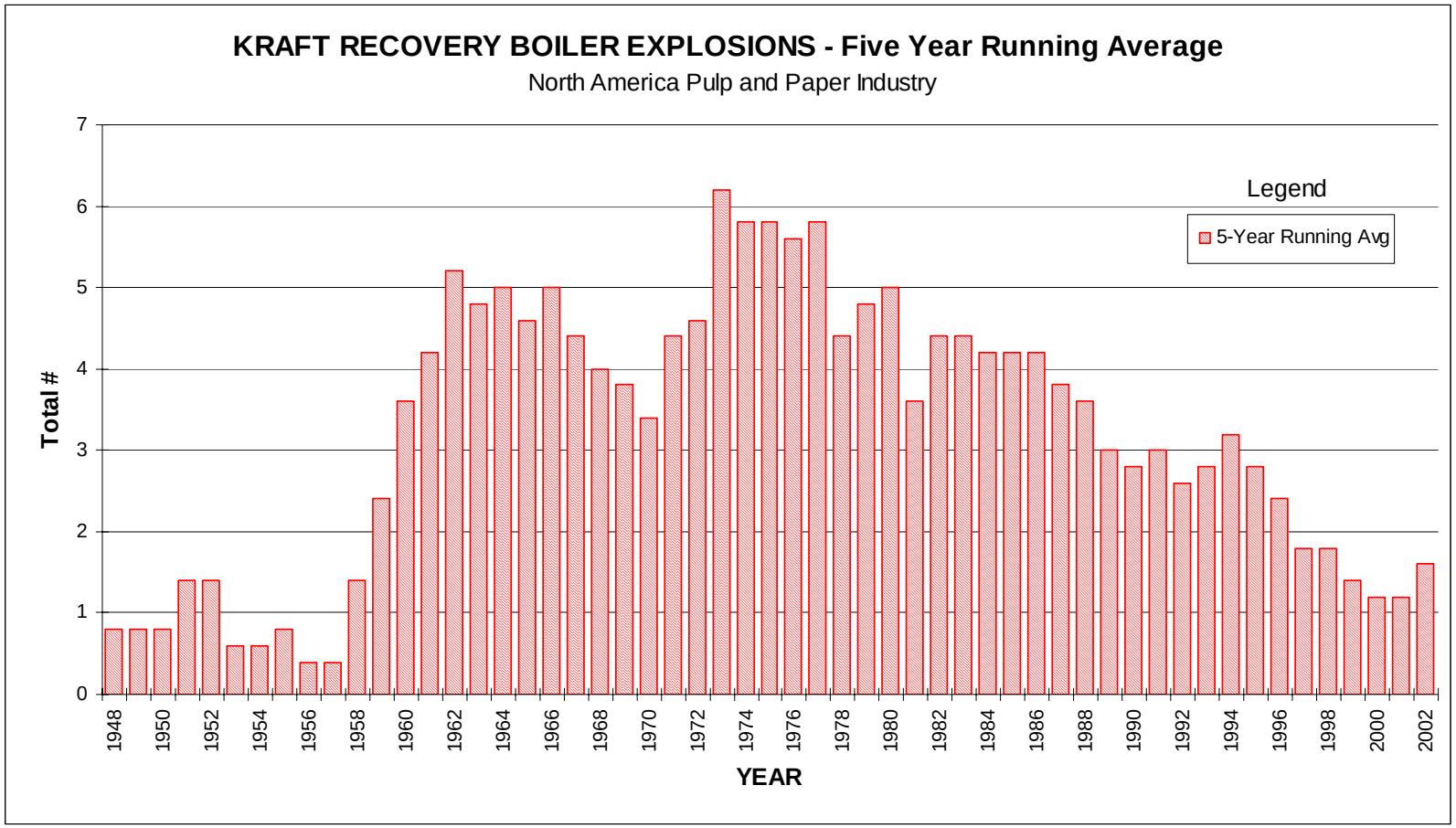
Figure 3



5. SUBCOMMITTEE REPORTS – (Cont.)

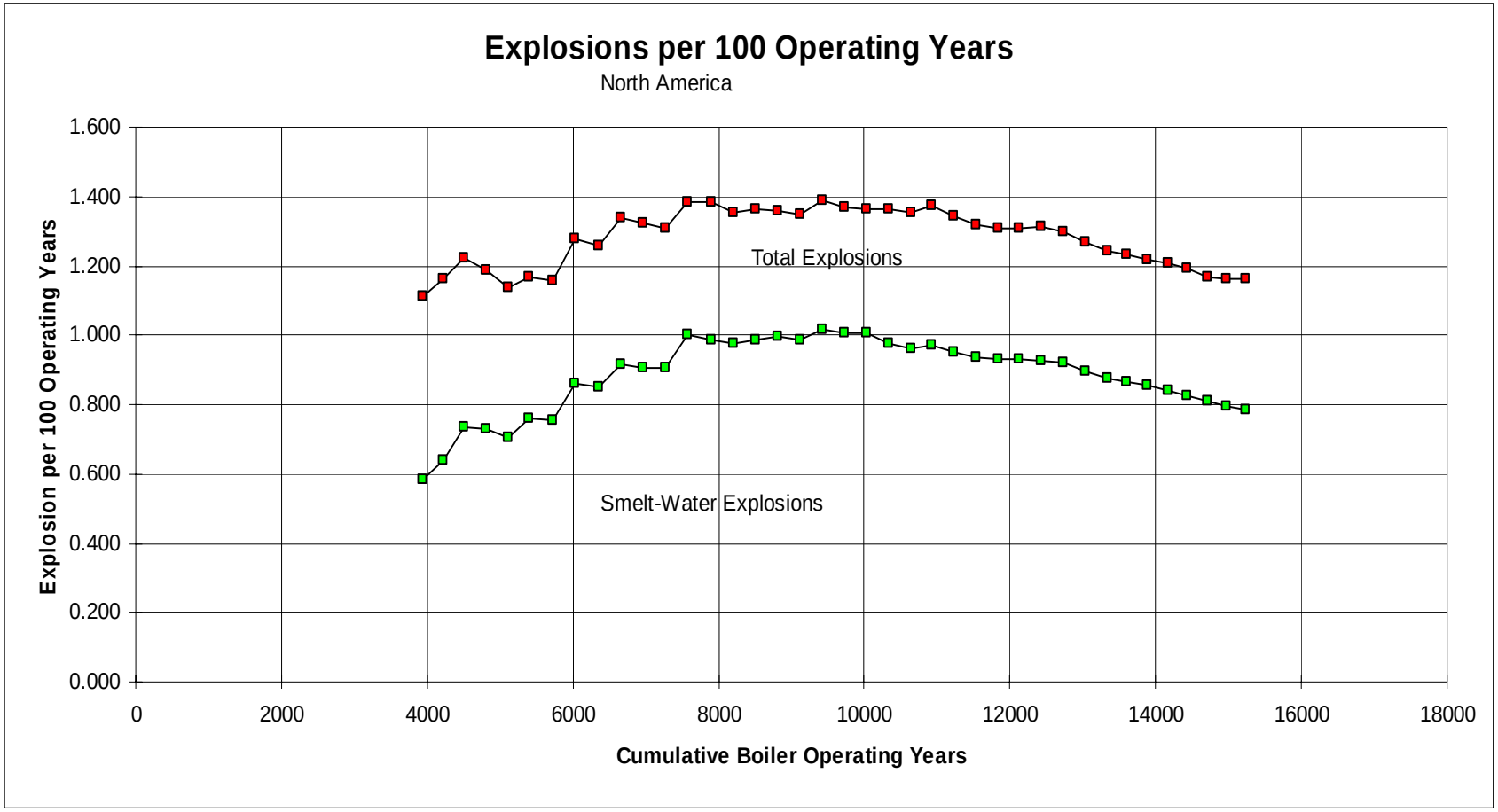
5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

Figure 4



5. SUBCOMMITTEE REPORTS – (Cont.)
5.1 ESP SUBCOMMITTEE REPORT – (Cont.)

Figure 5



5. SUBCOMMITTEE REPORTS – (Cont.)

5.2 FIRE PROTECTION IN DIRECT CONTACT EVAPORATORS AND ASSOCIATED EQUIPMENT REPORT – Jerry Vuoso

The subcommittee on Fire Protection in Direct Contact Evaporators & Associated Equipment met on Monday morning October 7, 2002 with 8 out of 16 subcommittee members (or alternates) present.

The minutes from the April 2002 meeting were accepted. A brief discussion followed reporting that no comments where received concerning the draft document that had been posted on the BLRBAC web page. Jerry Vuoso briefly reviewed the document slide presentation, which was to be presented at the Main Committee meeting. Since there was no further business for the subcommittee, the meeting was adjourned.

During the Main Committee meeting, Jerry Vuoso provided a brief summary of the subcommittees work in reviewing and developing the draft revision to the existing guideline document. Jerry thanked the subcommittee members for the hard work and interest in completing the revision process. Jerry then presented a slide presentation summarizing the contents of the draft document and some of the document details.

The floor was opened for questions and comments and hearing no questions or discussion from the general membership, Jerry requested that the Chairman initiate a vote on accepting the document. A vote was held resulting in the approval of the presented document. Jerry thanked the members for their interest.

CHAIRMAN: On behalf of BLRBAC I'd like to thank Jerry and all of his Subcommittee members. That was quite an undertaking to update that document. I don't know if it was his suggestion that it will be another 20 years before it gets done again or not.

5.3 INSTRUMENTATION SUBCOMMITTEE – Richard Pothier for Bill McQuillan

The Instrumentation Subcommittee met in two sessions on Monday. In the morning session we had ten regular members and 16 guests present. In the afternoon session we had seven regular members and seven guests present.

We went through another review of the Instrumentation Check List. We wanted to make some changes in some of the wording; not really changing the structure. We plan to submit it to the Executive Committee.

We have been working on putting together some recommendations or guidelines for functional testing of trips in the interlocks. Following review and comment by the Executive Committee, the Subcommittee has decided to review it again and will probably make some substantial changes. A new draft is expected following another meeting or two.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.3 INSTRUMENTATION SUBCOMMITTEE – (Cont.)

Once again we discussed recommended vs. required practices. We expect these discussions will continue because what's recommended and what's required is always an issue because of individual designs and control systems as well as people's opinions.

Another issue that came up during our meeting recently was the use of switches and transmitters. We have had discussions in the Executive Committee meetings about that with some of the other Subcommittees. I'm sure that's going to continue as well.

Pretty much that is where we stand as a Subcommittee. If anyone has any questions, I'll be happy to address them. Thank you.

5.4 MATERIALS & WELDING SUBCOMMITTEE – Joan Barna

No meeting was held. The subcommittee will meet during the Spring 2003 BLRBAC Meeting.

5.5 PERSONNEL SAFETY – Robert Zawistowski

The personnel safety sub-committee met in an "open" session on Monday, October 7, 2002. There were 14 members and 21 guests in attendance during the morning meeting. We also had several guests attend for portions of the meeting, for an average attendance of approximately 40 people. A "closed" session meeting was held on Monday afternoon for editing the Personnel Safety document.

Representation at our meeting included original equipment manufacturers ALSTOM Power, Andritz, Babcock & Wilcox, Diamond Power and Kvaerner. Representation from insurance and insurance service companies included AXA Corporate Solutions, FM Global, GE Global Asset Protection Services, HSB Forest Products Group and Hartford Steam Boiler. Operating company representation included, Boise Cascade, Delta Natural Kraft (Inland Paperboard), Eastern Paper of Lincoln, Georgia Pacific, International Paper Company, Mead Coated Board, Mead Westvaco, Packaging Corporation of America, Rayonier, Sappi, Smurfit Carton de Venezuela, Smurfit-Stone Container, Stora Enso, and Weyerhaeuser. Water treatment company representation included Buckman Laboratories International, and Consultant representation included The National Board and Power Specialists Associates, Inc.

We had no requests for information or clarification since the last meeting.

We solicited information regarding the Weyerhaeuser - Plymouth, NC and Durango - St. Mary's, GA explosions. Very limited information, due to confidentiality restrictions, was available on both during our meeting. However, some general information was exchanged and some photos were viewed. We were advised that Weyerhaeuser would make a report on Tuesday.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.5 PERSONNEL SAFETY – (Cont.)

The present Personnel Safety document contains information regarding welding in recovery boilers. We feel this information should be moved to the Materials subcommittee and incorporated in the document they are developing. This was discussed with the Materials subcommittee chairperson and it was agreed that this was acceptable. We were asked, and agreed, to retain the information in the Personnel Safety document until they are ready to publish their document.

We were asked to review some language regarding attachment welds. An earlier version of the Personnel Safety document contained language stating that attachment welds to tubes be limited and specifically that tangent welds be prohibited. Apparently this wording was changed sometime in the 1990's and is not contained in the latest version that is posted on the BLRBAC website. The original wording was reviewed by the subcommittee and reinserted into our current draft copy of the Personnel Safety document. Eventually, this information will also be moved over to the Materials subcommittee document.

We had extensive discussions regarding what may be a safe distance from the recovery boiler during an ESP to provide personnel protection from an explosion. Due to numerous configurations of recovery boilers relative to other boilers and equipment, we concluded this would be very difficult to define. However, we did conclude that the "assembly point" for personnel following an evacuation should be located sufficiently away from the boiler to avoid direct exposure to the blast and flying debris. The selection of an "assembly point" may vary in distance from the boiler depending on its location relative to other buildings and/or blast walls that may exist in a facility. While the distance is not specifically defined, and information is limited, we have been told that heavy objects can travel several hundred feet or more. The need to establish an assembly point that is located a sufficient distance from the recovery boiler will be addressed in the next version of the Personnel Safety document.

We were asked to review the use of the ESP alarm as it relates to evacuation prior to initiation of an ESP. An example of this would be if an operator suspects an abnormal condition that may require additional checking, the ESP alarm could be activated without starting the ESP process to signal people to leave the building. Additional investigation may be done and depending on the results of that investigation, an ESP may be initiated. The purpose of this would be to start moving all unnecessary personnel and/or contractors out of the building in advance of a potential ESP. We spent a significant amount of time discussing the use of the ESP alarm for this purpose.

We also discussed using a separate alarm for the purpose of evacuation, which we were against. After lengthy discussion, we are maintaining that the sole function of the ESP alarm is to signal all personnel evacuate the recovery boiler building when an ESP is activated and not to use this alarm as a pre ESP evacuation signal. Discussions on this important topic continued outside the meeting. Based on all information on hand at this point, we will discuss this topic once again during the Spring 2003 meeting.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.5 PERSONNEL SAFETY – (Cont.)

Various sections of the Personal Safety document were re-drafted prior to the meeting. During our afternoon session, all of the language was reviewed and edited. This draft will be circulated to subcommittee members for an additional review following the fall BLRBAC meeting. Additional changes will be incorporated into the document for final review during the spring 2003 meeting. We expect that the document will be ready for submittal to the Executive Committee for review at that time.

This Subcommittee remains open to those members who would like to participate.

CHAIRMAN: I'm sure Bob would appreciate any input, as he requested, to help him in his endeavor.

5.6 PRESS RELEASE & PUBLICITY SUBCOMMITTEE REPORT – Craig Cooke

No report.

CHAIRMAN: Last spring Craig Cooke made a report from the Press Release & Publicity Subcommittee. He said that if you missed it, he's sorry, but it will be another three or four meetings before he will have another report. So we don't have a report from Craig.

5.7 SAFE FIRING OF AUXILIARY FUEL REPORT – Dave Streit

The Auxiliary Fuel Subcommittee met in open session on Monday afternoon in the Valentino room. There were 5 members/alternates and 13 guests present at the meeting.

There was no meeting during April 2002 and therefore, no agenda items carried over from the previous meeting.

The membership list was reviewed and up-dated to reflect current active membership. Currently there are 8 active members and 1 alternate.

One agenda item was listed for this meeting. The agenda item related to the use of isolation valves in sensing lines to devices used for auxiliary fuel interlocks.

During the April meeting the Safe Firing of Black Liquor Subcommittee recommended changes to their document to allow limited use of isolating valves for interlock devices. The intent was to allow for maintenance of the sensing elements. Prior to the changes recommended by the Safe Firing of Black Liquor Subcommittee, the Auxiliary Fuel document had basically the same wording as the Safe Firing of Black Liquor document regarding the use of isolating valves. The Auxiliary Fuel subcommittee reviewed the proposed changes made by the Safe Firing of Black Liquor Subcommittee to see if the same changes should be made to our document. Our document currently reads as follows (the wording in question is underlined):

5. SUBCOMMITTEE REPORTS – (Cont.)

5.7 SAFE FIRING OF AUXILIARY FUEL REPORT – (Cont.)

Currently in Auxiliary Fuel Document (Chapter 4, Item 5, Page 14)
The **Schematic Piping** diagrams show the various valves and other components in the piping that are mentioned in the Starting and Tripping diagrams. For clarity, miscellaneous piping components normally provided have not been shown. No valve or other shutoff device should be permitted in the sensing line to any interlock device, such as a pressure or temperature switch, that could defeat the interlock function if accidentally closed.

The Auxiliary Fuel Subcommittee agreed that our document should also be changed and be consistent with the Safe Firing of Black Liquor document. The proposed change to our document is as follows (changes underlined):

The **Schematic Piping** diagrams show the various valves and other components in the piping that are mentioned in the Starting and Tripping diagrams. For clarity, miscellaneous piping components normally provided have not been shown. No valve or similar shut-off should be installed in the sensing line to any interlock device, such as, a pressure or temperature switch, that could defeat the interlock function if accidentally closed. In a limited number of cases, it could be considered safer to install an isolation valve to allow repair(s) to be performed on interlock device(s) promptly. This could minimize the amount of time the safety interlock will be out of service in cases where an outage would have to be scheduled to make repairs. Isolation valves shall be allowed in these cases only. Examples could be drum level probe columns, black liquor pressure switches, auxiliary fuel system pressure switches, etc. If valves are installed, they must be utilized in a "managed system".

Whenever a "managed system" is utilized on sensing line isolation valves and it is necessary to defeat an interlock by closing a safety interlock sensing line isolation valve, the jumper policy must be followed.

Prior to placing a unit/system in service, a checklist of all the safety interlocks with valves in the sensing lines shall be completed by the operator, documenting that the valves are in the open position and secured per the "management system".

5. SUBCOMMITTEE REPORTS – (Cont.)

5.7 SAFE FIRING OF AUXILIARY FUEL REPORT – (Cont.)

The above changes will make our document read exactly the same as the Safe Firing of Black Liquor document with respect to the use of isolating valves in sensing lines. Because the wording is the same as has been under review from the Safe Firing of Black Liquor proposal since the April session, the vote by the general membership will apply to both the Safe Firing of Black Liquor proposal and our proposal. *(The proposed changes were approved during the Safe Firing of Black Liquor subcommittee report.)*

Changes to the Auxiliary Fuel document have been approved by the general membership on two occasions in the past, without the document posted on the web site being up-dated. The last change occurred two year ago during the October 2000 session. An up-dated document, scheduled to be posted on the web site, has been has been forwarded to the Auxiliary Fuel Subcommittee for review. It is expected all reviews will be completed and the up-dated document will be posted on the web site before the April 2003 meeting. A copy of the up-dated document will be e-mailed to subcommittee members and guests for review and comment, if requested during the subcommittee meeting.

There was discussion regarding the use of transmitted signals for interlocks. Some of the pro's were:

- High reliability with the ability to troubleshoot on-line
- No hysteresis around the set point to cause inaccuracy
- No mechanical parts or movement to fail
- Continuous measurement of process signal

Some of the con's were:

- Additional device in the circuit with increased opportunity for failure
- Transmitters usually have isolation valve manifolds that if misused can defeat interlocks
- Transmitter ranges can be changed without the interlock set point being changed
- If a transmitter is used for both control and an interlock, a failure of the transmitter could cause a process deviation with unsafe conditions and the interlock would also be compromised

The auxiliary fuel document does not discuss the use of transmitted signals; therefore no action was taken at this time. This topic may be worked on in the future to be consistent with other documents, if appropriate.

There was no new business brought before the subcommittee, therefore there was discussion as to the need for a subcommittee meeting during the spring session. Based on the discussion, a spring meeting will not be scheduled; however, a meeting can be scheduled if the need arises.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.8 SAFE FIRING OF BLACK LIQUOR REPORT – Len Erickson

Closed Meeting Minutes – October 7th, 2002 9:00 AM

The Safe Firing of Black Liquor Subcommittee met Monday morning in closed session with eight members present.

1) The Executive Committee approved the following revisions to the Safe Firing document:
   a) Chapters 9 & 10. One comment was received on Chapter 9 & 10 from the membership at large as follows; from Larry Carter @ Weyerhaeuser *"Add sentence to item 3 page 65 <<< 'It is also good practice to follow this as a pre-start up condition since hearth or starting burners can cause smelting of residual salts in the furnace prior to liquor introduction.' >>>"* It was agreed to add the phrase "and / or Auxiliary Fuel"

   b) The use of isolating valves on critical instruments.

2) The following two documents were forwarded to the executive committee for approval @ the spring meeting, however were not acted on. They are on the Executive Committee's fall agenda:

   a) Revision providing for the use of a keyed interlock switch for water washing the lower furnace. Several revisions were made to clarify the logic. This revision will incorporate changes to the Safe Firing Tripping logic and Safe Firing Permissive logic. *(Secretary's note: This change is not posted for membership review, pending receipt of modified tripping and permissive logic drawings.)*
   b) Revisions to SFBL to allow an increase in the testing interval when firing high solids (> 70%) black liquor. The TAPPI test method was changed to T 650 om-99.

   The proposed revision for testing interval is posted on the BLRBAC Web site for membership review and comment. Subject to resolution of any comments received, it will be presented for vote at the April 2003 meeting.

3) Weyerhaeuser has asked SFBL to include guidelines for determining the smelt bed temperature prior to initiating a water wash. The SFBL committee is deferring this to the executive committee for action.

4) Weyerhaeuser has proposed a revision to SFBL for high solids systems, (>80%), that re-circulate back to a pressurized storage tank. Richard Wiseman is leading the investigation into this request.

5) It has been brought to the committee's attention that TAPPI test method has been updated to T 650 om-99. The revision includes a new Significance section and a revision to the precision paragraph. The test method proper has not changed.

5. SUBCOMMITTEE REPORTS – (Cont.)

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

5) IP has asked SFBL to review the ring header design on Large BLRB's that have sub-headers on each wall. Mark Sargent will lead this effort.

7) Old Business:

a) Len Erickson will send a notification to Fuel Tech™ that BLRBAC does not approve or condone the injection of water into a recovery boiler. In systems such as this, they should have sufficient interlocks, block & bleeds, etc. to ensure that the system will shut down in the event of a broken spray, stuck water purge valve etc. (Fuel Tech™ presented a write up and schematic of a chemical injecting system that injects an aqueous solution of a fouling inhibitor into the upper furnace of recovery boilers).

b) At the spring meeting Jansen Combustion and Boiler Technologies and Alstom gave technical presentations on their methods of enhancing recovery boiler operation by enriching the combustion air with Oxygen. Following the technical sessions, the committee agreed to ask each company to submit their typical safety interlocking system. It was agreed that language would be drafted and reviewed that acknowledges the use of oxygen, and recommending a minimum set of interlocks to the SFBL system. The language will be drafted for the Spring 2003 meeting. Ari Verloop will follow up.

Open Meeting Minutes – October 7th, 2002 1:00 PM

The Safe Firing of Black Liquor Subcommittee met Monday afternoon in open session with eight members and about 60 guests in attendance.

1) Weyerhaeuser has asked SFBL to include guidelines for determining the smelt bed temperature prior to initiating a water wash. The SFBL committee is deferring this to the executive committee for action.

2) Weyerhaeuser has proposed a revision to SFBL for high solids systems, (>80%), that re-circulate back to a pressurized storage tank. Richard Wiseman is leading the investigation into this request.

3) The committee advised the general membership in attendance that TAPPI test method has been updated to T 650 om-99. The revision includes Significance section and a revision to the precision paragraph. The test method proper has not changed.

4) IP has asked SFBL to review the ring header design on Large BLRB's that have sub-headers on each wall. Mark Sargent will lead this effort.

5) Members or guests brought no new business to the committee.

6) The meeting was adjourned at approximately 1:30 PM.

5. SUBCOMMITTEE REPORTS – (Cont.)

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

Contact:

- Len Erickson at 208/384-4933, e-mail lenerickson@boisepaper.com , or Fax 208/384-7637 or
- Mark Sargent at 513/248-6086, e-mail mark.sargent@ipaper.com , or fax 513/248-6679 with questions or comments.

Briefly the changes to Chapter 9 & 10 of the SFBL document are:

- The spout cooling minimum Spout Cooling water temperature required has been increased from 120 degree to 140 degrees.
- Some of the spout discussions that were in the spout section were moved to the dissolving tank explosion section because they were more appropriate there.

If there are no questions, Wayman we are ready for a vote on the revisions to Chapter 9 & 10.

CHAIRMAN: Would all the voting members please stand? All those in favor of the revisions, please raise your right hand? Any opposed? It is unanimous. Thank you.

The changes to the SFBL document which allow the use of isolation valves on critical instruments are:

No valve or similar shut-off should be installed in the sensing line to any interlock device, such as, a pressure or temperature switch, that could defeat the interlock function if accidentally closed. In a limited number of cases, it could be considered safer to install an isolation valve to allow repair(s) to be performed on interlock device(s) promptly. This could minimize the amount of time the safety interlock will be out of service in cases where an outage would have to be scheduled to make repairs. Isolation valves shall be allowed in these cases only. Examples could be drum level probe columns, black liquor pressure switches, auxiliary fuel system pressure switches, etc. If valves are installed, they must be utilized in a "managed system".

Whenever a "managed system" is utilized on sensing line isolation valves and it is necessary to defeat an interlock by closing a safety interlock sensing line isolation valve, the jumper policy must be followed.

Prior to placing a boiler in service, a checklist of all the safety interlocks with valves in the sensing lines shall be completed by the operator, documenting that the valves are in the open position and secured per the "managed system".

If there are no questions, I would like to present it for a vote.

5. SUBCOMMITTEE REPORTS – (Cont.)

CHAIRMAN: Again, would all the voting members please stand? All those in favor of the revisions, please raise your right hand? Any opposed? It is unanimous. Thank you.

One thing, the By-laws use to require that any revisions like this be mailed for review prior to a vote. Of course, we are now utilizing our WEB site instead of the mail. There is a separate location on the WEB site that contains all of the documents with any proposed revisions. I would encourage all of you to visit that WEB site occasionally and if you have any issues with any of the proposed revisions, then you need to make those known. We keep adding bells and whistles and all of these bells and whistles you folks will have to live with. It's up to you to have your input if you have any issues with any of these. There is generally always something out there posted on our WEB site for proposed revisions.

5.9 WASTE STREAMS REPORT – John Rickard

The Waste Streams Subcommittee met in closed session at 8 AM on October 7, 2002, with nine members present including one new member, Paul Seefeld of A.H. Lundberg Associates.

We finished our work on Chapter 6, Liquid Waste Streams Blended With Black Liquor, during the morning meeting. The majority of new changes involved using consistent language for each waste stream description. There was one major change. After serious debate, the members agreed to recommend that turpentine <u>not</u> be blended with black liquor. The thinking behind this recommendation involved the hazardous and unpredictable nature of turpentine. It is volatile and has an undefined upper explosive limit. Blending it with black liquor will make the black liquor system more risky to operate. Chapter 6 will be presented to the Executive Committee for their review.

The next work item is writing guidelines for firing waste streams in dedicated burners. The most likely waste stream for this application is methanol. There is Scandinavian experience with rectified methanol fired in dedicated burners, and some North American experience. Turpentine and soap may also be candidates for this firing style.

Knowing that we will hear a presentation on firing methanol in a dedicated burner in our afternoon meeting, we discussed generalities concerning writing these next guidelines. We agreed that the scope of our guidelines does not reach back to manufacture and storage of waste streams. Our scope does cover all devices and equipment in the immediate vicinity of a recovery boiler.

We discussed the format of the new guidelines. They may follow the format of Safe Firing of Auxiliary Fuels or our Chapter 5, "Guidelines for Thermal Oxidation of CNCG and SOG". The Finnish Recovery Boiler and the Swedish Recovery Boiler organizations have guidelines for waste streams fired in a dedicated burner. Olli Kujanpaa will obtain and translate the Finnish guidelines for us. Bentley Sherlock volunteered to create an outline for this new section.

5. SUBCOMMITTEE REPORTS – (Cont.)

5.9 WASTE STREAMS REPORT– (Cont.)

We also discussed a future review of the entire document once the dedicated burner section is completed. One change that may be helpful would be to discuss all methods of thermal oxidation of one waste stream in one continuous section rather than have separate sections for different firing methods.

The afternoon session convened at 1 PM in an open meeting. There were eight subcommittee members present and 19 visitors. Mr. Richard Vetter of Riverwood in Macon, GA, made a presentation on his mill's experience with firing CNCG and methanol in their recovery boiler. By rectifying the methanol out of their SOG, they reduced the volume of waste to be fired and provided a no cost support fuel to sustain CNCG combustion. It is a successful, trouble-free installation.

Following Richard's presentation, the group discussed blending turpentine with black liquor, with the input of a mill representative who is presently oxidizing turpentine by blending. With the end of general discussion, the meeting adjourned. In the spring we will have a presentation by a burner manufacturer with methanol experience.

6. AMERICAN FOREST & PAPER ASSOCIATION REPORT – Tom Grant

The AF&PA Recovery Boiler Program continues in its mission to produce greater awareness of safe practices and to improve the operation, maintenance, safety, and efficiency of recovery boilers. Each of the subcommittees is working in the same direction for the Program's mission.

Currently, we have 27 companies in the Program including three non-AF&PA member companies. Our goal is to have all companies with recovery boilers participate in the Program in the common cause for the safe operation of recovery boilers. In this way, all companies with recovery boilers may directly gain the benefits of the Program. There are seven companies that operate recovery boilers in the U. S. that are not in the Program. We encourage them to join with the current members to cooperate in these efforts of safe operation and research to improve the reliability and safe operation of the boilers.

As many of you know, the Operation and Maintenance Subcommittee has conducted Operational Safety Seminars in an effort to further improve operations and maintenance. The seminars have proven most beneficial to those attending them. The over 1,800 who have attended received quite a bit from discussions with the monitors, as well as the other attendees, on the causes and procedures that should have been followed to avoid the explosions. Actual cases of explosions are discussed without identification of the mill. Much has been learned from the seminars in the formal and informal discussions at these seminars. This year we had the lowest number of attendees in all the years that we have sponsored the seminars. Was it due to economical conditions, or is there no longer a need for the safety seminars? The Committee is reviewing this matter.

6. AMERICAN FOREST & PAPER ASSOCIATION REPORT– (Cont.)

After five years of no explosions, although a number of incidents were near misses, we had two explosions this year with serious injuries to personnel including one fatality. We ask companies to revisit their training program to see if there is a need to send those many new operators and those with some experience, as well as the many new people in the recovery and maintenance areas, to the seminars.

Mr. Jack Clement continues in his role as the AF&PA explosion monitor. He is also working with the BLRBAC ESP Subcommittee on collecting, reporting and tracking recovery boiler incidents.

The AF&PA Recovery Boiler Training Program continues to be of interest in many mills and many companies (members and non-members) are using this extensive information to their best advantage. There are only a handful of mills that do not have the program and we urge those mills to consider using this program in their training.

The "Recovery Boiler Char Bed Cooling Following an ESP" project, sponsored by the AF&PA, is now complete. Drs. Grace and Tran have completed a video and will be showing it at the Annual AF&PA Conference in February. Copies of the final report on the investigation of the relationship between recovery boiler furnace design and explosion damage was completed earlier this year and was distributed to Program members. It may be ordered through AF&PA.

The "Damage Mechanism" project sponsored by the R&D Subcommittee, and working with the Pressure Vessel Research Council (PVRC) of the Welding Research Council (WRC) to create a document on damage mechanisms, is nearly complete. Dr. Dave Bennett will report at the Annual Conference on the outcome of the project, which identifies damage mechanisms in the pulp and paper industry. This is in conjunction with the development of the American Petroleum Institute document API-571 "Damage Mechanisms in the Refining Industry." The ultimate objective is to be able to determine whether damaged equipment is fit-for-service. A task force from AF&PA will review the draft before it is published.

Mr. Clement and Dr. Grace are researching the "Overheat Floor Tube Failures" project sponsored by the R&D Subcommittee and are working with B&W, Alstom, Andritz-Ahlstom and Kvaerner - both in the U.S. and in Scandinavia. In this project, they are investigating the experiences with overheat floor tube failures in chemical recovery boilers. They are nearly complete in their work to compile the industry's experience with floor tube failures. This will provide a better understanding of the issues involved. A copy of the report will be distributed to AF&PA Program members when it is published in the spring. The Subcommittee will then determine what further investigation may be needed.

The R&D Subcommittee is sponsoring a study with Mc Dermott Technology to identify potential nondestructive technologies for detecting waterside deposits in recovery boiler furnace wall tubes. The objective of the project is to eliminate overheat failures due to waterside deposits and optimize the chemical cleaning interval. This project is about to get underway next month and we expect to have the first phase of the work completed about May 2003. We will then determine which direction to go to do further work.

6. AMERICAN FOREST & PAPER ASSOCIATION REPORT– (Cont.)

The Energy Performance Task Group for Agenda 2020 is continuing to work to develop projects with a vision for the future. There are several projects currently underway with funding from DOE including gasification. The Sensors and Controls Task Group also has several additional projects underway being funded by DOE that relate to recovery boilers. Others are being reviewed for possible future funding from DOE with cooperative research at universities, research institutions and at the corporate level. Proposals continue to be reviewed in the selection process by the Task Groups.

The AF&PA's Recovery Boiler Conference will be held February 4th and 5th in Atlanta. The presentations will include reports on the projects currently underway and sponsored by the AF&PA Recovery Boiler Program. A status report on the research projects in the Agenda 2020 program funded by DOE and subcommittee reports on their accomplishments will also be presented. The object of the Conference is to keep not only the members advised, but also the remainder of the recovery boiler community, as well. A notice and agenda for the annual meetings and Conference will be sent about mid-November. The Conference is open to vendors, insurers, as well as companies operating recovery boilers. We hope that many of your will plan to attend next year's Conference.

7. TAPPI RECOVERY BOILER SUBCOMMITTEE REPORT – Karl Morency

The Recovery Boiler Subcommittee met on September 9th in San Diego in conjunction with the TAPPI Engineering Conference. The committee has completed the following technical information papers that have been submitted to TAPPI for publication:

- Recommended Test Procedures for Black Liquor Evaporators
- Tube Rolling Procedures for Boilers with Two Drum Generating Banks
- Stripping of Kraft Pulping Process Condensates - Regulations, Design and Operations
- Collection and Burning of Concentrated Noncondensible Gases - Regulations, Design and Operations

Those documents should be available from TAPPI in the near future.

The committee has also completed a review of the "Recovery Boiler Performance Calculations - Short Form" and is in the process of updating of the "Recovery Boiler Performance Calculations - Long Form" to make sure that it is compatible with the updates to the short form.

The committee is in the process of completing a review of the draft of another technical information paper, "Effect of Composition on the First Melting Temperature of Fireside Deposits in Recovery Boilers", written by Professor Honghi Tran of the University of Toronto. This paper discusses the impact of potassium and chlorides on pluggage potential for recovery boilers. We hope to have the draft review completed and the paper ready for submittal to the full subcommittee for approval at the Spring Meeting.

7. TAPPI RECOVERY BOILER SUBCOMMITTEE REPORT– (Cont.)

The Corrosion Material Subcommittee has also published a number of TAPPI Technical Information Papers that should be of interest to members of this committee. These include:

- ❖ Radiograph Quality for X-ray of Tube-to-Tube Butt Welds
- ❖ Ultrasonic Sheer Wave Inspection of Boiler Tubes as an Alternative to Using Radiography
- ❖ Inspection for Cracking of Composite Tubes in Black Liquor Recovery Boilers
- ❖ Ultrasonic Technician Performance Test for Boiler Tube Inspections

Those documents are currently available through TAPPI.

This last meeting ended my five-year tenure as Chairman of that Subcommittee. Andy Jones of IP will be assuming the Chairmanship starting with the spring meeting.

The next meeting of the TAPPI Recovery Boiler Subcommittee has tentatively been scheduled to follow the spring BLRBAC meeting here in Atlanta.

8. NATIONAL BOARD OF BOILER & PRESSURE VESSEL INSPECTORS' REPORT – Bob Sullivan

The NBIC 2002 Addenda was approved at the August 2002 meeting. This will be published and issued December 31. 2002.

The NBIC Committee has been reorganized and specific goals are being established. The inspection section of the NBIC "NB" Subcommittee will be attempting to address unique inspection criteria. To that end, any areas dealing with inspection of Black Liquor Recovery Boilers that should be acknowledged as different from other boilers which should be included, such as, failure mechanisms and their causes, specific inspection and/or examination requirements. Please advise me so they can be addressed at the Subcommittee meeting.

There were eight interpretations approved at the August 2002 NBIC meeting. These will be published on the National Board web site (www.nationalboard.org) soon.

An ASME Section VIII, Div. 1, Pressure Vessels item that may be of interest to BLRBAC members is the proposed new Part UHX. This part will replace the current non-mandatory Appendix AA, which will be deleted. It will provide design and construction rules for tubular heat exchanges. The provisions, if implemented as proposed, may affect repairs or replacement parts of tubular heat exchangers.

The problem is caused by a difference between the proposed rules becoming mandatory and the Tubular Exchanger Manufacture's Association (TEMA) rules. The difference may cause some joint misalignment and there may be dimensional problems, such as, tube sheet thickness.

8. NATIONAL BOARD OF BOILER & PRESSURE VESSEL INSPECTORS' REPORT– (Cont.)

The item is making its way through the approval process that provides opportunities for change. This is only on advisory to be aware of the possible change.

The National Board announced a reorganization of the former Communications and Government Relations function to a new Public Affairs Department. The interest to BLRBAC is that part of the responsibilities of the new department will be to publish the Synopsis of Boiler and Pressure Vessel Laws, Rules and Regulations. This activity was formerly performed by "The Uniform Boiler and Pressure Vessel Law Society," which has been dissolved.

We recognize the importance of an accurate listing of laws and regulations. Owners, manufacturers and repair organizations need to know what rules are applicable in a given locality. The National Board will strive to make this information as accurate and accessible as possible. It is also recognized that it will take some time before a final publication is completed.

9. WESTERN CANADA BLRBAC REPORT – Bob Norton

The spring meeting was held in Kamloops, BC with 30 people in attendance. Weyerhaeuser hosted the meeting with a tour of the mill as part of the session.

Submitted incidents
There were 8 reported incidents at the meeting. Of the 8 leaks, one of the boilers was shutdown using the ESP.

The leaks were as follows.
- 2 economizer tube leaks
- 2 distribution header cap incidents
- 2 handhole leaks, one welded and one gasket failure
- 2 in the upper furnace in areas cleaned by soot blowers.

Operating Problems discussed at the meeting
- Discussion on minimum air flow permissives and trips
- Soot blowers
  - Feed tube maintenance, i.e. missing keys
  - Using 'Gemini' nozzles
- Burning secondary sludge in a recovery boiler
- Increased wastage in the lower furnace due to higher throughput and low excess air.
- Discussion on the use of potassium phosphate in water treatment

Presentations
There were four presentations put on by the boiler manufactures during the technical section:
- **Alstom --** Presented the new High Performance Igniter as well as Alstom's capability in control systems as they relate to recovery boilers.
- **Andritz --** Walked through selected modules of their training CD's. This training package is interactive and includes about 8 CD's and takes about 6-8 hours to go through.

9. WESTERN CANADA BLRBAC REPORT– (Cont.)

- **B&W --** They are developing a program that can be used by their tech services people that will allow them to quickly assess the liquor distribution for a given boiler and select the best liquor nozzle, location and quantity.
- **Kvaerner --** Described their RB optimization program. The focus was on Intelligent Soot blowing which will select which blower should be activated and for how long depending on a number of inputs such as steam temperature rise, flue gas temperature, etc.

The fall meeting will be held November 6 & 7, 2002 in Vancouver, BC. We are also planning for the 40th anniversary of the WCLRBAC in the fall of 2003.

10. ACTIVITIES OUTSIDE NORTH AMERICA REPORTS

10.1 REPORT FROM SOUTH AFRICA – A Palsgraaf, Pr Eng

There are eight recovery furnaces in Southern Africa spread over four mills ranging in capacity from 300 to 1800 tds/d each, in total ca 7000 tds/d. The age of these units ranges from three to 50 years with five of them more than 30 years old. This age is a major concern for safe and reliable operation, despite several upgrades and modernizations that have taken place. This report covers six of the eight units. Over the past six months there have been five reportable incidents.

Tugela Mill SRF 1 (B&W, 1952, 300 tpd, 63 b/440 C) had an economizer leak, which was caused by an attachment weld. This weld had cracked due to a lack of expansion capability. It was ground out and rewelded.

Usutu Mill CRU 2 (CE, 1970, upgraded in 1989, 500 tpd, 42 b/400 C) had a smelt spout failure two months after replacement. This unit has a vacuum system. The unit was brought down in a regular manner and both spouts were replaced. The cause for the failure has not been identified. The water proved to be as per specification, all manufacturing records were proof of the required quality, and there were no reports of excessively heavy smelt runs or cooling water flow interruptions.

Ngodwana Mill CRF 1 (B&W, 1965, 600 tpd, 15 b/sat) have had several incidents over the past few years, three of them in the past 6 months. There was one boiler bank leak, one set of cracked buck stay clip welds, and one was an ESP after water was found running out of a wind box tell tale opening after observation of black ports. This increased the concern from known, but supposedly under control, to serious risk. Previous incidents include one boiler bank leak due to excessive thinning just above the mud drum (original tubing, after extensive NDT, tubes were plugged), near lower header economizer leaks due to corrosion (the lower section was replaced), buck stay attachment welds cracked (modified some eight years ago, now inserts), cracks in fins propagating into the tube (poor replacements of inserts) and cracks in burner panel tube to fin welds (all four panels replaced). This unit still has the long heavy fins in the lower hearth in combination with thin walled tubes (3.6 mm) and is operated on/off due to lack of liquor. This mode of operation is forced but undesirable in view of the wall

10. ACTIVITIES OUTSIDE NORTH AMERICA REPORTS– (Cont.)

10.1 REPORT FROM SOUTH AFRICA– (Cont.)

construction and the repair procedures applied in the past (lack of fin to tube weld penetration or excessive penetration, manipulated tubes with even longer fins with associated repairs, excessive start/stops since 1984, etc). The leak leading to the ESP was caused by a crack just under a primary airport between the tube and fin. Further inspection revealed three other locations with similar cracks. The tube sections were all replaced. The unit is back in operation, but under close scrutiny. A decision to carry out mayor repairs and/or replacements is being prepared.

To counter past incidents, a comprehensive furnace audit standard has been developed over the past six years. It has been applied to bring all units to a common and improved safety standard. It covers per unit some 1300 questions/issues ranging from verification of compliance with the BLRBAC RGP's, to water treatment, maintenance, management and training procedures. The severity of the issues has been given a weighing factor; one for important, to be resolved as soon as possible, and two for less important but still required. It was the intention to have no severity (criticality) one issues open on any of our furnaces by the end of this year. We know now that we will not make this, but in the course of next year we should be there, or at least very close. This will mean we will have a full understanding of what equipment and systems are in place and utilized to manage the processes and to flag deviations from required conditions for management action before an excessive risk develops. Our furnaces in Southern Africa have now gone into the third cycle of auditing along these lines. Suggestions for improvements to this Document are discussed after each audit at our internal BLRBAC meetings. The weighing of severity is a recurring problem.

10.2 REPORT FROM BRAZIL – Elvecio Leoncio Galdino

At the 11th Recovery and Utility Seminar in May 8 and 9 in São Paulo City, 18 papers were presented and discussed.

Douglas Reeve, Jim Frederick, Dale Sanchez, and other Brazilians teachers held the TAPPI Kraft Recovery Short Course Jul 29- Aug 2, in São Paulo.

The five incident reports on recovery boilers in Brazil were discussed in the ESP Subcommittee meeting yesterday.

The first meeting of the Brazilian Recovery Boilers Safety Committee was held July 4th at Aracruz Celulose. Two incidents were exhaustively discussed and the main topic of the meeting was CNCG burning in Recovery Boilers. The next meeting will be during the 35th Annual Congress of the Brazilian Technical Pulp and Paper Association (ABTCP) next October 16th in São Paulo City.

10. ACTIVITIES OUTSIDE NORTH AMERICA REPORTS – (Cont.)

10.2 REPORT FROM BRAZIL – (Cont.)

Activities Planned 2002/2003

The 3rd Recovery Boiler Operators Meeting will be next November 19-21 in the city of Ribeirão Preto, SP. The sponsor of this meeting will be Votorantim Celulose e Papel – VCP LA with coordination by Roberto Villaroel.

The 15th Latin American Recovery Boiler Congress is scheduled to be held in Argentina in middle of next year.

The first meeting addressing maintenance in Recovery Boilers is planned to be held in Curitiba - PR on March 4, 2003.

The 12th Recovery and Utility Seminar is planned for May 7 and 8, 2003 in São Paulo City.

The first 2003 meeting of the Brazilian Recovery Boilers Safety Committee is planned for June in São Paulo City. The second will be during the 36th Annual congress of ABTCP in October 2003.

CHAIRMAN: We appreciate any and all reports we receive from off-shore. Again we would ask, so that we can allocate a place on the agenda, if you want to make a report, please notify Mike Polagye so time may be allotted to you on the Agenda.

11. OPERATING PROBLEMS SESSION REPORT – Dean Clay

We had a large turnout on Tuesday afternoon. It was a little quieter than I was looking for, but that is fine. As always, if you have any suggestions on how we can improve this session and make it more useful to you, please feel free to send them to me or Karl Morency, who will be leading the Operating Problems Session at our next meeting in April 2003. All of the officers will have their e-mail addresses and telephone numbers listed in the Meeting Minutes if you need to get in touch with any of us. I'll just hit a few highlights on the topics that came up.

- **Operator Training:** We did an informal survey and the majority of the mills indicated that they do have a dedicated Power & Recovery Shared Trainer for the power plant.

- **Scenario Training:** Tom Grace was kind enough to point out that one of the key scenarios that everybody needs to make sure their operators are trained on is to know how to quickly recognize a large leak in a recovery boiler and be able to take immediate action, which would be to initiate an ESP. This, of course, needs to be customized to your boiler and to the instrumentation that you have and the feedback that the operator gets, but certainly highlight this in the training.

11. OPERATING PROBLEMS SESSION REPORT – (Cont.)

- **ESP Evacuation and Assembly Area:** We talked about the need to make sure you are reassembling people in a safe area.

- **Auxiliary Fuel Pressure Interlock Settings, High Energy Spark Igniters for Heavy Fuel Oil:** These subjects were discussed.

- **Smelt Bed Bicarbonate Cooling**: It was noted that this is being tracked in the ESP Subcommittee using reports from the mills that indicate they use it and the amount of time they feel they are saving by using it.

- **Stuck Soot Blowers:** We talked about considerations for immediately reducing steam flow to a stuck soot blower.

- **Safety Valve Incident:** We also were advised of an incident with a safety valve that lifted properly on high pressure, but then blew off part of the discharge piping. Luckily nobody was injured although the results could have been catastrophic. It was suggested as part of our maintenance and safety valve programs that we pay attention to the discharge piping.

I would like to also indicate that following our break; we do have two technical presentations. I encourage you all to stick around for that if you have the time. We did change one of the topics:

"Electrical Resistance Mapping" presented by Alstom Power – Bill Keagan
This is a method where you can do on-line monitoring of part of your furnace wall in a recovery boiler for thinning.

"Non-destructive Inspection of Boilers and Tanks Using a Thermal Line Scanning System" presented by A Ronald Jacobstein and Thomas L. Reilly of Therm Tech Services, Inc.

CHAIRMAN: Again, thank you for your participation and I look forward to another good session in the spring.

TIME & PLACE OF NEXT MEETING: The next meeting will be held on April 7, 8 & 9, 2003, at the Crowne Plaza Hotel/Atlanta Airport, in Atlanta, Georgia.

ADJOURNMENT: Are there any other questions or comments, which need to be addressed? If not, this meeting is adjourned. Everyone have a safe trip home!

APPENDIX A

Past Chairmen of BLRBAC

1962 – 1963	C. William Conaway
1964 – 1965	James B. Smith
1966 – 1969	John M. Osborne
1970 – 1971	Dick W. Jebbink
1972	Al Logan
1973 – 1974	Norman L Heberer
1975 – 1976	Russ J. Delvin
1977 – 1978	Frank W. Moulton
1979 – 1990	Herbert D. Couture, Jr.
1991 – 1996	Lon M. Schroeder
1997 – 1998	Ron McCarty
1999 – 2000	Jules Dominguez
2001 – 2002	Wayman Thompson

APPENDIX B

Pictures from the 40th Anniversary Dinner

APPENDIX C (Page 1 of 8)

Recommended Guidelines for **Post-ESP Procedures for Black Liquor Recovery Boilers**

The activities that take place following initiation of an Emergency Shutdown Procedure (ESP) on a black liquor recovery boiler can have a significant impact on personnel safety, equipment protection and down time. The following guidelines are intended to identify the essential elements of a Post-ESP Procedure. It is the responsibility of each operating company to use these guidelines to develop a comprehensive set of site-specific procedures covering post-ESP activities. These guidelines are intended to cover situations when there has not been an explosion. In the event that an explosion occurs prior to, during, or following an ESP, the post-ESP procedures may have to be altered to deal with emergency situations.

This guideline reflects nomenclature and functions of current system installation and industry practice. This document should not be used to interpret BLRBAC system design recommendations. For detailed ESP system recommendations refer to BLRBAC document "Emergency Shutdown Procedure (ESP) and Procedure for Testing ESP System for Black Liquor Recovery Boilers".

1.0 Verification of ESP Functions

Immediately following initiation of an ESP, the control room operator should use a customized checklist to verify that all ESP functions took place. This checklist should contain information regarding the desired status of equipment following the ESP. The checklist should include the following equipment/functions, where applicable:

- Warning lights went on
- Siren sounded
- Black liquor pump(s) shut down
- Black liquor diverted
- Auxiliary fuel tripped
- Feed water stop valve closed
- Rapid drain valves opened
- Drum level dropped indicating unit is draining
- Desuperheater stop valve closed (pumped systems)
- Desuperheater control valve(s) closed (sweetwater condenser systems)
- Chemical feed pumps shut down
- Chemical feed flush water system isolated
- Air heater steam supply shut off
- Fuel supply to direct fired air heaters shut off

- Water supply to water coil air heaters shut off
- Soot blower steam supply shut off
- Steam supply to direct and indirect liquor heaters shut off
- Auxiliary fuel atomizing steam supply shut off
- NCG gases diverted
- Waste stream supply valves closed, pumps shut off
- Primary air damper closed
- I.D. Fan maintaining balanced draft
- F.D. Fans and secondary/tertiary air dampers followed ESP logic
- Superheater vent valve opened after appropriate time interval
- Furnace floor thermocouple recording device activated

The above list is not intended to be all-inclusive and each mill should review their system to insure that the checklist covers all ESP functions. A mill may elect to add additional items to this list that are considered to be good operating procedures but are not necessarily covered under the ESP Guidelines. Examples are functions such as: "saltcake feeder screw shut off", and "precipitator drag conveyors shut off".

2.0 Operating Procedures

There should be site-specific operating procedures covering the following:

2.1 Evacuation. There should be procedures covering evacuation of the area and a method for accounting for personnel

2.2 Failure of ESP Functions. Site-specific operating procedures should be developed to cover failure of each of the ESP functions included on the checklist. The procedures should incorporate information from the BLRBAC ESP guidelines regarding the desired status of the equipment following an ESP. The procedures should also incorporate the instructions from the ESP Guidelines that prohibit restarting any fan, including the I.D. fan, that trips immediately prior to or during an ESP.

2.3 Control of Access. Procedures should be established to control access to the area until re-entry is permitted.

2.4 Closing Remote Isolation Valves. There should be a checklist of remote isolation valves to be closed following an ESP. Operating procedures should designate responsibility for closing the valves. Valves to be closed should include:

- Natural gas supply valve
- Fuel oil supply valve
- Combustible waste streams

Closing these isolation valves will protect against fuel line rupture hazards in the event of an explosion. In addition to isolating fuel lines, consideration should also be given to isolating the feedwater header and all steam headers (with the exception of the header providing steam to the smelt shatter jets) if it can be done safely from remote locations.

2.5 Notification. There should be a list of management personnel, insurance company representatives and local authorities to be notified in the event of an ESP. The procedures should state who is responsible for making the notifications. If local fire or medical emergency services are summoned, they should be met at the mill gate by knowledgeable personnel who can direct their activities and keep them away from the area of explosion danger.

2.6 Adjacent Equipment. There should be procedures for operating and/or shutting down adjacent equipment.

2.7 Lower Furnace Water Level. The water level remaining in the lower furnace following an ESP should be measured to help determine the potential for overheat damage to floor and lower sidewall tubes. There should be site-specific procedures for collecting this information. Some boilers are equipped with permanent systems for measuring the water level over the full height of the furnace and it will only be necessary to assure that the information is recorded. On units that are not equipped with a permanent system, it will be necessary to install temporary clear tubing on a lower furnace drain connection after it is safe to re-enter the area following the ESP. There are instructions for doing this posted on the BLRBAC Web site. The water level data should be included as part of the BLRBAC incident report.

2.8 Operating Data Collection. Operating parameters before and after an ESP are often used to evaluate an incident. Each site should include a methodology to capture and document the operating parameters. Depending on the type control and monitoring equipment installed this may be either hard copy (charts) or soft copies of data that pertains to the boiler. It may include items such as:

- Combustion air system flows, temperatures and pressures
- Flue gas temperatures and drafts
- Floor tube temperatures
- Feedwater, blowdown and steam flows
- Drum level
- Drum pressure
- Feedwater, boiler water and blowdown analytical data (conductivity, pH, etc)

- Oil, gas and black liquor flows and pressures
- Superheater temperatures
- Sequence of event print outs
- First out print outs

3.0 Operator Interviews

All operators on duty at the time of the ESP should be interviewed before leaving the mill to assure all information relating to the ESP is available for making subsequent decisions. The interview should include:

- Events and/or conditions that led to the decision to ESP
- Any problems encountered during or following the ESP

4.0 ESP System Reset

The ESP system should not be reset until re-entry into the area is permitted. The ESP system reset logic/procedures may result in automatic movement of controls to undesired positions. Proper caution should be taken to position controls where intended. Examples of valves that may need isolation or manual positioning prior to reset include the feedwater to the economizer and the steam to the steam coil air heater(s).

The audible ESP alarm should be silenced after sounding for a minimum of 15 minutes if it is a distraction to operating personnel and impedes communications. Procedures to control access to the area should be in effect prior to silencing the alarm. Silencing the alarm should be completely independent of the ESP system reset. Visual alarms are to remain in effect until the ESP system is reset.

5.0 ESP Re-Entry Waiting Period

Post-ESP procedures should include rules covering the length of the waiting period for re-entry into the recovery boiler area following an ESP (no explosion). BLRBAC has not set a minimum waiting period and has left this decision to the operating companies. At the fall 1993 BLRBAC Meeting, a paper (copy attached) was presented summarizing BLRBAC recovery boiler explosion history including data on the time interval from water entry into the furnace till explosion. This information can be used as the basis for establishing a safe waiting period.

The industry currently utilizes two types of rules – fixed time periods and condition based.

5.1 Fixed time period – a number of companies set a fixed time period that personnel must remain outside the building following an ESP.

5.2 Condition based rules – with condition-based rules, the information available to operating personnel is used to determine the minimum-waiting period that personnel must remain outside the area following an ESP. The following conditions should be considered when determining the waiting period:

- **Location of leak** (Water could / could not enter the furnace.)
- **Size of leak** (Large / Small)
- **Was the boiler successfully ESP'ed?** (Yes / No)
- **Evidence of floor tube damage resulting from the ESP** (Yes / No)

Use of condition-based rules will require establishing a minimum waiting period for each of the possible combinations of conditions listed above. Procedures should designate who is responsible for making the decision regarding the waiting period.

Example 1: After the boiler was ESP'ed, it was determined that there was a small leak in the economizer (no possibility of water entering the furnace), the boiler was successfully ESP'ed and there was no evidence of floor tube damage from the ESP. These conditions would require minimal waiting time before re-entering the building.

Example 2: After the boiler was ESP'ed, it was determined that there was a large leak in the lower furnace, the boiler did not drain**,** and there was no evidence of damage to the floor due to the ESP. These conditions would require maximum waiting time before re-entering the area.

Inadequate Information. If any of the information required to make a decision is not available or the accuracy is questionable, the worst conditions should be assumed and the maximum waiting period should be used.

6.0 Re-Entry into Recovery Boiler Area

Once the waiting period has expired, one or two qualified personnel should enter the recovery building to determine if there are any conditions that require extending the waiting period. If there are not, then required operating and maintenance personnel can be allowed back into the area.

If there is any evidence of accumulation of water on the bed, operating and maintenance personnel should be kept out of the area until all indications of any hot spots in the bed are gone. The surface of the bed fractures as it cools and the potential exists for accumulated water to enter one of these fractures and cause a smelt water explosion.

7.0 Condition Assessment

After re-entry into the area, it will be necessary to assess the condition of the boiler to determine what steps are required to make repairs and get the boiler ready to return to operation. This assessment should include the following:

- Assessment of the condition of the char bed and determination of whether supplemental bed cooling will be used
- Determination of whether it will be necessary to water wash
- Determination of whether a hydrostatic test will be required to locate the leak
- Identification of the location of the leak and extent of damage
- Evaluation of floor thermocouple data and any information regarding lower furnace water level to determine if the floor boiled dry and the potential for floor tube damage

The normal sequence of events following condition assessment will be:

- Char bed cool-down
- Probing bed to check for hot spots
- Water washing
- Hydrostatic test for determination of leak location
- Leak repair
- Floor cleaning and inspection
- Final hydrostatic test

8.0 Char Bed Cool-Down

Before the furnace can be water-washed or hydrostatically tested, it is necessary to determine that the char bed / smelt pool has cooled sufficiently to ensure that there is no longer the possibility that molten smelt is present. A char bed is highly insulating and pockets of molten smelt can exist in a large bed for several days after an ESP. Before the furnace can be water-washed, the bed should be probed with thermocouples to make certain that no hot spots remain that could contain molten smelt. A hard crust will normally form on the surface of the bed and some hand lancing will usually be necessary to break up the crust to allow checking subsurface material for hot spots. Under no circumstances should water washing begin if there are any visible, glowing hot spots present in the char bed.

The char bed can be allowed to cool on its own or it can be broken up and cooled down using hand lances to inject a cooling medium such as nitrogen propelled sodium bicarbonate, liquid carbon dioxide, or low pressure dry steam. The use of hand lances with cooling medium facilitates break-up of the bed crust - disrupting the bed and exposing hot material to the cooling medium. In addition to significantly reducing the cool down time, breaking up the bed makes it much easier to probe the bed with thermocouples and determine that all hot spots have been eliminated. Under no circumstances should water - including "fog" nozzles - be used for bed cooling.

Each mill should have a written char bed cool-down procedure that includes the following:

- Procedures for use of bed cooling mediums such as sodium bicarbonate, liquid carbon dioxide or low-pressure steam (if they are to be used). If low-pressure steam is to be used, the procedures need to include provisions to prevent any condensate from entering the furnace.
- Type of thermocouple equipment and procedures to be used for probing the bed to check for hot spots.
- Maximum bed temperature allowable to start water washing in the furnace. For units with hearth designs that retain a residual pool of smelt, the procedures may also include a minimum time interval before water washing can commence.

The melting temperature for smelt is normally around 1400° F but it can be as low as 1000° F depending on the chemistry. The maximum bed temperature allowable to start water washing should provide enough safety-margin to take into account potential variations in smelt chemistry, the potential for localized hot spots, and the inability to probe 100% of the bed. The maximum bed temperature used by the majority of companies that provided input for these guidelines is 800° F.

9.0 Water Washing

Following completion of cool down of the bed including any minimum time interval requirements, water washing of the furnace can begin using the mill's normal water wash procedures. These procedures should include the following:

- The differential between wash water temperature and pressure part metal temperatures does not exceed manufacturer's recommendations
- An adequate number of smelt spouts are open to drain wash water
- Procedures to protect personnel from burn hazard due to exposure to hot water
- Procedures to prevent flooding and collapse of flues, ducts, hoppers, etc. due to plugged drain lines or openings

APPENDIX C (Page 8 of 8)

As an additional precaution, consideration should be given to having all but essential personnel leave the area for a pre-established period of time starting prior to the introduction of wash water into the furnace.

10.0 Floor Inspection

The floor thermocouple data and any information regarding lower furnace water level should be evaluated to determine if the floor boiled dry and the potential for floor tube damage. If there is evidence of potential damage, then the floor should be cleaned and inspected prior to starting back up.

11.0 Check of Drum Internals

There have been several reports of loose drum internals found after an ESP. Drum internals should be checked prior to putting the boiler back in service.

12.0 Hydrostatic Tests

A final hydrostatic test should be conducted following completion of repairs and inspection of the unit. The ESP procedure subjects the boiler to significant thermal stresses so the boiler should be thoroughly inspected for any resultant damage. In a number of cases, leaking generating bank tube seats were found in two-drum recovery boilers following an ESP, so the generating bank should be carefully inspected for leaks.

2002 Oct. - 1	
Location:	**Daishowa Marubeni International Ltd., Peace River, Alberta, Canada**
Unit:	B&W Contract No. 761401. Startup 1990.
Size:	3.785 million ppd sftwd. 3.276 million ppd hdwd. Operating – 563,200 lb/hr @ 925 psig & 815F,Design @ 1120 psig. 2 drum/large economizer
Incident Date:	June 6, 2002
Leak/Incident Loc:	**Economizer -** Pinhole leak in handhole cap of bottom header on first economizer
Downtime hrs due to leak/total:	Total time off-line – 36 hours. Total time off liquor – 45.5 hours
ESP?	None. Current revocable policy is to stay out of recovery area 6 to 12 hours
Classification:	**Non-critical**
How discovered:	Observed while washing hopper
Leak detection:	Acoustic and mass balance system in operation but did not detect nor confirm leak
Sequence of events:	Boiler off liquor, on gas & washing economizer hoppers from manway above hoppers. Operator noticed abnormal saltcake "cone" on structural steel , and then observed spray from leak.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Flaw ground out and repaired with preheat & 7018 rod followed by dye penetrant test and hydro. Alstom weld procedure SMA 1.1Y-304
Root cause:	Porosity in header handhole cap seal weld.
Future prevention:	Ensure use of inspection techniques and use of appropriate weld procedures and qualification
Last full inspection:	September 2001. Chemically cleaned October 1995 with chelant.

2002 Oct. - 2	**Critical Incident No. 558**
Location:	**Smurfit-Stone Container, Fernandina Beach, Florida**
Unit:	No. 4 Recovery Boiler. B&W Contract No. PR-126. Startup 1970.
Size:	3.0 million ppd solids. Operating – 492,000 lb/hr @ 860 psig & 825F. 2 drum, cross flow bank with no baffle/large, multipass, crossflow economizer
Incident Date:	March 16, 2002
Leak/Incident Loc:	**Economizer –** 1/32" hole in 6 year old weld of plug into header tube stub. 2nd upper header, 8th tube in from left sidewall in top row towards rear of boiler.
Downtime hrs due to leak/total:	Total downtime – 25:05 hours
ESP?	No. Current irrevocable policy is to stay out of recovery area 8 hours.
Classification:	**Critical Incident**
How discovered:	Operator discovered on routine round
Leak detection:	Trasar system in operation did not detect nor confirm leak
Sequence of events:	Boiler on-line after 6 day annual outage. Operator on rounds noticed small amount of steam coming out economizer roof . Boiler hopper found dry & water in economizer hopper. Door opened and water observed running down tubes. Oil burners placed in operation and 3-4' bed burned out.
Bed cooling:	No
Wash adjacent tube:	Leak thinned adjacent area
Repair procedure:	Old stub and plug cut off and a new plug installed using TIG weld procedure
Root cause:	Porosity in weld
Future prevention:	No information
Last full inspection:	1 week before incident. Chemically alkaline cleaned in 1995.

2002 Oct. - 3	
Location:	**Smurfit-Stone Container, Fernandina Beach, Florida**
Unit:	No. 5 Recovery Boiler. B&W Contract No. PR-189. Startup 1978.
Size:	3.0 million ppd solids. Operating – 495,700 lb/hr @ 860 psig & 825F. 2 drum/large, multipass, crossflow economizer
Incident Date:	April 9, 2002
Leak/Incident Loc:	**Economizer –** 1/32 "' pinhole in old plug weld of 2nd lower header, 3rd tube from the north side, in 3rd row down on rear side of header
Downtime hrs due to leak/total:	Total downtime – 31 hours
ESP?	No. Current irrevocable policy is to stay out of recovery area 8 hours.
Classification:	**Non-critical Incident**
How discovered:	Operator discovered on routine round
Leak detection:	Trasar system in operation did not detect nor confirm leak
Sequence of events:	Operator on routine round found water in the economizer hopper. Verified boiler hopper to be dry. Oil guns were lighted and bed burned out.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Old plug cut out and new plug installed
Root cause:	Porosity in an old weld
Future prevention:	No information
Last full inspection:	March 2002. Alkaline boilout in 1990

2002 Oct. - 4	
Location:	**Weyerhaeuser Company, Johnsonburg, Pennsylvania**
Unit:	Tampella Contract No. 90132. Startup 1993
Size:	2.2 million ppd solids. Operating- 346,000 lb/hr @ 1250 psig & 900F. Design- 1600 psig. 1 drum, large economizer
Incident Date:	December 12, 2001
Leak/Incident Loc:	**Economizer –** crack at 12 o'clock position on weld of reducer (small end) at No. 1 economizer lower header, platen 10.
Downtime hrs due to leak/total:	Total downtime – 36 hours
ESP?	No. Current irrevocable policy is to stay out of recovery area 12 hours
Classification:	**Non-critical Incident**
How discovered:	Operator walkdown
Leak detection:	None installed
Sequence of events:	Operator during routine walkdown noticed moisture in No. 1 economizer ach conveyor and liquor pulled for visual inspection and a wet area observed directly above the hopper. Boiler shutdown in an orderly manner.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Weld defect removed by grinding out the porosity and area overlaid
Root cause:	Corrosion fatigue cracking from internal surface of a weld with porosity
Future prevention:	Investigating the feasibility of replacing No. 1 economizer lower headers during next annual outage
Last full inspection:	Inspected May 2001. Boiler acid cleaned in 1991.

2002 Oct. - 5	
Location:	**Weyerhaeuser Company, Johnsonburg, Pennsylvania**
Unit:	Tampella Contract No. 90132. Startup 1993
Size:	2.2 million ppd solids. Operating- 346,000 lb/hr @ 1250 psig & 900F. Design- 1600 psig. 1 drum, large economizer
Incident Date:	December 22, 2001
Leak/Incident Loc:	**Economizer –** crack at 6 o'clock position in tube to header weld at No. 1 economizer lower header, tube No. 6 (counting upward on header), platen No. 15.
Downtime hrs due to leak/total:	Total downtime – 36 hours
ESP?	No. Current irrevocable policy is to stay out of recovery area 12 hours
Classification:	**Non-critical Incident**
How discovered:	Operator walkdown
Leak detection:	None installed
Sequence of events:	Operator during routine walkdown noticed moisture in No. 1 economizer ash conveyor and liquor pulled for visual inspection and a wet area observed directly above the hopper. Boiler shutdown in an orderly manner.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Weld defect removed by grinding and area overlaid.
Root cause:	Crack appeared to be an undercut at site of weld porosity
Future prevention:	Investigating the feasibility of replacing No. 1 economizer lower headers during next annual outage
Last full inspection:	Inspected May 2001. Boiler acid cleaned in 1991.

2002 Oct- 6	
Location:	**Weyerhaeuser, Port Wentworth, Georgia**
Unit:	Unit 24370. B&W Contract PR-190. Startup 1979. B&W revamps in 1990 and 1995
Size:	5.1 million ppd solids. 699,000 lb/hr @ 600 psig & 750F. Design @ 1700 psig. 2 drum/large economizer
Incident Date:	July 6, 2002
Leak/Incident Loc:	**Economizer –** leak from crack in handhole weld at lower header of No. 2 economizer (2^{nd} in water flow). First leak since reactivation in August 2000 after boiler shutdown for 22 months.
Downtime hrs due to leak/total:	Total downtime – 28 hours 52 minutes
ESP?	No. Current revocable policy is to not enter recovery area for 24 hours.
Classification:	**Non-critical Incident**
How discovered:	Operator saw water running down corner of economizer hopper while making rounds
Leak detection:	None installed
Sequence of events:	Operator observing the water in the hopper inspected the boiler bank hoppers and saw no evidence of water. Team leader notified and went to hopper. Sootblowers turned off and boiler walked down. There was no indication of water entering the furnace and the hopper discharge did not connect to the liquor system. An economizer IK poppet valve that was leaking was replaced, but water flow continued in the hopper. Inspection through doors with liquor guns pulled and aux fuel fired revealed the leak. No significant changes in flow or trends of water chemistry, feedwater and steam flows observed
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Installed new hand hole plug and welded using a qualified WPS for P1 and P2. Final visual inspection using Dye Penetrant method Type B.
Root cause:	Weld failure
Future prevention:	Continued good inspection.
Last full inspection:	Inspected September 2001. Acid cleaned in 1990 by previous owner.

2002 Oct. - 7	**Critical Incident No. 559**
Location:	**International Paper Co., Prattville, Alabama**
Unit:	Plant Unit No. 2. CE Contract 20278. Startup 1979-80
Size:	3.2 million ppd solids. 457,000 lb/hr @ 1450 psig and 900F. Design @ 1500 psig. 2 drum, single pass crossflow bank/large economizer
Incident Date:	August 6, 2002
Leak/Incident Loc:	**Economizer –** 6 inch long thin lipped failure in the front economizer bank. 2nd tube from south sidewall and ~ 4 ft below roof.
Downtime hrs due to leak/total:	Downtime for ESP and repairs – 58hr-47 min. Total downtime 60 hr 17 minute
ESP?	ESP initiated.
Classification:	**Critical Incident**
How discovered:	Lost drum pressure and boiler tripped on high furnace pressure.
Leak detection:	Nalco TRASAR leak detection system was in service and showed no warning of sudden tube rupture
Sequence of events:	Operator observed loss of drum level & boiler tripped on high furnace pressure. Operator immediately initiated ESP. Boiler had been on line less than 3 hours following a planned shutdown.
Bed cooling:	
Wash adjacent tube:	
Repair procedure:	
Root cause:	Erosion/corrosion thinning of a very localized area in 10" long section next to the fin. Tubes cracked both sides and above and below failure
Future prevention:	
Last full inspection:	Inspected annually

2002 Oct. - 8	
Location:	**Mead-Westvaco, Charleston, South Carolina**
Unit:	B&W Contract PR-206. Startup 1984
Size:	4.5 million ppd solids. Operation-691,000 lb/hr @ 1450 psig & 880F. Design- 1725 psig. 2 drum/ large, longflow economizer. Economizer replace 1996 by Kvaerner.
Incident Date:	March 28, 2002
Leak/Incident Loc:	**Economizer –** longitudinal crack in lower headers of rear economizer module (feedwater inlet) that propagated on the interior surface of the 12th header from the right sidewall (14th tube from the rear sidewall) and 13th and 21st headers from the right sidewall Note: lower headers are offset at two staggered elevations for access; these are referred to also as 'upper' and 'lower' in describing the location of cracks. Tubes are 1.9" OD & headers 3" OD
Downtime hrs due to leak/total:	Total downtime – 28 hours and 35 minutes
ESP?	No. Current irrevocable policy is to stay out of recovery area 12 hours
Classification:	**Non-critical Incident**
How discovered:	Water observed in ash conveyor after alarm on the No. 12 EARS .
Leak detection:	Acoustic leak detection system in operation alarmed the leak before the leak was found
Sequence of events:	Following alarm and observation, liquor was pulled and doors opened to expose the lower economizer headers. Multiple leaks were observed.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Cracks in tube to header socket weld repaired by grinding over defects and welding
Root cause:	Unknown. B&W Service Bulletin identifies a similar crack mechanism they attribute to feedwater temperature cycling. Investigating possibility that manufacturer did not follow the specified weld detail.
Future prevention:	
Last full inspection:	Last inspection May 11, 2001. Chemical cleaned with chelant in 1989

2002 Oct. - 9	
Location:	**Mead-Westvaco, Charleston, South Carolina**
Unit:	B&W Contract PR-206. Startup 1984
Size:	4.5 million ppd solids. Operation-691,000 lb/hr @ 1450 psig & 880F. Design- 1725 psig. 2 drum/ large, longflow economizer
Incident Date:	July 26, 2002
Leak/Incident Loc:	**Economizer –** longitudinal crack in lower header of rear economizer module (feedwater inlet) that propagated on the interior surface of the 7th header from the right sidewall (10th tube from the rear sidewall) Note: lower headers are offset at two staggered elevations for access; these are referred to also as 'upper' and 'lower' in describing the location of cracks. Tubes are 1.9" OD & headers 3" OD
Downtime hrs due to leak/total:	Total downtime – 33 hours and 40 minutes
ESP?	No. Current irrevocable policy is to stay out of recovery area 12 hours
Classification:	**Non-critical**
How discovered:	Water observed in ash conveyor.
Leak detection:	Acoustic leak detection system in operation did not alarm the leak
Sequence of events:	Following observation, liquor was pulled and doors opened to expose the lower economizer headers. Multiple leaks were observed.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Cracks in tube to header socket welds repaired by grinding over defects and welding
Root cause:	Unknown. B&W Service Bulletin identifies a similar crack mechanism they attribute to feedwater temperature cycling. Investigating possibility that manufacturer did not follow the specified weld detail.
Future prevention:	
Last full inspection:	Last inspection May 11, 2001. Chemical cleaned with chelant in 1989

2002 Oct. - 10	
Location:	**Mead-Westvaco, Charleston, South Carolina**
Unit:	B&W Contract PR-206. Startup 1984
Size:	4.5 million ppd solids. Operation-691,000 lb/hr @ 1450 psig & 880F. Design- 1725 psig. 2 drum/ large, longflow economizer
Incident Date:	August 24, 2002
Leak/Incident Loc:	**Economizer –** longitudinal crack in lower headers of rear economizer module (feedwater inlet) that propagated on the interior surface of the 17th header from the right sidewall (14th tube from the rear sidewall) and 18th header from the right sidewall. Note: lower headers are offset at two staggered elevations for access; these are referred to also as 'upper' and 'lower' in describing the location of cracks. Tubes are 1.9" OD & headers 3" OD
Downtime hrs due to leak/total:	Total downtime – 38 hours and 15 minutes
ESP?	No. Current irrevocable policy is to stay out of recovery area 12 hours
Classification:	**Non-critical**
How discovered:	Water observed in ash conveyor.
Leak detection:	Acoustic leak detection system in operation but did not detect the leak.
Sequence of events:	Following observation, liquor was pulled and doors opened to expose the lower economizer headers. Multiple leaks were observed.
Bed cooling:	No
Wash adjacent tube:	Yes. Washed adjacent tube to failure.
Repair procedure:	Cracks in tube to header welds repaired by grinding over defects and welding
Root cause:	Unknown. B&W Service Bulletin identifies a similar crack mechanism they attribute to feedwater temperature cycling. Investigating possibility that manufacturer did not follow the specified weld detail.
Future prevention:	Studying to repair or replace
Last full inspection:	Last inspection May 11, 2001. Chemical cleaned with chelant in 1989

2002 Oct. – 11	**Critical Incident No. 560**
Location:	**International Paper Co., Texarkana, Texas**
Unit:	B&W Contract PR-186. Startup 1976
Size:	4.55 million ppd solids. Operating- 763,600 lb/hr @ 1050 psig & 813F. Design @ 1200 psig. 2 drum/large economizer
Incident Date:	May 28, 2002
Leak/Incident Loc:	**Economizer –** plug weld failed in the upper, front header of the economizer located directly behind the 2 drum, single pass crossflow generating bank. Tube in 19th tube from LHSW, 4th row from front
Downtime hrs due to leak/total:	Total downtime- 37.75 hours
ESP?	None. Irrevocable policy is to stay out of recovery area a minimum of 4 hours following ESP.
Classification:	**Critical Incident**
How discovered:	Water noticed in the economizer hopper.
Leak detection:	None installed
Sequence of events:	On finding the leak, liquor was pulled and the boiler shutdown in an orderly manner.
Bed cooling:	None
Wash adjacent tube:	Adjacent tube to the rear was thinned.
Repair procedure:	Installed a new plug & plugged the adjacent tube
Root cause:	Likely due to porosity in the weld
Future prevention:	
Last full inspection:	Inspected March 2, 2002. Acid cleaned with HCl in 1996

2002 Oct. - 12	
Location:	**International paper Co., Quinnesec, Michigan**
Unit:	B&W Contract PR-203. Startup 1985
Size:	3.66 million ppd solids. 564,000 lb/hr @ 600 psig and 750F. Design @ 800 psig, 2 drum/large economizer.
Incident Date:	February 24, 2002. 2-1/2 days after chill-and-blow
Leak/Incident Loc:	**Superheater –** Classic overheat rupture of primary SH tube in 11th row from front and 15th element from left sidewall. Primary bank is first bank in gas flow
Downtime hrs due to leak/total:	**Total downtime – 56.25 hours**
ESP?	No. Current irrevocable policy is to stay out of recovery area 6 hours minimum.
Classification:	**Non-critical**
How discovered:	Control room indications: drum level went high, steam flow dropped and ID fan speed increased
Leak detection:	Acoustic/ Mass Balance system in operation; leak detected by acoustic sensors.
Sequence of events:	Control room operator witnessed within one minute: Increase in drum level of ~ 8"; decrease in steam flow of ~ 80,000 pph (15%); ID fan turbine speed increase from 4000 to 4600 rpm; 1 ½ " increase in furnace pressure. Operating crew interpreted loss of steam flow as a SH leak; acoustic system confirmed leak in area. Liquor pulled and controlled shutdown began.
Bed cooling:	Sodium bicarbonate injection credited with reducing cooling time by 5 hours. Bed probed until less than 800F.
Wash adjacent tube:	No
Repair procedure:	Ruptured element removed and tube plugged at headers. Element replaced during May 2002 annual outage.
Root cause:	Overheating due to condensate in tube at startup. Classic thin lip, wide mouth failure. Thermocouples were only on every other tube.
Future prevention:	Added SH outlet leg thermocouples for complete coverage of tubes in primary and secondary SH.
Last full inspection:	Inspected May 2001. Chemically cleaned in 1996

2002 Oct. - 13	
Location:	**International Paper Co., Riegelwood, North Carolina**
Unit:	No. 3 Recovery boiler. CE Contract No. 3263. Startup 1964. CE/BE&K Retrofit in 1987, Contract Nos. CECS55086/CS717764
Size:	1.05 million ppd solids. 153,000 lb/hr @ 850 psig & 825F Design @ 950 psig, 2 drums/DCE
Incident Date:	August 20, 2002
Leak/Incident Loc:	**Superheater –** a small section of tube blew out of the bottom (outside of bend) inner hair pin loop in the 3rd Platen from the right hand sidewall. Bend was considerably out-of-plane of element.
Downtime hrs due to leak/total:	
ESP?	ESP initiated. Current irrevocable policy is to stay out of recovery area for 4 hours
Classification:	**Non-critical Incident**
How discovered:	Operator noticed an increase in the generating bank inlet temperature.
Leak detection:	None installed
Sequence of events:	Operator noticed a sharp increase in gas temperature entering the generating bank. He stepped out of the control room and heard a loud noise coming from inside the unit. Sootblowers were shut off and Fireman and Shift Manager walked down unit. Definite sound from inside the unit, but no evidence of water or steam in the furnace. Drum level was stable and it was thought to be a SH leak. However, with not knowing cause of the noise, the unit was ESP'd 45 minutes after observing the temperature increase.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Tube was sectioned and the bend replaced
Root cause:	Unknown
Future prevention:	Reestablished procedure for NDT inspection of these loops during the annual inspection
Last full inspection:	Inspected April 2002. Loops were not inspected during 2002 annual outage. Acid cleaned in 1998

2002 Oct. - 14	
Location:	**International Paper, Prattville, Alabama**
Unit:	Recovery Boiler No. 1. CE Contract No. 1965. Startup 1967.
Size:	2.1 million ppd solids. Operating-320,000 lb/hr @ 850 psig & 830F. Design @ 900 psig. 2 drum/DCE
Incident Date:	February 12, 2002
Leak/Incident Loc:	**Superheater –** 1" wide x 2" long thin lip blowout on bottom side of hockey stick formed by the inlet tube rows in a platen of the final bank of a total counterflow superheater (bank in hottest gas). Replacement superheater installed 1984
Downtime hrs due to leak/total:	Downtime due to ESP – 87:35 hrs and 111:35 hrs Total outage time
ESP?	ESP was initiated. Current irrevocable policy is to stay out of recovery area 24 hours. Level checked with Tygon tubing after 24 hours showed no water in walls.
Classification:	**Non-critical Incident**
How discovered:	Boiler tender discovered leak while punching out liquor gun openings
Leak detection:	Nalco TRASAR RBLI system in operation showed the leak 1 hour before operator discovery. The progressive, stepped system was ~ 15 minutes from alarming when leak discovered.
Sequence of events:	Boiler tender went to 3rd floor to punch out gun ports and heard a loud noise in the furnace. He went 40' to the control room & operator checked that all instruments were normal. Shift supervisor had operator shut off sootblowers and determined the loud blowing noised continued. Supervisor instructed operator to initiate ESP. Lapsed time reported as 3 minutes from tender first hearing noise until ESP initiated.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Replaced four hockey sticks and pad welded some small, dime size areas. Hydro revealed additional leaks in penthouse where support attachments weld to superheater tube legs.
Root cause:	Corrosion thinning suspected. Tube sent out for analysis.
Future prevention:	Additional hockey sticks to be replaced on Fall outage. UT readings on hockey sticks made annually. Failure between normal grid readings. Plan to start scanning between grid lines and spend more time with visual inspection.
Last full inspection:	Inspected September 2001. Chemical cleaned September 2001.

2002 Oct. - 15	
Location:	**Inland Paperboard and Packaging, Orange, Texas**
Unit:	No. 1 recovery boiler. B&W Contract PR-108. Startup 1965.
Size:	1.65 million ppd solids. 256,000 lb/hr @850 psig & 835F. Design @ 975 psig. 2 drum/DCE
Incident Date:	October 5, 2001.
Leak/Incident Loc:	**Superheater –** 8" longitudinally oriented, thin lipped, fish mouth rupture in 2nd bank of parallel flow primary superheater. Report interpreted as saying leak in 10th element from left sidewall, row 11 from front of primary superheater**.**
Downtime hrs due to leak/total:	Total downtime – 97 hrs 50 min
ESP?	ESP initiated. Current irrevocable policy is to stay out of recovery area 4 hours
Classification:	**Non-critical Incident**
How discovered:	Boiler tripped on drum level. Furnace pressure had increased indicating a leak.
Leak detection:	Nalco Trasar system in operation did not detect nor confirm leak
Sequence of events:	Operators and supervisor investigated trip and heard steam blowing around drum area. ESP initiated 5 minutes after trip.
Bed cooling:	Southland Fire bed cooling enhancement credited with saving 48 hours. Bed cooled below 700F in 12.5 hrs.
Wash adjacent tube:	No
Repair procedure:	Tube removed and stubs plugged at headers
Root cause:	Short term overheat The boiler had been steaming higher than normal and it was determined soap from a heavy liquor tank at low level had been burned for about 8 hours.
Future prevention:	De-soaping the heavy tanks on a regular basis and monitoring superheater temperature.
Last full inspection:	Inspected December 2001.

2002 Oct. - 16	
Location:	**Smurfit-Stone Container Corporation, Brewton, Alabama**
Unit:	No. 2 Recovery Boiler. B&W Contract PR-79. Startup 1963.
Size:	1.1 million ppd solids. Operating- 186,000 lb/hr @ 860 psig & 830F Design @ 975 psig. @ drum/DCE
Incident Date:	June 1, 2002
Leak/Incident Loc:	**Superheater, Secondary –** 11th tube from south side sheared about 3' below roof where 180 degree bend starts in this tube that bridges cavity.
Downtime hrs due to leak/total:	Outage time due to ESP – 47:55 hours. Total downtime – 61:20 hours
ESP?	ESP initiated. Current irrevocable policy is to stay out of recovery area 8 hours.
Classification:	**Non-critical Incident**
How discovered:	Assistant operator saw steam flow drop 25,000 lb/hr from 110,000 lb/hr and boiler back draft a little.
Leak detection:	None installed.
Sequence of events:	Sootblowers shutdown and noise confirmed. ESP initiated 3 minutes after steam flow drop.
Bed cooling:	No.
Wash adjacent tube:	No
Repair procedure:	Superheater element removed and stubs plugged at both headers. Hydro disclosed leak in 20th element from north side of secondary superheater. A 5 to 6 inch crack on side of bend in lower loop that angles forward for tie to primary superheater tubes. Tube was "hanging alone & bowed together" in 1st pass of Sec. SH. Section removed and plugged in penthouse
Root cause:	Stress fatigue due to cyclic stress by sootblowers in area
Future prevention:	No information
Last full inspection:	Inspected February 2002

2002 Oct. – 17	
Location:	**Domtar. Ashdown, Arkansas**
Unit:	CE Contract No. 27477. Startup 1979.
Size:	4.2 million ppd solids. Operating at 560,000 lb/hr @ 850 psig & 850F. Design @ 1075 psig. 2 drum/large economizer
Incident Date:	August 25, 2002
Leak/Incident Loc:	**Superheater –** 2 leaks at seal weld of tubes to high crown seal – elements # 10 and #15 from the right sidewall. Elements are four flow and crack was in front most tube of the four tube bundle. Tube in # 10 sheared completely and tube in # 15 cracked 20% around circumference. Superheater elements are supported by crown seal.
Downtime hrs due to leak/total:	Total downtime – 68 hours
ESP?	No. Irrevocable policy is to stay out of recovery area for 4 hours minimum.
Classification:	**Non-critical Incident**
How discovered:	Recovery Boiler Advisor
Leak detection:	Recovery Boiler Advisor leak detection system was in operation and alarmed
Sequence of events:	RB Advisor alarmed at intervals with increasing frequency until 2 alarms at a space of 6 minutes reported "wall screen" and "superheater: Boiler chemistry and ID fans were in normal range. Liquor was pulled and bed burned out. The third shift to look for the leak found it.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Repaired crack & Dutchman used to repair tube that sheared.
Root cause:	Fatigue crack at support weld
Future prevention:	x-ray all similar welds on high crown seal
Last full inspection:	Last inspected September 2001. Acid cleaned in 1998

2002 Oct. - 18	**EXPLOSION NO. 158**
Location:	**Weyerhaeuser, Plymouth, North Carolina**
Unit:	No. 5 Recovery Boiler. CE Contract No. 20673. Startup 1976. Revamp 2001 by B&W, Contract No. 63-C-03006.
Size:	5.8 million ppd solids. Operation- 863,000 lb/hr @ 875 psig & 825F. Design @ 1040 psig. 2 drum crossflow bank/ large economizer
Incident Date:	May 8, 2002
Leak/Incident Loc:	**Boiler Bank –** in Row 34, tube # 12 sheared off at the steam drum and tub # 13 cracked at the mud drum
Downtime hrs due to leak/total:	Hours out of service due to leak – 2566 hours (110 days)/
ESP?	ESP initiated. Current irrevocable policy is to stay out of area 12 hours.
Classification:	**EXPLOSION –** Smelt/water
How discovered:	Investigation after explosion.
Leak detection:	Nalco Trasar system was in operation and confirmed the leak
Sequence of events:	05/07 @ 22:40 to 05/08 @ 01:40 ID fan average speed 514 RPM, maximum speed 537 RPM, minimum speed 485 RPM. (3 hour 10 minute time frame) 01:46 Process data system indicates that blower, IK No. 67, returned to its "Home" position (fully retracted position) after its normal blow sequence. IK 67 is located on the left wall of the boiler, in the centerline of the generating bank, and approximately 11 feet above the mud drum. Vibration/Alignment system is approximately 3 feet above the sootblower. 01:55 IK No. 67 lost its "Home" position indication. Sootblower average steam flow increased from 45,000#/hr to 65,000#/hr. 02:00 to 05:10 ID fan average speed 534 RPM, maximum speed 561 RPM, minimum speed 510 RPM. (3 hour 10 minute time frame) 05:20, Boiler drum level experienced a downward swing, drum pressure was 980 psig. ID fan speed 546 RPM

2002 Oct. - 18 **Location:** **Unit:**	**EXPLOSION NO. 158** **Weyerhaeuser, Plymouth, North Carolina** No. 5 Recovery Boiler. CE Contract No. 20673. Startup 1976. Revamp 2001 by B&W, Contract No. 63-C-03006.
	05:24 Feedwater control valve was placed in manual by the operator. The drum level was at –1.74", and the feedwater valve position was at 73% open. Drum pressure was at 972 psig. ID fan speed 573 RPM 05:25 Feedwater valve was still in manual, drum level was at +1.60", feedwater valve position was at 96% open, drum pressure was 972 psig 05:26 Feedwater valve was placed back in automatic, drum level was at +3.23", feedwater valve position was at 71% open, drum pressure was 966 psig. 05:30 Master Fuel Trip, drum pressure was at 952 psig, ID fan speed 587 RPM. The first out was Furnace Pressure > 4". The FD and Tertiary Fans tripped. High furnace draft and loss of ID Fan are the only common interlock trips these fans share. The ID Fan did not trip. After the boiler tripped the feedwater control valve remained in automatic. Drum level is at –2.7". Feedwater flow continued into the drum until the Emergency Shutdown Procedure (ESP) was initiated. 05:31 Drum pressure was 814 psig, Drum level indication reading –17.6" 05:35 Drum pressure was 499 psig, Drum level indication reading –18.1" 05:46 Feedwater valve was placed in manual, drum level was at -14.30", feedwater valve position was at 77% open, drum pressure was 164 psig 05:47 Feedwater valve remained in manual, drum level was at -15.40", feedwater valve position was at 57% open, drum pressure was 153 psig. 05:49 Feedwater valve remained in manual, drum level was at –14.77", feedwater valve position was at 69% open, drum pressure was 135 psig 05:54 Feedwater valve was placed in automatic, drum level was at +1.25", feedwater valve position was at 50% open, drum pressure was 87 psig. After drum level was established, it took approximately 500,000 lb/hr of feedwater flow to maintain the drum level. 06:07-06:08 Initial boiler furnace pressure excursion, as evidenced by the boiler furnace draft pressure indication out of range. Interviews with the operators indicated they heard two distinct blasts. Boiler room operator called the Recovery Boiler operator on the radio and said there was an explosion on the recovery boiler. 06:12:30 Boiler ESP, Drum pressure was 45 psig. Feedwater flow was Approximately 500,000#/hr at the time of the ESP activation. 06:31:30 Electromatic relief valve opened per ESP logic, Drum Pressure was 12 psig. 06:43:30 Third boiler furnace pressure excursion event based on the furnace draft tap indications, Drum pressure was 8 psig.
Bed cooling:	Carbonate was injected into the bed using nitrogen as a propellant
Wash adjacent tube:	No
Repair procedure:	Generating bank and sidewall tube replacement and Buckstay replacement
Root cause:	PLC output card failure in the sootblower control system that sent intermittent signals to a motor control and sent a sootblower into the boiler out of sequence. • Sootblower is one of approximately 35 blowers that share one master forward and reversing starter. • When the card sent an output pulse, the sootblower would either move forward or reverse, depending on which way the master starter was running. • The sootblower went into the boiler and stopped with its nozzles almost horizontal. • The steam from the nozzle blew on Tube #13.

2002 Oct. - 18 **Location:** **Unit:**	**EXPLOSION NO. 158** **Weyerhaeuser, Plymouth, North Carolina** No. 5 Recovery Boiler. CE Contract No. 20673. Startup 1976. Revamp 2001 by B&W, Contract No. 63-C-03006.
	• The steam velocity put the tubes into a fluid elastic instability range. • The tubes vibrated side to side until failure. • Tube #13, Row 34 cracked at the mud drum. • Tube #12, Row #34 sheared off at the steam drum. • These failed tubes allowed water inside the furnace which led to a smelt water reaction.
Future prevention:	Installed an automatic continuous blow down valve and wrote logic to maintain 50 cycles of concentration using the Nalco's RBLI system for Leak Detection.. Added sootblower logic that alarms the operator when: sootblower steam is higher than normal for the number of blowers blowing at the time, if a sootblower leaves home and wasn't asked to run. Changed the walk down for the recovery boiler. Held leak detection training for all recovery/caustic personnel.
Last full inspection:	Inspected 2001. Chemically cleaned with 7.7% HCl in 1984

2002 Oct. - 19 **Location:** **Unit:**	**Critical Incident No. 561** **Weyerhaeuser, Dryden, Ontario, Canada** No. 3 Recovery Boiler. CE Contract CA-64108. Startup 1965. ABB revamp Contract No. 6408 in 1994.
Size:	3.5 million ppd solids. Operation- 517,000 lb/hr @ 600 psig & 750F. Design @ 715 psig. @ drum/DCE
Incident Date:	May 15, 2002
Leak/Incident Loc:	**Furnace Screen –**2 leaks in the screen at torn "pin welds" between the tubes in sloped part of screen. One was between top & 2nd tube in 3rd element from left wall at nose tip elevation. Second in 2nd element from left wall between top & 2nd tube below a SH cavity. Sloped part of elements at different elevations
Downtime hrs due to leak/total:	Downtime due to ESP/Total downtime – 94 hrs
ESP?	ESP initiated. Current irrevocable policy is to stay out of recovery area 12 hours
Classification:	**Critical Incident**
How discovered:	Initial indication was dropping boiler water chemical residuals. Steam and water flow differential little different.
Leak detection:	None installed
Sequence of events:	With sootblowers off, no sign of leak. Trending flows did not show problem. Reevaluation next day showed 11 tonnes (24,000 lb/hr) difference (about 5%) with increasing deviation. With liquor off and firing gas, upper furnace very steamy. Orderly shutdown started and abandoned upon consideration that water would stop flashing as pressure dropped. ESP initiated.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Pin welds and cracks in tubes completely ground out. Pinweld attachments re-welded. Hydro disclosed leak in superheater stitch weld which was repaired.
Root cause:	Damage from large chunks of salt cake falling onto the screen tubes. Sectioned tube showed internal SAC.
Future prevention:	Optimize sootblower operation & reduce or eliminate build-up at the roof
Last full inspection:	Inspected June 2001. Chemical cleaned with acid in 1982

2002 Oct. - 20	**Critical Incident No. 562**
Location:	**Weyerhaeuser Company, Plymouth, North Carolina**
Unit:	CE Contract No. 20673. Startup 1975. Gotaverken Revamp Contract No. 732-809 in 1975.
Size:	4.5 million ppd solids. Operation- 820,000 lb/hr @ 850 psig & 825F. Design @ 1040 psig. 2 drum / large economizer.
Incident Date:	September 26, 2000
Leak/Incident Loc:	**Furnace Screen** – a 2" x'1/2" long crack at the tie weld, 2nd tube (counting down from the top) in the 4th screen tube element (assembly) counting from the right sidewall
Downtime hrs due to leak/total:	Total downtime – 113 hrs & 58 minutes
ESP?	ESP was initiated.
Classification:	**Critical Incident**
How discovered:	By leak detection system and boiler walkdown.
Leak detection:	Nalco Trasar Leak Detection System (RBLI) in operation detected a small leak when the concentration of Trasar chemical in the boiler water dropped indicating a possible leak.
Sequence of events:	During the week of 9/19/00, a leak was suspected because of slight deterioration of the boiler water chemistry. The RBLI had malfunctioned twice during the week skewing data from the system. However, each time the system was returned to service, the Trasar concentration in the boiler water continued to deteriorate. Walkdown of the boiler did not determine any unusual noises. On 9/26, during another walkdown, the door to the screen tube area at the 4th floor was opened and a leak of the screen tube was observed. Unit was ESP'd.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Bent section of tube replaced with a dutchman
Root cause:	Sootblower lance weld broke and lance was propelled across the furnace striking the 4th screen tube assembly
Future prevention:	Prevention is to ultrasonically test all of the sootblower forged flange butt welded lance hubs for corrosion
Last full inspection:	Inspected May 2000.

2002 Oct. - 21	**Critical Incident No. 563**
Location:	**Weyerhaeuser Company, Plymouth, North Carolina**
Unit:	CE Contract No. 20673. Startup 1975. Gotaverken Revamp Contract No. 732-809 in 1975.
Size:	4.5 million ppd solids. Operation- 820,000 lb/hr @ 850 psig & 825F. Design @ 1040 psig. 2 drum / large economizer.
Incident Date:	October 21, 2000
Leak/Incident Loc:	**Furnace Screen** – a 2" x'1/2" long crack at the tie weld between the 4th and 5th tubes (counting down from the top) in the 29th screen tube element counting from the left sidewall
Downtime hrs due to leak/total:	Total downtime – 154 hrs & 58 minutes
ESP?	ESP was initiated.
Classification:	**Critical Incident**
How discovered:	By leak detection system and boiler walkdown.
Leak detection:	Nalco Trasar Leak Detection System (RBLI) in operation detected a small leak when the concentration of Trasar chemical in the boiler water dropped indicating a possible leak.
Sequence of events:	The RBLI began to indicate a small leak at midnight. Also, steam and feedwater flow indication showed separation. Boiler walkdown detected no leak. During the day, Trasar concentration continued to drop. Another walkdown on the evening shift discovered a leak in the screen tube on the right hand side of the boiler. Unit was ESP'd.
Bed cooling:	
Wash adjacent tube:	No
Repair procedure:	Bent section of tubes replaced with a dutchman
Root cause:	Short term loss of water circulation in screen tubes once a week when rapid drain valves were tested. Practice was to energize the two series drain valves one at a time without closing the manual block valve at the header. A damaged seat on a bottom valve leaked when the upper valve was stroked. Water blowing from the screen tube header disrupted screen circulation. As tubes momentarily heated up, they expanded and bowed out of plane. Over a period of time, the tube elongated and continued to bow until the weld attachment pulled from the tube causing a leak. No change in tube microstructure
Future prevention:	SOP modified to close the manual valve when testing the rapid drain valves
Last full inspection:	Inspected May 2000.

2002 Oct. - 22	
Location:	**Mead-Westvaco, Evadale, Texas**
Unit:	No. 4 Recovery Unit. CE Contract No. 29873. Startup 1975. Ahlstrom (Andritz) rebuild in 1991 to large economizer and 2002 for steam flow increase
Size:	4.7 million ppd solids. Operation-680,000 lb/hr at 600 psig & 750F. Design @ 765 psig. 2 drum/ low odor
Incident Date:	June 2, 2002
Leak/Incident Loc:	**Upper Furnace –** Leak external to furnace from a pinhole in an attachment weld of door mounting box to the tube
Downtime hrs due to leak/total:	Total downtime – 49.5 hours
ESP?	ESP initiated. Current irrevocable policy is to stay out of area for 12 hours
Classification:	**Non-critical Incident**
How discovered:	Operator making routine walkdown observed steam coming from casing
Leak detection:	Nalco Trasar RBLI in operation did not alarm on mass balance or Trasar concentration as the leak was very small and within limits set for the system
Sequence of events:	Steam and water observed leaking from casing below an access door just in front of the mud drum. Operator and foreman stripped insulation and lagging from the door and determined leakage was from the box. The door was opened and they thought a noise was heard. They were not certain whether wall was membrane at this location and accordingly, requested an ESP.
Bed cooling:	Sodium bicarbonate cooling of the bed to 300F by Southland Fire and Safety Equipment credited with possibly saving 12 hours
Wash adjacent tube:	No
Repair procedure:	Pinhole ground out and site checked for cracking with dye penetrant, weld repaired and then again dye penetrant checked. No cracking was found.
Root cause:	Possibly pinhole formed in an undercut of attachment weld
Future prevention:	SAC inspection in key areas on future outages. Reinforced by recent leaks.
Last full inspection:	Inspected January 2002. chemically cleaned in January 2002 with Chelant; EDTA

2002 Oct. – 23	**Critical Incident No. 564**
Location:	**Mead-Westvaco, Evadale, Texas**
Unit:	No. 2 Recovery Unit. CE Contract No. 7557. Startup 1958.
Size:	1.6 million ppd solids. Operation-242,000 lb/hr @ 600 psig & 750F. Design @ 700 psig. 2 drum/ large economizer
Incident Date:	June 14, 2002
Leak/Incident Loc:	**Furnace, Upper/ Boiler Bank Screen –** attachment for a slip tie assembly between the 3rd screen tube from the unit South wall and the backside of a superheater pendant pulled loose from the screen that is between the superheater and the boiler bank. The screen is a continuation of the nose tubes.
Downtime hrs due to leak/total:	Total downtime- 72 hours
ESP?	ESP was initiated. Current irrevocable policy is to stay out of recovery area 12 ours
Classification:	**Critical Incident**
How discovered:	During routine walkdown, operator noticed furnace puffing at the spout level. Went to gun level and observed fire blowing out of the furnace.
Leak detection:	Nalco Trasar RBLI was in operation and did not detect the leak because of suddenness of the leak
Sequence of events:	At the same time as operator noticed puffing, Fireman observed drastic swing in drum level and operator noticed furnace pressurization and the ID fan was not picking up speed. Oxygen dropped from 4% to !%. Fireman opened feedwater bypass valve to restore drum level. Blowback continued when liquor flow was reduced and fan speed increased. Fireman diverted liquor. Thinking a IK might be stuck in boiler, sootblower steam supply valve was closed. Opening doors made obvious there was a leak. Boiler ESP'd 16 minutes after first noticing puffing at spouts.
Bed cooling:	Sodium bicarbonate applied by Southland Fire & Safety Equipment estimated to have saved 12 hours
Wash adjacent tube:	No
Repair procedure:	Failed section of tube removed and new section installed. Butt welds x-rayed
Root cause:	Initial review suggests that the original weld tying the lug to the screen tube was to heavy and stresses set up over the years led to minute fireside fissures that weakened the weld. It appears a mechanical force of the lance pushing a piece of slag into the tube caused the break. Lug design has been subject of a number of broken ties and lugs
Future prevention:	All lug ties to between screen and superheater cut loose. Follow up with supplier
Last full inspection:	Inspected April 2002. Chemically cleaned using EDTA in April 1999

2002 Oct. - 24	**Critical Incident No. 565**
Location:	**Smurfit-Stone Container, Fernandina Beach, FL**
Unit:	No. 5 Recovery Boiler. B&W Contract PR-189. Startup 1978
Size:	3.0 million ppd solids. Operating- 495,700 lb/hr @ 860 psig & 825F. 2 drum/large economizer
Incident Date:	August 12, 2001
Leak/Incident Loc:	**Furnace, Upper-** 9 in. split in a roof tube where the superheater loop bridging the sootblower cavity penetrates the roof 122 ft. above the bed Tube was 13th counting from the right side wall & on the rear side of the cavity between the 1st and 2nd bank of superheater.
Downtime hrs due to leak/total:	Total downtime – 93:10 hours
ESP?	ESP initiated. Irrevocable policy is to stay out of recovery area for 8 hours after ESP.
Classification:	**Critical Incident**
How discovered:	High furnace pressure alarm followed by a low drum level alarm. The steam flow was dropping.
Leak detection:	A Trasar leak detection system was in operation but neither detected nor confirmed the massive failure
Sequence of events:	Boiler operating at 80% load when operator got a high furnace pressure alarm. Drum level and steam flow started dropping. Feedwater valve started opening ID fan speed increased to bring furnace pressure under control. Operator assumed a tube leak and initiated ESP 2 minutes after first alarm.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	27 roof tubes showed signs of thinning. Thinned tubes were all bent tubes around superheater tubes penetrating the roof. No straight tubes were thinned. Thinned tubes pad welded.
Root cause:	Sootblower erosion. Poppet valve had been changed without checking the valve position, and was subsequently found to be in the wide open position. Nozzles are high impact.
Future prevention:	During the annual outage, 61 of the bent roof tubes were replaced and new penetration seals installed. Mechanics trained on setting poppet valves. Normal mechanic verifies correctness. Pressures checked on a routine basis.
Last full inspection:	Inspected February 2001. Alkaline boilout in 1990

2002 Oct. - 25	**Critical Incident No. 566**
Location:	**International Paper, Riegelwood, North Carolina**
Unit:	No. 5 Recovery Boiler. CE Contract 20980-V2RE. Startup
Size:	5.52 million ppd solids. Operating – 772,000 lb/hr @ 850 psig & 825F. Design @ 890psig. 2 drum/large economizer
Incident Date:	May 14, 2002
Leak/Incident Loc:	**Furnace, Upper –** leak on crown of 53rd tube from the right rear corner, 42 ft. above floor and 5.5 ft. above composite to carbon cut line. Heavy deposit (400 gm/sq. ft.) only above cut line and weight varied tube to tube.
Downtime hrs due to leak/total:	No information
ESP?	ESP initiated. Irrevocable policy is to stay out of recovery area 24 hours
Classification:	**Critical Incident**
How discovered:	See Sequence of Events
Leak detection:	None installed
Sequence of events:	Smelt runoff and smelt blowing out of one of six doghouses prompted pulling liquor. During attempts to open spouts and clean doghouses, green colored liquor noted dripping from 2 spouts. No problem seen with steam or feedwater flows. Thought problem at spouts external to boiler. Further investigation by rodding spouts released a “two finger wide” stream of water from the bed. Boiler ESP’d.
Bed cooling:	Sodium bicarbonate applied using fire extinguishers. Took 72 hours before could water wash
Wash adjacent tube:	No
Repair procedure:	Thinned tubes (11) removed and replaced
Root cause:	Extreme water side deposition **and fouling in a very localized area**
Future prevention:	Multiple acid cleaning during subsequent annual outage. Improvements in boiler feedwater system
Last full inspection:	Acid cleaned in 1999. Tube samples checked by sampling every 1-2 years for deposits. NDT used annually to check tube thickness. No deposits below cut line

2002 Oct. - 26	
Location:	**Weyerhaeuser Co., Prince Albert, Saskatchewan, Canada**
Unit:	Unit No. K58-5101. B&W Contract No. C-7810. Startup 1999
Size:	3.8 million ppd solids. Operating – 634,900 lb/hr @ 1250 psig and 900F. Design @ 1525 psig. 1 Drum/ large economizer
Incident Date:	March 22, 2002
Leak/Incident Loc:	**Furnace, Lower (below floor)–** five pinholes in one of two bends in spout (rear) wall replaced because of external corrosion. End tubes of 2 butting headers are installed out-of-plane so header end plate can be installed. Leak was 3 ft. below the floor.
Downtime hrs due to leak/total:	Total downtime – 85.43 hours
ESP?	No. Current irrevocable policy is to stay out of recovery area 12 hours
Classification:	**Non-critical Incident**
How discovered:	Operator noticed steam and condensate coming out of lagging behind the No. 3 smelt spout
Leak detection:	Acoustic system not on operation
Sequence of events:	Spoutman noticed wisp of steam coming out of a lagging joint at the corner of the furnace. He then saw steam coming out behind the No. 3 spout hood. Bed was burned down and boiler taken out of operation in normal manner.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Two composite tube bends were replaced with carbon steel tube bends
Root cause:	Corrosion due to exposure of hot tube to weak wash fluid containing sodium sulphide, sodium carbonate and chlorides
Future prevention:	Check for external tube corrosion anytime something is leaking onto the boiler as lagging is not water tight.
Last full inspection:	Inspected May 2001. Boiler has not been chemically cleaned

2002 Oct. - 27	
Location:	**UPM Kymmene Miramichi Inc., Miramichi, New Brunswick, Canada**
Unit:	ABB-CE Contract No. CA88101. Startup 1990
Size:	2.5 million ppd solids. Operation – 410,000 lb/hr @ 1250 psig & 850F. Design @ 1425 psig. @ drum/
Incident Date:	April 9, 2002
Leak/Incident Loc:	**Furnace, Lower (below floor)-** ¼ inch rupture in floor supply tube between T-connection and floor supply header
Downtime hrs due to leak/total:	Total downtime – 38.25 hours
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Observed noise, water and vapor coming from the top of the smelt dissolving tank
Leak detection:	None installed
Sequence of events:	Further review of control room data showed above normal deviation of steam and feedwater flows. Determined leak to be below the furnace floor and proceeded with normal shutdown.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Section of corroded tube removed and replaced
Root cause:	Chemical attack on furnace tube by weak wash leaking from hood wash piping. Believe chemical attack occurred before previous failure and was not discovered.
Future prevention:	When replacing/repairing spout hood plates, inspect tubes behind the hood.
Last full inspection:	

2002 Oct. - 28	
Location:	**Weyerhaeuser, Port Wentworth, Georgia**
Unit:	Plant ID- #24370. B&W Contract PR-190. Startup 1979. B&W retrofit Contract No. SCI 1179 in 1990/95
Size:	5.1 million ppd solids. Operate- 699,000 lb/hr @ 600 psig & 750F. Design @ 1700 psig. 2 drum/large economizer
Incident Date:	June 26, 2002
Leak/Incident Loc:	**Smelt Spout –**End of #2 and # 3 spouts (west-center and east-center) of four spouts. Leaks at 5 o'clock and 7 o'clock positions pointing downward at the bottom-side end of the insertable, baffled spout. Smelt flow hid the leaks during operation
Downtime hrs due to leak/total:	Total downtime – 8 hours 30 minutes
ESP?	No
Classification:	**Non-critical Incident**
How discovered:	Recovery outside operator was checking and inspecting hood showers and shatter jets on a 24 hour kraft outage
Leak detection:	None installed/not applicable
Sequence of events:	Outage inspection discovered the leaks
Bed cooling:	Not applicable
Wash adjacent tube:	Not applicable
Repair procedure:	All four spouts replaced.
Root cause:	Spouts thinned to the point that leaks occurred. Doghouse was modified to a Mini-hood design in 2000 and it is believed that the smaller volume in combination with closer proximity of the showers creates an extremely corrosive environment.
Future prevention:	As a test, underside of # 2 and # 3 spout ends overlaid with Inconel 625. Working with B&W to include factory overlay on future spouts
Last full inspection:	Last inspection September 2001. Acid cleaned in 1990

2002 Oct. - 29	
Location:	**Tembec, L.L.C., St. Francisville, Louisiana**
Unit:	B&W Contract PR-85. Startup 1965
Size:	3.0 million ppd solids. Operation-481,000 lb/hr @ 565 psig & 750F. Design – 600 psig. 2 drum/large economizer
Incident Date:	May 5, 2002
Leak/Incident Loc:	**Dissolving Tank –** tank moved ~ 9-12 in. One doghouse destroyed & both spouts replaced. One dissolving tank agitator replaced. Furnace wall membrane & windboxes repaired. Tank explosion dampers at scrubber rebuilt. Black liquor not being fired at time of incident
Downtime hrs due to leak/total:	Total downtime – 68 hours
ESP?	ESP initiated as precautionary measure following catastrophic dissolving tank explosion. Revocable policy is to stay out of area for 8 hours following an ESP.
Classification:	**Dissolving Tank Explosion**
How discovered:	
Leak detection:	None installed
Sequence of events:	Smelt rush occurred when one of two spouts unplugged with a natural gas torch. Shatter jet could not handle and the result was a series of catastrophic explosions. No injuries. Pulp mill downtime resulted in boiler liquor firing termination . Smelt flow stopped & rod inserted in each of two spouts. .Smelt spouts plugged ~ 24 hrs. when boiler again ready for firing liquor. Spout cleared with gas torch while startup burners in service. When spout opened, smelt pool in furnace was released. (Size of pool (~ 16" deep) underestimated. Operators unable to handle flow)
Bed cooling:	No
Wash adjacent tube:	Not applicable
Repair procedure:	Repair and replacement of tank system components
Root cause:	If the operators had kept the spouts open the run off would not have occurred. Burning of gas while trying to open spout.
Future prevention:	Follow procedures. Procedure for unplugging spouts reviewed with operators in October 2001, but an "attitude to not value these meetings" and "an attitude of disregarding a problem until it requires immediate attention" indirectly contributed to the incident.
Last full inspection:	Inspected March 2002. Acid cleaned 2001 with HCl/thiourea.

2002 Oct. - 30	
Location:	**Smurfit-Stone Container, Florence, SC**
Unit:	No. 2 Recovery Boiler. B&W Contract PR-159. Start-up 1974.
Size:	3.9 million ppd solids. Operating – 575,000 lb/hr @ 600 psig & 750F. Design- 650 psig. 2 drum/ large economizer
Incident Date:	May 27, 2002
Leak/Incident Loc:	No leak found
Downtime hrs due to leak/total:	Total downtime – 121 hours
ESP?	Initiated ESP. Current irrevocable policy is to stay out of recovery area 8 hours minimum
Classification:	**ESP. No leak.**
How discovered:	Operator observed moisture in generating bank hoppers
Leak detection:	None installed
Sequence of events:	Moisture observed in generating bank was increasing and supervisor observed an apparent leak above the nose arch. ESP was initiated. After bed was cooled, boiler was water washed and extremely hard bed removed using high pressure robotic cleaner.
Bed cooling:	Sodium bicarbonate injection
Wash adjacent tube:	Not applicable
Repair procedure:	Not applicable
Root cause:	No leak was found. Boiler returned to operation with oil burned for 6 hours before introducing liquor.
Future prevention:	Not applicable
Last full inspection:	Inspected October 2001.

2002 Oct. - 31	
Location:	**International Paper Co., Courtland, Alabama**
Unit:	No. 3 Recovery Boiler. B&W Contract PR-213. Startup 1991.
Size:	4.4 million ppd solids. Operation – 611,000 lb/hr @ 1350 psig & 900F. Design @ 1525 psig. Single drum/large economizer
Incident Date:	August 6, 2002
Leak/Incident Loc:	**Boiler Bank –** ~ 16 inch long split at along the outside membrane weld on both sides of corner tube of generating bank sidewall that is tied by membrane to the adjacent steam cooled tube. Location is at upper end of nose arch on outside of wall
Downtime hrs due to leak/total:	Downtime for repair 27 hours/ Downtime Liquor to liquor – 69 hours
ESP?	ESP initiated. Current irrevocable policy is to stay out of recovery area 4 hours
Classification:	**Non-critical**
How discovered:	Operator heard a loud noise from the boiler along with drum level drop to – 8", feedwater/steam flow differential increased,
Leak detection:	Mass balance leak detection system alarmed to confirm leak
Sequence of events:	Boiler at half rate on liquor; natural gas also being fired. Raising load when loud noise, drop in drum level, etc. occurred. No change in fan speed. Operators walked down boiler with sootblowers off. Steam observed blowing out the side of boiler at 8th floor, and operators returned to control room and contacted Shift Manager. Leak detection alarm at 15 min. after loud noise. Valved out sootblowers; noise continued. 25 min. after loud noise, steam/feedwater differential at 100,000 lb/hr. At 35 minutes from noise, boiler ESP'd with all personnel in control room.
Bed cooling:	Cooling using sodium bicarbonate applied by Southland Fire & Safety is credited with saving 4 hours. Note the bed was low as boiler at reduced rating and burning gas as well as liquor.
Wash adjacent tube:	No
Repair procedure:	Failed tube section removed and Dutchman installed. Mirror image tube on opposed sidewall removed for analysis
Root cause:	Caustic Stress Corrosion Cracking. Intergranular fracture starting from ID into membrane weld, where it followed the heat affected zone of weld up to 75% of tube thickness. 11 ft. of tube plugged solid above point of failure.
Future prevention:	Circulation being reviewed.
Last full inspection:	Inspected May 2002. Chemically cleaned in September 2001 using Wistrand-nitrogen circulation, HCl

2002 Oct. - 32	
Location:	**International Paper Co., Franklin, Virginia**
Unit:	No. 4 Recovery Boiler. ABB-CE Contract No. 1263. Start-up 1964.
Size:	1.75 million ppd solids. 273,500 lb/hr @ 600 psig & 750F. Design @ 700 psig. 2 drum/direct contact evaporator
Incident Date:	August 9, 2002
Leak/Incident Loc:	**Superheater-** crack at a stitch weld of attachment installed in 1989 for primary superheater alignment. Located in straight tube section 18 inches below roof in tube 3 on pendant 17
Downtime hrs due to leak/total:	Total downtime- 109 hours
ESP?	No
Classification:	**Non-critical**
How discovered:	Operator heard steam blowing in superheater section.
Leak detection:	Mass balance system alarmed indicating a small leak
Sequence of events:	Boiler on line burning liquor when operator heard steam blowing in the superheater. No water observed. Operators immediately began lighting oil burners and pulling liquor guns. Boiler taken off line in an orderly manner.
Bed cooling:	None
Wash adjacent tube:	No
Repair procedure:	~ 12 inch Dutchman installed
Root cause:	Fatigue cracking of weld. Boiler has a history of stitch weld attachment leaks that are found during maintenance hydro's. This was the first attachment leak to take the boiler off line
Future prevention:	NDT of attachment welds during the next annual maintenance outage
Last full inspection:	Inspected June 2002

2002 Oct.- INTL 1	**New Zealand**
Location:	**Carter Holt Harvey-Kinleith, Kinleith, Tokoroa, New Zealand**
Unit:	No. 4 Recovery Boiler. CE Contract No. CA 70108. Startup 1972. Ahlstrom upgrade 1996.
Size:	2.75 million ppd solids. Operation – 330,000 lb/hr @ 4500 kPag (650 psig) & 400C (750F). Design @ 5350 kPag (760 psig). 2 drum / DCE
Incident Date:	May 22, 2002
Leak/Incident Loc:	No leak found when boiler hydro'd
Downtime hrs due to leak/total:	Total downtime – 37 hours
ESP?	ESP initiated accidentally. Current policy is to stay out of boiler area for 4 hours following an ESP
Classification:	
How discovered:	
Leak detection:	
Sequence of events:	Electrician in switchroom cut the cable for the sequential events recorder, Cable carried signal for ESP activation and cutting acted in same manner as pushing button. The first response of operating crew was that an electrical failure had occurred as weather was bad. After some 10 to 15 minutes, they realized the ESP system had activated and immediately closed the manual valves on drains. Basement & 1st floor areas closed off for 4 hours.
Bed cooling:	No
Wash adjacent tube:	Not applicable
Repair procedure:	Not applicable
Root cause:	
Future prevention:	Recommendation that ESP button have a "Forney buffer" between the button circuit and the recorder to ensure that feedback from the recorder cannot initiate an ESP
Last full inspection:	Inspected May 2001. Cleaned with HCl (Fill and Soak) in May 2001

2002 Oct – INTL 2	Swaziland
Location:	**Sappi Usutu, Swaziland**
Unit:	Local Unit ID 16033/2. ICAL Contract No. SB 130. Startup 1971
Size:	516 T/Day solids (1.138 million ppd). Operation – 60 T/Hr (132,300 lb/hr) @ 620 psig & 750F. Design @ 725 psig.
Incident Date:	June 27, 2002
Leak/Incident Loc:	**Smelt Spout – two ruptures at the mouth of spout**
Downtime hrs due to leak/total:	Total downtime – 19 hours
ESP?	No. Smelt spout area was evacuated
Classification:	
How discovered:	Several small 'pops' accompanied by header tank low level alarm, as well as low cooling water alarm. Visible water
Leak detection:	None installed
Sequence of events:	
Bed cooling:	
Wash adjacent tube:	
Repair procedure:	
Root cause:	
Future prevention:	
Last full inspection:	Inspected March 2002

2002 Oct. – INTL 3	**South Africa**
Location:	**Sappi Kraft Ngodwana Mill, Nelspruit, South Africa**
Unit:	Chemical Recovery Furnace No. 1. B&W Contract. Startup 1965
Size:	600 tds/d. (1.32 million ppd solids). 60 t/hr (132,000 lb/hr) @ 15 barg (218 psig) Sat'd. Design @ 16.6 barg (240 psig). 2 drum/large economizer
Incident Date:	April 7, 2002.
Leak/Incident Loc:	**Furnace, Upper** – Approx 10 meter (33 ft) above floor. Cracks along wild line in buckstay support lugs modified some 8 years ago.
Downtime hrs due to leak/total:	
ESP?	No. Current irrevocable policy is to stay out of recovery area for 24 hours following an ESP
Classification:	
How discovered:	Observed water running along rearwall during startup on oil
Leak detection:	None installed
Sequence of events:	
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Further inspection revealed additional affected tubes. Affected area was inspected and all affected tubes were provided with an insert.
Root cause:	'Ash buildup between wall and casing with poor welding of buckstay support lugs. Successive accumulation produced an excessive mechanical load on the lugs.
Future prevention:	Reinstate inspection procedures that had "fallen away" due to improved construction
Last full inspection:	Inspected March 2002.

2002 Oct. – INTL 4	**South Africa**
Location:	**Sappi Kraft Ngodwana Mill, Nelspruit, South Africa**
Unit:	Chemical Recovery Furnace No. 1. B&W Contract. Startup 1965
Size:	600 tds/d. (1.32 million ppd solids). 60 t/hr (132,000 lb/hr) @ 15 barg (218 psig) Sat'd. Design @ 16.6 barg (240 psig). 2 drum/large economizer
Incident Date:	June 28, 2002.
Leak/Incident Loc:	**Furnace, Lower** – crack in a tube to fin weld just under primary air port. Approx 0.5 meter (~15"") above floor
Downtime hrs due to leak/total:	
ESP?	ESP initiated. Current irrevocable policy is to stay out of recovery area for 24 hours following an ESP
Classification:	
How discovered:	Observed "black ports" and subsequently water flowing from tell tale opening in windbox
Leak detection:	None installed
Sequence of events:	Operators were closely watching an area of dark bed when a hissing noise was heard. Further investigation led to a suspicion of a leak. Water was seen running out of the windbox tell tale and unit was ESP'd immediately.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Tube section cut out and insert installed. Inspection revealed 3 additional that were repaired with inserts.
Root cause:	Poor welding of fin to tube in combination with long and heavy fins in a boiler operated on/off (to many trips/diverts, etc.
Future prevention:	Do not cycle a furnace with long, heavy fins. Value of windbox tell tale demonstrated.
Last full inspection:	Inspected March 2002.

2002 Oct – INTL 5	**South Africa**
Location:	**Sappi Kraft Ngodwana Mill, Nelspruit, South Africa**
Unit:	Chemical Recovery Furnace No. 1. B&W Contract. Startup 1965
Size:	600 tds/d. (1.32 million ppd solids). 60 t/hr (132,000 lb/hr) @ 15 barg (218 psig) Sat'd. Design @ 16.6 barg (240 psig). 2 drum/large economizer
Incident Date:	August 6, 2002.
Leak/Incident Loc:	**Boiler Bank** – pinhole leak 0.3 meters (12 ") above mud drum developed into a larger hole. This is original bank.
Downtime hrs due to leak/total:	
ESP?	No. Current irrevocable policy is to stay out of recovery area for 24 hours following an ESP
Classification:	
How discovered:	Observed water running out of boiler hopper and poor ash discharge from hopper.
Leak detection:	None installed
Sequence of events:	Observed water and shutdown the boiler.
Bed cooling:	No
Wash adjacent tube:	Possibly
Repair procedure:	Further inspection revealed general thinning of tubes throughout the lower section of the boiler bank. 22 tubes plugged
Root cause:	Long term corrosion (near drum) attributed to on/off (as long as 2 weeks at times) and Sootblower leakage. This was the second incident.
Future prevention:	Inspect sootblowers for potential leakage
Last full inspection:	Inspected March 2002.

2002 Oct – INTL 6	**International - Brazil**
Location:	**VCP-Jacareí**
Unit:	Recovery boiler#3, CBC, start-up 1994
Size:	3.8 million ppd solids. Operation @ 1300 psig & 900 F
Incident Date:	June 04, 2002
Leak/Incident Loc:	**Dissolving tank explosion**
Downtime hrs due to leak/total:	10 h
ESP?	No
Classification:	**Dissolving tank explosion** (Classification assigned by Brazilian Safety Committee
How discovered:	
Leak detection:	No
Sequence of events:	Boiler was running in in low load in order to execute a scheduled maintenance, the level of the dissolving tank went to 0% and material started to build up at the dissolving tank bottom, the explosion happened after feeding again the dissolving tank.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Rebuild the system
Root cause:	Operational failure
Future prevention:	Improve operators training, install man protection devices at smelt spouts area, set up new logic at the DCS in order to prevent unsafe conditions at the dissolving tank area
Last full inspection:	August, 2001

2002 Oct – INTL 7	International **- Brazil**
Location:	VCP-LA, Luis Antônio, SP, Brazil
Unit:	No.1 Recovery. Boiler. CBC contract start-up1991.
Size:	3,3 million ppd @ 950 psig & 850 F
Incident Date:	20th September 2002
Leak/Incident Loc:	Super heater- 11º panel – 24º tube
Downtime hrs due to leak/total:	76,83 hours
ESP?	No
Classification:	**Not critical** (Classification assigned by Brazilian Safety Committee
How discovered:	The operator detected an increased super heater tube temperature.
Leak detection:	No
Sequence of events:	Increase furnace pressure Increase of outlet gas dampers gaps Decrease steam production Increase of super heater tube temperature
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	01 tube of 500 mm was replaced and crack was repaired
Root cause:	Fatigue stress on welds
Future prevention:	Inspection on the tubes
Last full inspection:	20 –27th May 2002

2002 Oct – INTL 8	**International - Brazil**
Location:	**Aracruz Celulose S/A, Aracruz, ES, Brazil**
Unit:	**A**
Size:	8,0 million ppd solids. Operation @ 910 psig & 842º F
Incident Date:	September, 13th, 2002
Leak/Incident Loc:	Small crack at economizer tube close to the tube membrane and in two tubes of primary superheaters
Downtime hrs due to leak/total:	73 h
ESP?	No
Classification:	**Not critical** (Classification assigned by Brazilian Safety Committee)
How discovered:	Humidity detected by the operator on the ash conveyor
Leak detection:	No
Sequence of events:	The boiler was shut down in normal condition and a repair in the eco II was made. During the hydro test was detected a new leakage in the two tubes in the sealing box of primary superheater. The repair was made accessing the place by penthouse
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Replace the tubes at the leakage areas.
Root cause:	In the economizer tube there was a fail of fabrication in the welding and in the SH probably there was a fatigue caused by vibration, arising from sootblowing. The damaged tubes are under metallurgical evaluation
Future prevention:	It will depend on the result of the metallurgical analysis. The boiler is under guarantees.
Last full inspection:	The boiler started in last 2001,November, after it had all pressure parts retrofitted

2002 Oct – INTL 9	**International - Brazil**
Location:	**Orsa Celulose Papel e Embalagens S.A., Nova Campina, SP, Brazil**
Unit:	Gotaverken Boiler, start up 1982
Size:	580 thousand ppd @ 280 psig & 392 F
Incident Date:	June 27, 2002
Leak/Incident Loc:	Dissolving tank explosion
Downtime hrs due to leak/total:	45 hrs without liquor
ESP?	No
Classification:	**Dissolving tank explosion** (Classification assigned by Brazilian Safety Committee
How discovered:	
Leak detection:	No
Sequence of events:	A big sulfate lump fell at the rear wall and a smelt pool was formed and ran out suddenly causing an explosion and damages to the dissolving tank.
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	The system was rebuild
Root cause:	Excessive smelt flow
Future prevention:	The mill started to use emergency steam shatters continuously and will install an additional explosion door at the tank.
Last full inspection:	April , 2002

2002 Oct – INTL 10	**International - Brazil**
Location:	**BahiaSul Celulose S.A., Mucuri, BA, Brazil**
Unit:	Gotaverken/Kvaerner
Size:	7.1 million ppd solids. Operation @ 1300 psig & 900 F
Incident Date:	August, 26th, 2002
Leak/Incident Loc:	Small crack at economizer tube close to the tube membrane
Downtime hrs due to leak/total:	38 h
ESP?	No
Classification:	**Not critical** (Classification assigned by Brazilian Safety Committee
How discovered:	Humidity detected by the operator on the ash conveyor
Leak detection:	No
Sequence of events:	The ash handling system stopped and the operator detected the water. The boiler was shut down and a repair was made
Bed cooling:	No
Wash adjacent tube:	No
Repair procedure:	Replace the tube at the leakage area.
Root cause:	The damaged tube is under metallurgical evaluation
Future prevention:	It will depend on the result of the metallurgical analysis
Last full inspection:	March, 2002