



BRAZIL AND URUGUAY RECOVERY BOILER SAFETY COMMITTEE (CSCRBU) – 2024 OVERALL VIEW



CSCRBU

- The CSCRBU is one of the ABTCP Technical Committees. There are 9 other ones
- Started up in 1999
- At least two meetings per year, one meeting at ABTCP in the first semester and the other during the annual recovery boiler operators meeting
- 4 subcommittees:
 - Combustion: Fábio Costa - Bracell SP
 - Maintenance, Inspection and Instrumentation: Flávio Paoliello – Cenibra MG
 - Accidents and incidents: Afonso Pereira – Ibase RS
 - Recovery boiler water treatment: Ronaldo Esteves - Suzano MA
- One WhatsApp group and another at LinkedIn: CSCRBU - ABTCP



OUR MISSION

Enable the achievement of operational excellence while mitigating the risk of accidents in recovery boilers.

1. Maintain and analyze the database of recovery boilers in Brazil and Uruguay
2. Exchange information with similar organizations (BLRBAC, SNRBC, FRBC)
3. Generate technical recommendations for recovery boilers
4. Analyze events in recovery boilers
5. Training and developing of RB operators and maintenance personnel

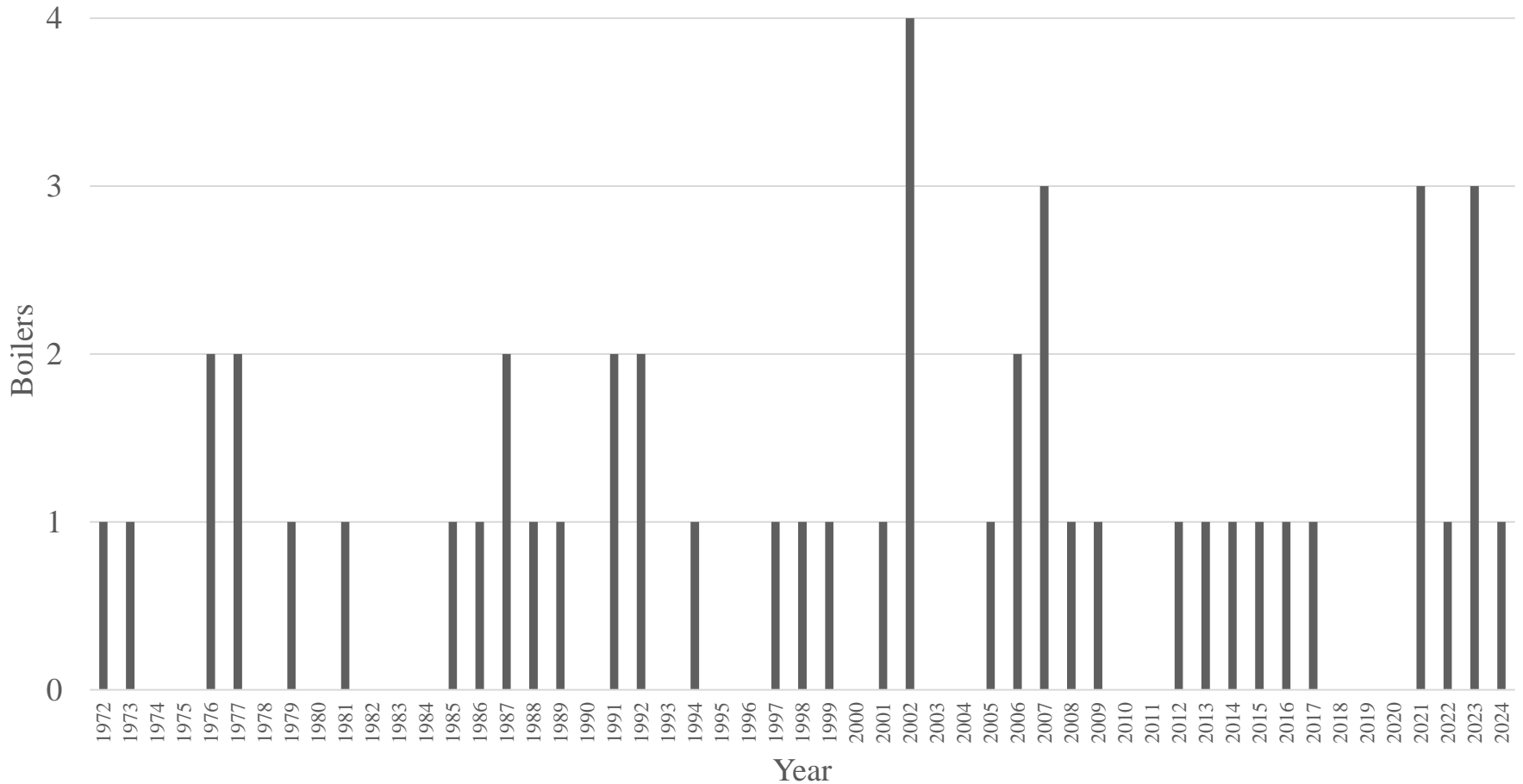


1. DATA BASE

- 49 recovery boilers
 - 48 in operation and 1 hibernated (Cenibra)
- None in the design phase
- 11 new boilers since 2013
- Average age: 23 years old (newest starting this month, oldest 51 years)
- Average size: 3,100 tdsv/day (biggest 13.000 smallest 86)
- Average utilization rate: 20.6 tdsv/m².day (highest 26,6 lowest 12,7)



1. DATA BASE



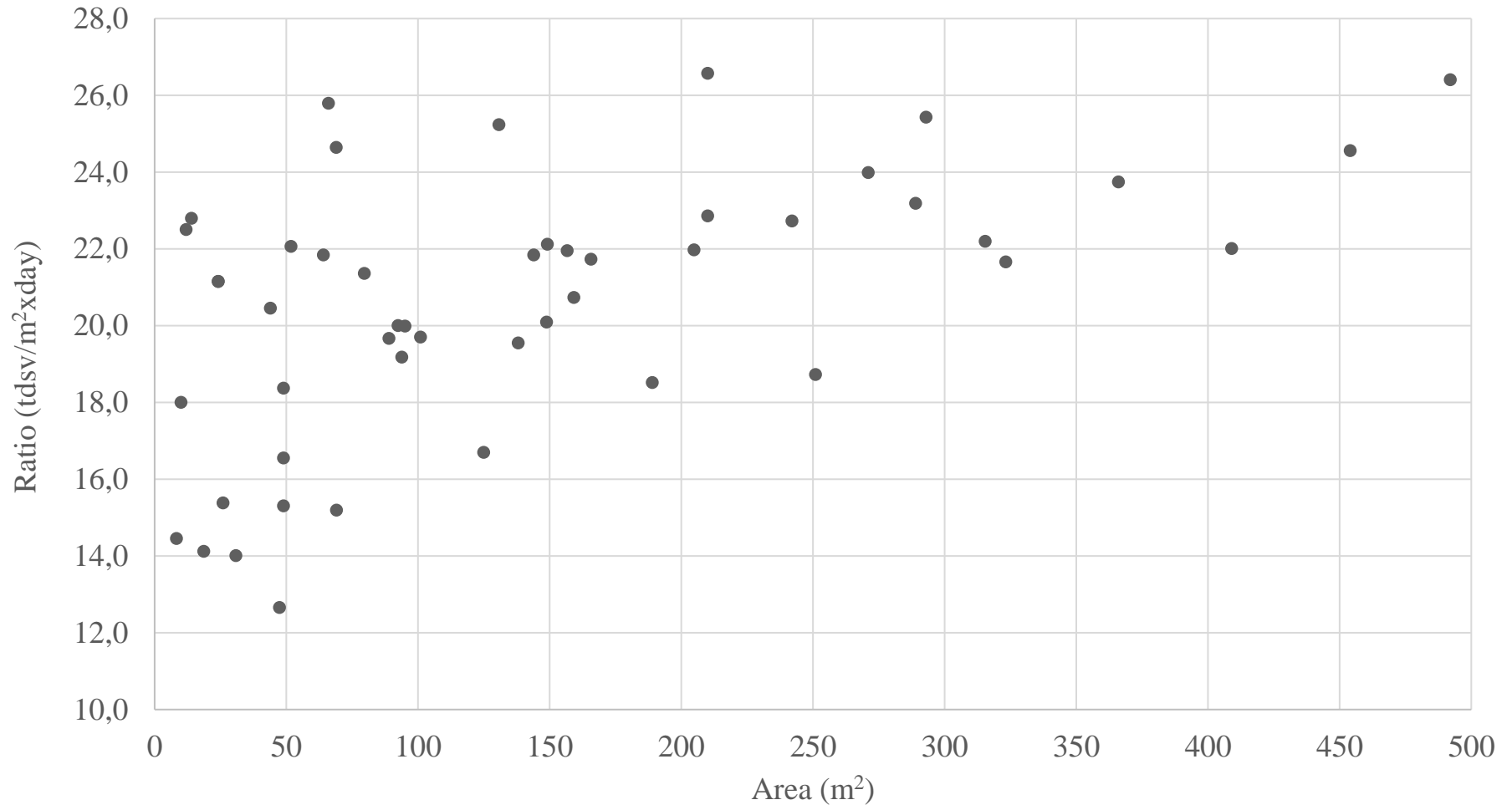


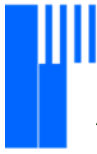
1. DATA BASE

CSCRB - ABTCP ESP COMMITTEE - April 2024																	
#	Group	Country	Mill	Supplier	Status	Start up (ano)	Retrofit (ano)	Age (anos)	Capacity Original (tss virgin/d)	Capacity Real (tss virgin/d)	Pressure (barg)	Temp(°C)	Steaming rate (th)	Area (m2)	Ratio (tss/m2xday)	Updated date	Person in charge
1	Arauco/Stora	URU	Montes del Plata	Andritz	Running	2014		9	5710	6700	97	494	928	289	23.2	06/06/2023	Matias Fossemale <matias.fossemale@montesdelplata.com.uy>
2	Bracell - BA	BRA	Camacari	CBC	Running	2008		15	3000	3300	85	490	494	149	22.1		Reinaldo Fernandes <reinaldo_fernandes@bracell.com>
3	Bracell - SP	BRA	Lençóis Paulista	CBC	Running	2002	2008	21	700	900	85	480	142	44	20.5	08/08/2023	Karina Honjaya <@kshonjaya@bracell.com>
4	Bracell - SP	BRA	Lençóis Paulista	Andritz	Running	2021		2	13000	13000	96	515	1980	492	26.4	02/05/2023	Julio Macedo <jmacedo@bracell.com>
5	CMPC - Guaiba	BRA	Guaiba	B&W	Running	2002		21	2087	2087	64	465	300	125	16.7	02/08/2023	Daniel Alvienes Wentz <daniel.wentz@cmprcs.com.br>
6	CMPC - Guaiba	BRA	Guaiba	Valmet	Running	2015		8	6200	6500	95	490	1075	271	24.0	02/08/2023	Daniel Alvienes Wentz <daniel.wentz@cmprcs.com.br>
7	CMPC - Guaiba	BRA	Guaiba	Valmet	Running	2023		0	1900	1900	95	490	309	95	20.0	02/08/2023	Daniel Alvienes Wentz <daniel.wentz@cmprcs.com.br>
8	CMPC - Iguaçu	BRA	Iguaçu	São Caetano	Running	1976		47	204	264	12	Sat	33	19	14.1	04/09/2022	Roberto Machado <roberto.muller@cmcp.com>
9	CMPC - Iguaçu	BRA	Iguaçu	NI	Running	1986		37	86	120	12	Sat	6.5	8	14.5	04/09/2022	Roberto Machado <roberto.muller@cmcp.com>
10	COCELPA	BRA	COCELPA	Valmet	Running	1988	2010	35	160	270	45	425	30	12	22.5		Daniel Almeida <daniel.almeida@cocelpa.com.br>
11	Eldorado	BRA	Eldorado	Valmet	Running	2012		11	6800	7450	85	485	1116	293	25.4		Adelson Xavier <adelson.xavier@eldoradobrazil.com.br>
12	Irani	BRA	Campina da Alegria	CBC	Running	2023		0	432	432	88	480	70	31	14.0	20/11/2023	Robert David Friesen <robertfriesen@irani.com.br>
13	Jari	BRA	Monte Dourado	BHI	Running	1979	1988	44	1360	1750	59	450	276	89	19.7		Thomas Pertile <thomas.pertile@grupojari.com.br>
14	Klabin	BRA	Correa Pinto	CBC	Running	1987	1992	36	580	750	85	480	110	49	15.3		Alexandre Augusto <alexandre.augusto@klabin.com.br>
15	Klabin	BRA	Telemaco Borba CR-1	Valmet	Running	1977	2000	46	1100	1850	46	430	235	93	20.0	10/08/2023	Paulo Henrique Maziero Pohlmann <PPHLMANN@klabin.com.br>
16	Klabin	BRA	Telemaco Borba CR-2	CBC	Running	2007		16	1700	1700	106	503	243	80	21.4	10/08/2023	Paulo Henrique Maziero Pohlmann <PPHLMANN@klabin.com.br>
17	Klabin	BRA	Ortigueira CR-1	CBC	Running	2016		7	7000	7000	104	503	1200	315	22.2		Adriano Burgardt <aburgardt@klabin.com.br>
18	Klabin	BRA	Ortigueira CR-2	Andritz	Running	2021		2	3300	3300	104	503	605	159	20.7		Adriano Burgardt <aburgardt@klabin.com.br>
19	Klabin	BRA	Otaclio Costa	CBC	Running	1998		25	1100	1050	89	483	170	69	15.2		Sergio Felipe de Litz <slitz@klabin.com.br>
20	Klingele	BRA	Nova Campina	CBC	Running	2006		17	400	400	42	400	74	26	15.4		Wagner William Wincel <wagner.wincel@klingele.com>
21	LD	BRA	Indianópolis	CBC	Running	2022		1	4100	4500	92	490	655	205	22.0	17/04/2023	Enzo Picelli <@picelli@ltenzing.com>
22	OJI	BRA	CENIBRA	CBC	Hibernated	1977	2003	46	1440	1800	65	450	200	94	19.2	01/08/2023	Virgilio Procópio <virgilio.procopio@cenibra.com.br>
23	OJI	BRA	CENIBRA	CBC	Running	1992	2004	31	2050	2700	65	450	422	138	19.5	01/08/2023	Virgilio Procópio <virgilio.procopio@cenibra.com.br>
24	OJI	BRA	CENIBRA	CBC	Running	2006		17	3500	3500	65	450	524	189	18.5	01/08/2023	Virgilio Procópio <virgilio.procopio@cenibra.com.br>
25	Suzano	BRA	Araucuz CR-A	Valmet	Running	2001		22	3440	3440	64	450	524	157	22.0		Breno de Marchil <breno.marchi@suzano.com.br>
26	Suzano	BRA	Araucuz CR-B	Valmet	Running	1991	2022	32	2200	3600	64	450	524	166	21.7		Breno de Marchil <breno.marchi@suzano.com.br>
27	Suzano	BRA	Araucuz CR-C	Andritz	Running	1997	2000	26	2200	3300	64	455	433	131	25.2		Breno de Marchil <breno.marchi@suzano.com.br>
28	Suzano	BRA	Imperatriz	Valmet	Running	2013		10	7000	7000	95	492	1207	323	21.7		Michael Mota <michaelm@suzano.com.br>
29	Suzano	BRA	Jacarei CR-3	CBC	Running	1994		29	1430	1990	90	470	240	101	19.7		Raphael Campos <raphaelr@suzano.com.br>
30	Suzano	BRA	Jacarei CR-4	CBC	Running	2002		21	2500	2990	93	480	360	149	20.1	29/08/2023	Raphael Campos <raphaelr@suzano.com.br>
31	Suzano	BRA	Limeira CR-A	Valmet	Running	1972		51	270	510	42	380	65	24	21.2		Chrystian Gazoni <cgazoni@suzano.com.br>
32	Suzano	BRA	Limeira CR-B	Valmet	Running	1981	2000	42	270	510	42	380	65	24	21.2		Chrystian Gazoni <cgazoni@suzano.com.br>
33	Suzano	BRA	Limeira CR-C	CBC	Running	2002	2007	21	1100	1700	46	400	180	69	24.6		Chrystian Gazoni <cgazoni@suzano.com.br>
34	Suzano	BRA	Mucuri CR-1	Valmet	Running	1992	2007	31	1750	3145	85	480	479	144	21.8	20/11/2023	Emerson Marculino <emersonp@suzano.com.br>
35	Suzano	BRA	Mucuri CR-2	Valmet	Running	2007		16	4700	4700	85	480	738	251	18.7	20/11/2023	Emerson Marculino <emersonp@suzano.com.br>
36	Suzano	BRA	Ribas do Rio Pardo	Andritz	Running	2024		0	11150	11150	100	515	1850	454	24.6	04/09/2023	Marco Aurelio <marco.rodrigues@suzano.com.br>
37	Suzano	BRA	Suzano GTV	Valmet	Running	1973	2004	50	670	811	50	380	110	49	16.6	25/08/2023	Gilberto Vanderlei <gilbertos@suzano.com.br>
38	Suzano	BRA	Suzano CR-3	CBC	Running	1987	2002	36	800	1400	50	420	218	64	21.8	25/08/2023	Gilberto Vanderlei <gilbertos@suzano.com.br>
39	Suzano	BRA	Tres Lagoas H1	Valmet	Running	2009		14	5300	5500	86	487	822	242	22.7	13/12/2023	Iuri Diniz <iuridiniz@suzano.com.br>
40	Suzano	BRA	Tres Lagoas H2	Andritz	Running	2017		6	8690	8690	86	485	1310	366	23.7	13/12/2023	Iuri Diniz <iuridiniz@suzano.com.br>
41	Suzano/Stora	BRA	Veracel Celulose	Valmet	Running	2005	2011	18	4000	4800	94	490	630	210	22.9	04/08/2023	Estanislau Zutautes <estanislau.zutautes@veracel.com.br>
42	Sylvamo	BRA	Lula Antonio	CBC	Running	1991	2005	32	890	1702	64	450	245	66	25.8	04/01/2023	Vinicius Martins <Vinicius.Lopes@sylvamo.com>
43	Sylvamo	BRA	Mogi Guaçu CR-4	B&W	Running	1976		47	187	320	29	350	28	14	22.8		Estevão Maciel <estevao.maciell@sylvamo.com>
44	Sylvamo	BRA	Mogi Guaçu CR-6	Andritz	Running	1985	2006	38	950	1144	27.6	340	120	52	22.1		Estevão Maciel <estevao.maciell@sylvamo.com>
45	Trombini	BRA	Trombini	Orcopa	Running	1989	2000	34	140	180	21	420	30	10	18.0		Marcos Gatti <mgatti@fbo.trombini.com.br>
46	Westrock	BRA	Tres Barras CR-1	Andritz	Running	1999		24	850	800	64	460	126	47	12.7		Samir Besen <samir.besen@westrock.com>
47	Westrock	BRA	Tres Barras CR-2	CBC	Running	2021		2	900	900	95	515	145	49	18.4		Samir Besen <samir.besen@westrock.com>
48	UPM	URU	UPM - Fray Bentos	Andritz	Running	2007		16	4450	5580	94	490	780	210	26.6		Miguel Paolino <miguel.paolino@upm.com>
49	UPM	URU	UPM Passo de los Toros	Andritz	Running	2023		0	9000	9000	102	505	1555	409	22.0	10/10/2023	Carolina Pesce <carolina.pesce@upm.com>
#	Average			N/P	N/P	N/P	N/P	22.7	2786.4	15788.0	71.1	459.2	467.2	140	20.6		N/P
Recovery Boilers outside Brazil & Uruguay																	
#	Group	Country	Company	Supplier	Status	Start up (ano)	Retrofit (ano)	Age (anos)	Capacity Original (tss virgin/d)	Capacity Real (tss virgin/d)	Pressure (barg)	Temp(°C)	Steaming rate (th)	Area (m2)	Ratio (tss/m2xday)		Person in charge
1	VISY	AUS	Visy Pulp and Paper	Valmet	Running	2001	2006	22	880	675	95	515	145	37	18.2	11/04/2023	Rogério Barros <rbrm16@gmail.com>
2	VISY	AUS	Visy Pulp and Paper	Andritz	Running	2009		14	750	750	94	490	780	57	13.2	11/04/2023	Rogério Barros <rbrm16@gmail.com>
3	CMPC	CHI	Santa Fé	CBC	Running	1989		34	740	1251	63	455	180	66	19.0	08/08/2023	Saulo Godoy <sgodoy@celulosa.cmpc.cl>
4	CMPC	CHI	Santa Fé	Andritz	Running	2004		19	3520	4692	85	485	680	200	23.5	08/08/2023	Saulo Godoy <sgodoy@celulosa.cmpc.cl>



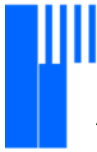
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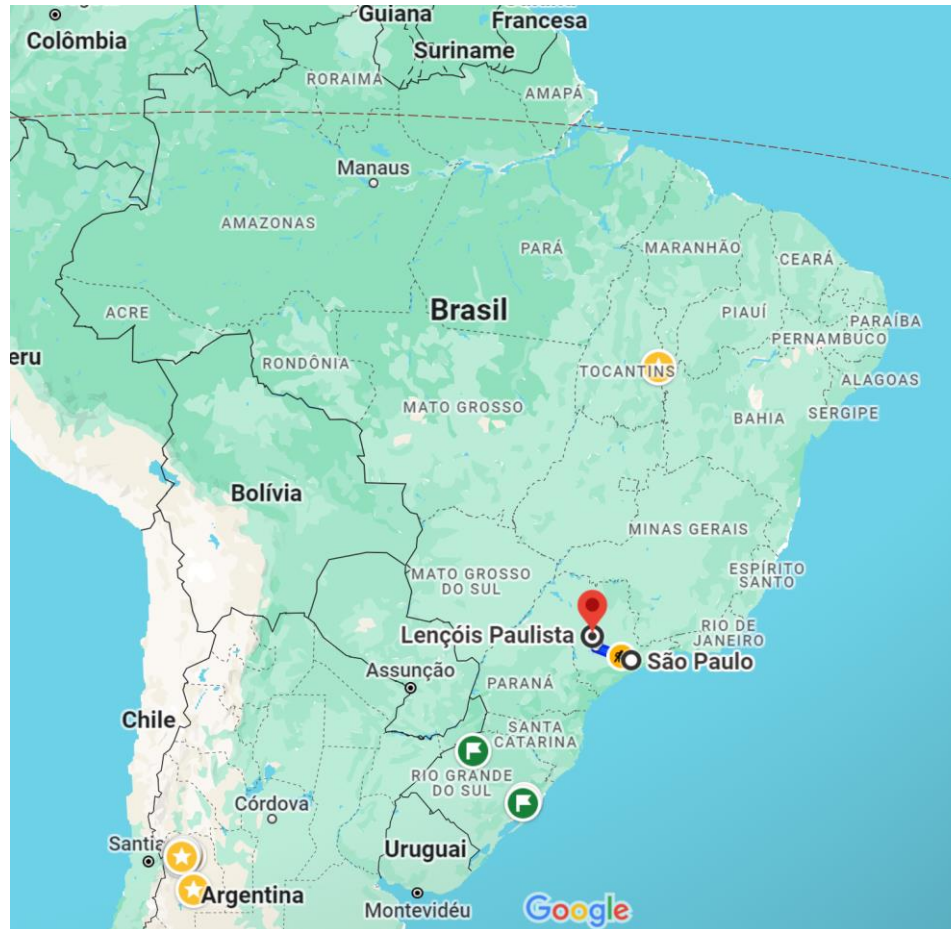


2. HIGHLIGHTS – FRBC/SNRBC/ BLRBAC

- That information will be presented at our second annual meeting
- This year it will take place during the 19th Annual Recovery Boilers Operators Meeting at Bracell SP, Lençois Paulista, SP, Brasil, on 30/31 Oct/2024
- It is going to be an international event with simultaneous translation
- Last year we had it at Suzano Mucuri with 11 technical presentations and 131 participants



2. HIGHLIGHTS – FRBC/SNRBC/ BLRBAC





3. TECHNICAL ACTIVITIES

Maintenance, Inspection and Instrumentation Subcommittee

- 2023: Final emission and presentation of the Recovery Boiler

Inspection Guide revision 3

RECOMENDAÇÃO DO COMITÊ DE SEGURANÇA EM CALDEIRAS DE
RECUPERAÇÃO DO BRASIL E URUGUAI

Revisão 3 – maio de 2023

(Subcomitê de Manutenção, Inspeção e Instrumentação)

GUIA PARA INSPEÇÃO PERIÓDICA DE CALDEIRAS DE RECUPERAÇÃO

1- Generalidades

1.1- Objetivo e Campo de Aplicação desta Recomendação

Por razões de segurança, normas técnicas e legais vigentes no Brasil preceituam que caldeiras de qualquer tipo sejam inspecionadas com regularidade. Estas normas estabelecem procedimentos, prazos, responsabilidades e demais requisitos para estas inspeções. Há, contudo, um reconhecimento geral, na indústria de celulose, de que a segurança das caldeiras de recuperação de álcalis requer cuidados de inspeção que transcendem as exigências oficiais e genéricas para geradores de vapor, contidas nas normas citadas. Com isto, surge a necessidade de que o escopo técnico aplicável à inspeção periódica de caldeiras de recuperação esteja definido. O presente documento, respeitando inteiramente os regulamentos oficiais vigentes tem, portanto, o objetivo de delinear e complementar este escopo recomendável de exames, de forma coerente com a criticidade e o risco associado às caldeiras de recuperação de álcalis da indústria de celulose.



3. TECHNICAL ACTIVITIES

Maintenance, Inspection and Instrumentation Subcommittee

- 2023: Final emission and presentation at the Maintenance Committee technical meeting: “Factors for defining the period between inspections of Recovery Boilers”

**RECOMENDAÇÃO DO COMITÊ DE SEGURANÇA EM
CALDEIRAS DE RECUPERAÇÃO DO BRASIL E URUGUAI -
CSCRBU**

(Subcomitê de Manutenção, Inspeção e Instrumentação)

**GUIA PARA DEFINIÇÃO DE PRAZO PARA
INSPEÇÃO PERIÓDICA DE CALDEIRAS DE
RECUPERAÇÃO**

Revisão 1 - 2022

1- Generalidades

1.1- Objetivo e campo de aplicação desta Recomendação

Por razões de segurança, normas técnicas e legais vigentes no Brasil preceituam que caldeiras de qualquer tipo sejam inspecionadas com regularidade. Estas normas estabelecem procedimentos, prazos, responsabilidades e demais requisitos para estas inspeções. Há, contudo, um reconhecimento geral, na indústria de celulose e papel, de que a segurança das caldeiras de recuperação de álcalis requer cuidados de inspeção, manutenção e operação que transcendem as exigências oficiais e genéricas para geradores de vapor, contidas nas normas acima mencionadas.



3. TECHNICAL ACTIVITIES

Maintenance, Inspection and Instrumentation Subcommittee

- 2024: Participation in the review of TAPPI-TIPS 0416-26
“Best practices for Recovery Boiler Inspections”
- 2024: In final revision the guide “Definition of hydrostatic test pressure for Recovery Boilers in service”
- 2024/2025: The guide on “Best practices during general shutdowns for a Recovery Boiler” is being prepared



3. TECHNICAL ACTIVITIES

Combustion Subcommittee

- Monthly on-line meetings
- 2024: A one-day seminar in April to discuss combustion related issues in Recovery Boiler with more than 70 participants and 4 technical presentations
- 2024: Evaluation of the extra large recovery boiler combustion strategy and results
- 2024/2025: Carry out a study on the instrumentation and safety of NCGC and NCGD burning systems, existing in all recovery boilers in Brazil;
- 2025: Review the NCGC and NCGD burning manual prepared by the CSCRBU;
- One question: Sulfidity control with a sulfuric acid plant



3. TECHNICAL ATIVITIES

Accidents and incidentes Subcommittee

- 2023/2024: Continued to keep the boiler register updated, exchanging information with similar institutions and analyzing events in Recovery Boilers
- 2024: Issuance of a set of recommendations based on the experience of BLRBAC and CSCRBU in almost 20 years of accident analysis
- 2024/2025: Initial emission of the document “Safety in Recovery Boilers”
- 2024/2025: The screen importance and its risk assessment, do we need it?



3. TECHNICAL ACTIVITIES

Water treatment subcommittee

- Emission and presentation of the “Recommendations for the implementation of leak detectors in Recovery Boilers”

CSCRBU -ABTCP

**RECOMENDAÇÃO DO COMITÊ DE SEGURANÇA EM CALDEIRAS DE
RECUPERAÇÃO DO BRASIL E URUGUAY - CSCRBU**

DETECTORES DE VAZAMENTO

1- INTRODUÇÃO

1.1- Objetivo e Campo de Aplicação desta Recomendação:

Esta recomendação busca fornecer elementos técnicos que confirmem a necessidade de se implementar detectores de vazamentos nas Caldeiras de Recuperação do Brasil e Uruguay. Tais sistema tem o objetivo específico de identificar um vazamento de água utilizando as indicações de variáveis disponíveis no sistema de controle de uma dada caldeira.



3. TECHNICAL ACTIVITIES

Water treatment subcommittee

- 2024/2025 Emission of the document “Avoiding recovery boiler water contamination”

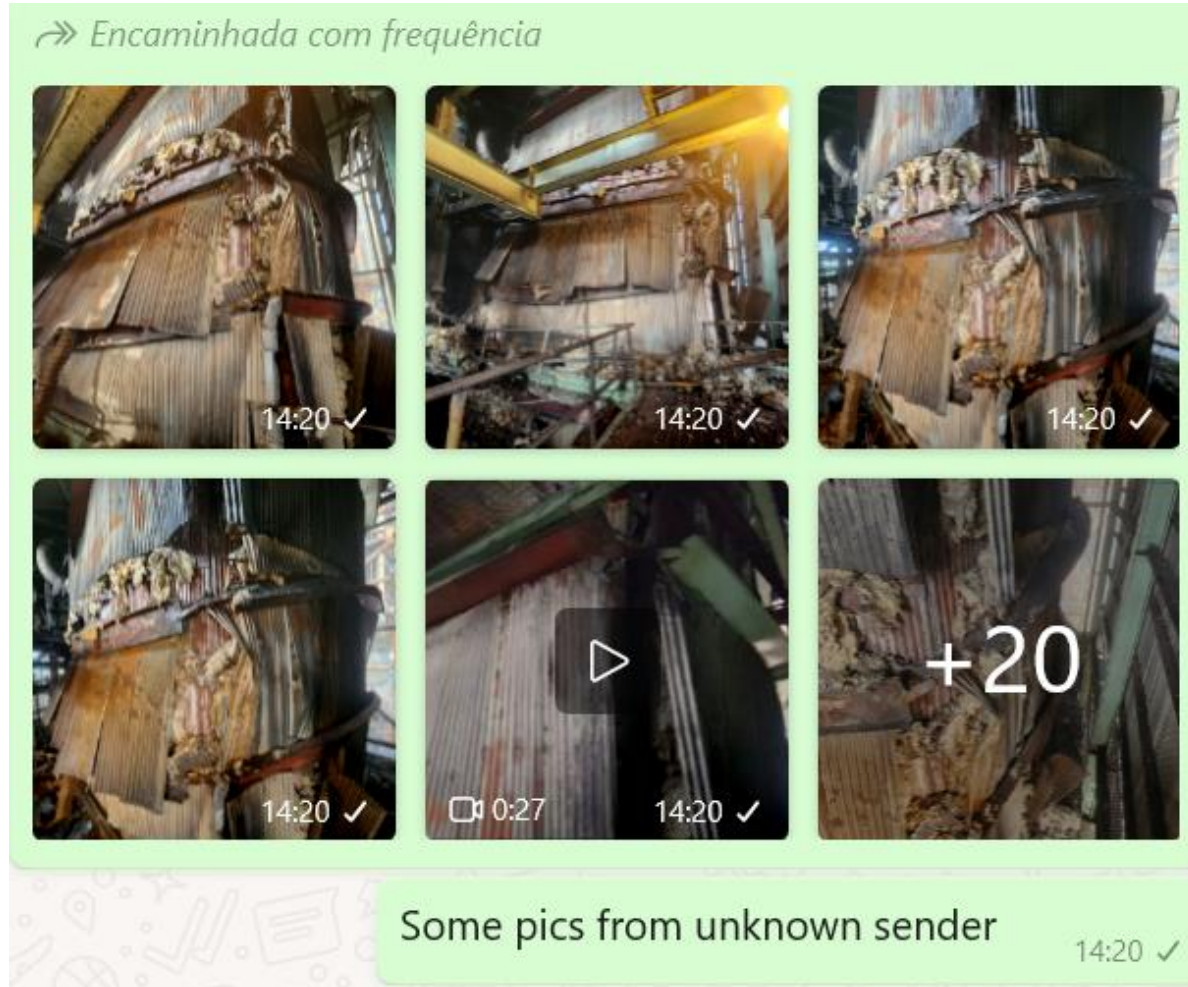


4. EVENTS

- No rapid drainage (ESP's) at CSCRBUR. Last ESP took place in December 2020 (17th ESP)
- Last explosion in 2013 – Auxiliary fuel explosion
- Last dissolving tank explosion in 2014
- No Class I or Class II leaks in 2023/2024 so far
- Within our circle of competence we had:
 - ESP (21/09/23) - MAPA Project, without further information
 - The evaporation gas explosion at MB Kemi (21/03/24)
 - April`s RB explosion at Jambi Mill – Indonesia (15/05/24)



4. EVENTS





4. EVENTS

- Past results do not guarantee a future free from events
- Some points of attention:
 - Cracks in primary air nozzles and smelt spout openings
 - Floor and lower furnace transition zones
 - Galvanic corrosion x recovery boiler water washes
 - Sootblower pressure, condensate drainage (serpentine instead of tree type piping system) and sealing air systems – endemic problem
 - Infiltration air on older boilers
 - Train, train and train
 - Doing more with more



SUOMEN SOODAKATTILAYHDISTYS
FINNISH RECOVERY BOILER COMMITTEE



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