UNIVERSITY OF MAINE SYSTEM

SEPTEMBER 3, 2025
REQUEST FOR QUALIFICATIONS
BOILER EVALUATIONS–STEAM PLANT UMAINE CAMPUS
QUESTIONS AND *RESPONSES*

1) QUESTION: Can any available information about prior repairs or modifications to Boilers 5 and 6 be supplied?

RESPONSE: There is limited documented information available regarding repairs and modifications to boiler 5 &6. But, below are four instances in our digital files. Other old paper information could be in the files/boxes at the steam plant.

a. 1995 Boilers 5 & 6: The current metal stack for boilers 5 & 6 was installed to replace the original
(to each boiler installation) building roof penetration stub stacks. The drawings indicate the work involved removing the two stub stacks, and reworking the breaching from the two induced draft fans to connect to the new (existing metal stack). No other documents have been located that show if other modifications were made to the boilers, their ID fan drives or other parts of the boilers or their operation.

b. 2008 Boiler 5 had a firebox 'puff' incident that damaged the boiler There is little documentation found of the repairs that were made, other then photos taken at the time, which shows the work included replacement of the burner gun wall, and associated boiler wall tubes, firebox refractory and possibly other replacement in kind repairs.

c. ~2012 Boiler 6, a steam coil loop was installed in the mud drum to keep the boiler "hot" so it could make steam quicker. No documents have been located as to the pressure vessel code modifications to the
boiler's mud drum that was made by a local contractor who did the work.

d. 2018 Applied Technical Services (ATS) did an ultrasonic thickness testing survey of Boiler 6 Boiler suBoiler 6 boiler internals were inspected by Applied Technical Services (ATS). Attached is the written report, with annotations and additional pages by the University. Access to view the supporting photos and videos of 10% of the boiler tubes (all tubes boroscoped were heavily scaled) can be made available upon request.

2) QUESTION: Can any available information about prior inspections or evaluations of Boiler 5 be supplied (the table on pages 1-2 does not list any)?

RESPONSE: See above response to question 1.

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Nondestructive Examination of

BOILER # 6

THICKNESS SURVEY

at

UNIVERSITY OF MAINE
ORONO MAINE

8-1-18

ATS Job No.: **ME 295407**
Purchase Order No.: **BOILER 6 NDE-UMO**
Kenneth Doiron

Kenneth Doiron <kenneth.doiron@maine.edu>

Boiler 6 UTT Survey inspection report

2 messages

Chuck Morissette <cmorissette@atslab.com> Fri, Aug 10, 2018 at 11:30 AM
To: "Kenneth Doiron (kenneth.doiron@maine.edu)" <kenneth.doiron@maine.edu>
Cc: Steve Leonard <sleonard@atslab.com>

Mr. Doiron,

Attached you will find the ATS UTT Boiler Survey report for Boiler number 6 At the University of Maine at Orono. The video Boroscope report will follow next week, as the film review takes more time to process into a report. I can tell you I was able to convey, and show your people who were on hand what the Drum Tubes looked like. Please see my notes below.

The tabbed excel Spreadsheet with actual wall readings Show each wall in its own tab, along with UT thickness data for each tube. Left, Center and right side reading was performed on each tube, with the report showing a readings for each.

Tubes 6 thru 15 on the Left and Right Sidewalls were a different nominal thickness to begin with as shown in the report and the U-1. You will see the report reflect the different tubes.

On the Video Boroscope I not only was able to get 10% of the drum tubes, I was also able to do a few Left and Right wall tubes at the Hand hole caps

All videos show heavy scaling in your tubes. I had and 1 and ½ inch probe with the ability to articulate, but was unable to use due to the thickness of scale build up. Never once did I see any bare tube. I did also have a 1 inch probe that was used instead, and was able to go through to the mud drum on nearly every tube.

I did find one tube completely blocked, and another half way blocked. We tried to push out the blockage with the probe, but were unable to. I did convey to the UMO people on site which tubes they were. They have a process with vacuuming the tubes clear, and were going to clear the tubes out.

With that said. All tubes boroscoped were heavily scaled, The scale appears to be peeling off slowly, which according to Chuck and Mike what is wanted with the new water treatments. Apparently they are trying for a slow peel of the scale, and appears to be working.

Need to verify, with UM steam plant operations, if this video of the boiler tubes pre-dates the use of new water treatment to help with a slow peel of the tube scale. ksd

Chuck Morissette

Senior Technician /Accounts Manager/Administrator

Applied Technical Services

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Level II UTT/MT/PT/VT

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Date 8/10/2018

Contact: Kenneth Doiron
Customer: University of Maine at Ororno
Location: Orono Maine

ATS Job #: 295407
Customer WO#: N/A
Customer PO#: Boiler 6

Service Provided: UTT Boiler Survey

Applied Technical Services has performed the requested scope of work for the Boiler 6. UMO or other competent engineering personnel should evaluate the results of these inspections and tests. Please see the enclosed report for further details regarding the results of this project.

Thank you for allowing ATS to perform the above service for your company. For further information regarding this project, please contact our office.

Respectfully submitted:

Sawyer Leonard
Level II

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Non Destructive Examination Report

Number 6 Boiler at UMO 8-1-18

Vidoe Boroscope of Drum Tubes

University of Maine at Ororno
Orono Maine

Boroscope inspection 8-1-18

Video Clips of Boroscope are available as seperate files for each tube inspected.
ksd 20180828

Prepared by: *Chuck Morissette* **Chuck Morissette**
Level II

Reviewed by: *Sawyer Leonard* **Sawyer Leonard**
Level II

ATS Job Number: 295406
Purchase Order Number: Boiler 6
Work Order Number: N/A

APPLIED TECHNICAL SERVICES, INCORPORATED

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Date 8/1/2018

Contact: Kenneth Doiron
Customer: University of Maine
Location: Ororno Maine

ATS Job #: 295407
Customer WO#: N/A
Customer PO#: N/A

Service Provided: Steam Drum Boroscope NDE and Boiler UTT survey

Applied Technical Services has performed the requested scope of work for the Number 6 Boiler. UMO personnel or other competent engineering personnel should evaluate the results of these inspections and tests. Please see the enclosed report for further details regarding the results of this project.

Thank you for allowing ATS to perform the above service for your company. For further information regarding this project, please contact our office.

Respectfully submitted:

Chuck Morissette
Level II

APPLIED TECHNICAL SERVICES, INCORPORATED

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SUPPLEMENTAL VISUAL EXAMINATION DATA SHEET

Job # 295407 PO # UMO Blr # 6 WO # N/A Date 8-1-18 Page 1 of 1

Client: University of Maine at Orono

Location / Site / Unit: Orono Maine

Project: Boiler number 6 Video Probe of Drum tubes

Component Description: Boiler number 6 Gen bank tubes

Component ID: Boiler # 6 System ID: Boiler number 6

EXAMINATION PROCEDURE

Code: ATS Proceedure for Power Boilers Category / Item #: N/A Drawing No. N/A

Procedure Number: ATS 170.1 Procedure Revision: Revision 14

COMMENTS / SUPPLEMENTAL INFORMATION:

ATS performed boroscope from the Steam drum to the Mud Drum of Boiler number 6. ATS was able to Boroscope 10% of all drum tubes in accesible areas. I was also able to Boroscope a few of the left and right waterwall tubes at the hand hole caps. All tubes inspected showed a large amount of scaling. Scaling appears to be flaking of the tubes at a slow rate. Due to the amount of scaling, I was unable to see bare tube on any of the tubes. I entered the Drum on the East end, away from the river side of the building. While looking from the hole, into the drum, Row 1-Tube 1 is at the right hand side of the drum, and tube 1 is the closest tube to the hole. Without a numbering system, this is how we created our own numbering. So from the outside of the west end of the drum looking in Row 1 is on the far right, with the rows moving right to left. Tube 1 is the tube closest to the hole, moving away from the hole as the tube number increases. On row 18-Tube number 17, the tube is halfway blocked at the 9.41 foot mark. On Row 18-Tube number 20, at the 8.62 foot mark the tube is entirely blocked. We marked out these tubes on the interior of the Drum. Mr. Messier was going to try a system using a vaccume in a attempt to unplug the hole. We tried to flush the blockage using the videoprobe itself, but were unable to as you will see in the video.

For the Tubes on the left and right waterwalls of the furnace, we found more of the same scaling, with no blockages.

Examiner (Printed) Chuck Morissette

Examiner (Signature) _____ Level II VT-2

Reviewed By (Printed): Sawyer Leonard

Reviewed By (Signature) _____ Level II VT-2

CLIENT APPROVAL: _____

APPLIED TECHNICAL SERVICES, INCORPORATED

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ULTRASONIC INSPECTION REPORT

Job # ME 94407 PO # Boiler 6 NDE-UMO WO # N/A Date 8-1-18 Page 1 of 1

Boiler 6 University of Maine

Orono Maine

MATERIAL: Carbon steel

PART SIZE: Various

INSPECTION PROCEDURE

SPECIFICATIONS: ATS 130.41 Rev.1, Ultrasonic Thickness Inspection of Recovery & Power Boilers

ACCEPT/REJECT CRITERIA: No accept/reject specified; client's discretion on use

☐ SHEAR ☐ SURFACE ☒ CONTACT

☒ LONGITUDINAL ☒ THICKNESS ☐ IMMERSION

☐ SKETCH ATTACHED

TRANSDUCER FREQUENCY: 7.5 MHz

TRANSDUCER SIZE: 3/8"

TRANSDUCER ANGLE: 0º

SCANNING METHOD: Manual

REFERENCE STD.: (SN) CSSW-9857

SURFACE CONDITION: Smooth

MATERIAL SIZE: (THICK./DIA.) .100"-.500"

U.T. EQUIPMENT: Olympus 38 DL Plus/ Multiple

COUPLANT/BATCH NO.: Exosen 14

TRANSDUCER: (MFG./SN) Panametrics / Multiple

DAC METHOD: N/A

CAL. DUE DATE: Calibrated Prior to each use

INSPECTION RESULTS

IDENTIFICATION	ACCEPT	REJECT	INDICATION LEVEL	REFERENCE LEVEL	REMARKS
Boiler 6	N/A	N/A	N/A	68 db	See attached pages for
Thickness Survey	N/A	N/A	N/A		thickness measurements
	N/A	N/A	N/A		and their locations.
	N/A	N/A	N/A		No Accept/Reject criteria given
	N/A	N/A	N/A		
	N/A	N/A	N/A		
	N/A	N/A	N/A		

SKETCH AND TECHNIQUE DESCRIPTION:
See attached pages for thickness measurements and their locations.

THICKNESS MEASUREMENTS

MIN. THICKNESS REQUIRED: N/A ACCEPT N/A

MIN. THICKNESS RECORDED: N/A REJECT N/A

INSPECTION APPROVED BY: Sawyer Leonard Level II U.T.

Level U.T.

CLIENT APPROVAL:

APPLIED TECHNICAL SERVICES, INC.

UNIVERSITY OF MAINE ORONO - BOILER NO. 6

FURNACE FRONT WALL

LOCATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
3' From Bricks	L	.118	.116	.117	.097	.121	.115	.123	.141	.114	.114	.119	.112	.116	.116	.118	.116	.116	.116	.113	.111	.110	.112	.118	.108	.115	.114
	C	.114	.115	.114	.117	.121	.116	.116	.119	.117	.119	.112	.117	.115	.118	.118	.115	.116	.112	.112	.114	.113	.110	.136	.114	.112	.114
	R	.113	.112	.114	.116	.116	.115	.114	.120	.133	.119	.111	.115	.123	.113	.120	.116	.116	.108	.110	.113	.116	.115	.116	.115	.112	.112
2' From Bricks	L	.122	.114	.115	.116	.115	.117	.116	.119	.116	.115	.112	.118	.119	.119	.116	.118	.112	.115	.111	.111	.109	.115	.114	.110	.115	.112
	C	.119	.115	.115	.116	.114	.114	.115	.121	.118	.118	.110	.115	.116	.119	.115	.114	.109	.112	.111	.117	.110	.107	.111	.112	.109	.112
	R	.118	.114	.115	.113	.115	.116	.116	.114	.116	.120	.115	.116	.116	.117	.116	.114	.116	.114	.110	.113	.110	.116	.116	.111	.115	.117
1' From Bricks	L	.115	.118	.114	.116	.115	.130	.113	.118	.116	.118	.117	.114	.115	.114	.115	.113	.112	.114	.127	.115	.115	.111	.118	.111	.108	.114
	C	.100	.116	.125	.114	.114	.116	.116	.138	.115	.118	.111	.112	.116	.116	.115	.114	.112	.110	.127	.113	.112	.110	.115	.114	.113	.114
	R	.114	.113	.111	.116	.116	.115	.117	.120	.112	.115	.113	.111	.114	.114	.114	.114	.110	.112	.110	.106	.115	.110	.119	.111	.107	.116
0' @ Bricks	L	.112	.108	.108	.107	.112	.106	.110	.106	.112	.115	.110	.105	.112	.106	.108	.113	.105	.112	.109	.110	.122	.108	.108	.109	.103	.108
	C	.110	.105	.106	.106	.111	.107	.106	.105	.102	.105	.106	.103	.129	.109	.126	.104	.100	.105	.105	.110	.106	.103	.103	.105	.099	.125
	R	.105	.108	.106	.109	.108	.103	.108	.107	.106	.105	.108	.100	.122	.107	.106	.105	.101	.106	.100	.108	.105	.099	.108	.105	.100	.106

UTT SURVEY RESULTS		LEGEND	OBSTRUCTIONS	
HIGH	.141	> 0.151"	OL - OVERLAY	NC - NOT CLEAN
AVG	.113	0.135" - 0.150"	HS - HEAT SHIELD	RF - REFRACTORY
LOW	.097	0.000" - 0.135"	ST - STRUCTURE	RT - RECESSED

APPLIED TECHNICAL SERVICES, INC.

UNIVERSITY OF MAINE ORONO - BOILER NO. 6

FURNACE RIGHT WALL

thicker pipe wall

LOCATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
5' From Bricks	L	RF	RF	.112	.114	.108	.117	.266	.272	.270	.259	.246	.262	.266	.272	.261	.248	.111	.126	.118	.115
	C	RF	RF	.112	.109	.105	.123	.270	.254	.260	.262	.256	.258	.269	.266	.260	.259	.112	.115	.114	.112
	R	RF	RF	.109	.108	.106	.122	.255	.261	.255	.257	.259	.256	.249	.262	.254	.253	.114	.114	.112	.117
4' From Bricks	L	.106	.109	.109	.107	.105	.105	.241	.250	.275	.259	.251	.269	.259	.254	.267	.253	.109	.112	.112	.115
	C	.108	.106	.109	.121	.103	.107	.258	.254	.245	.264	.249	.269	.274	.267	.251	.248	.116	.112	.118	.119
	R	.112	.109	.107	.102	.106	.105	.250	.259	.244	.268	.249	.243	.262	.272	.252	.248	.109	.111	.114	.113
3' From Bricks	L	.110	.107	.108	.107	.102	.126	.227	.261	.275	.258	.232	.256	.262	.252	.254	.236	.107	.111	.111	.114
	C	.105	.107	.105	.106	.103	.102	.246	.247	.244	.249	.232	.273	.251	.272	.245	.259	.111	.111	.112	.114
	R	.103	.108	.101	.107	.102	.102	.248	.248	.240	.269	.239	.271	.248	.273	.245	.253	.111	.112	.112	.111
2' From Bricks	L	.104	.105	.102	.106	.100	.101	.260	.252	.256	.235	.246	.234	.249	.241	.256	.232	.106	.111	.112	.111
	C	.103	.103	.103	.109	.102	.107	.248	.248	.255	.247	.225	.259	.244	.260	.251	.255	.108	.110	.112	.111
	R	.106	.103	.101	.106	.102	.101	.248	.249	.252	.257	.224	.255	.239	.263	.249	.257	.109	.110	.109	.110
1' From Bricks	L	.102	.104	.102	.096	.097	.247	.252	.241	.221	.240	.240	.241	.238	.260	.249	.226	.104	.112	.106	.109
	C	.102	.102	.098	.097	.100	.245	.261	.241	.258	.239	.243	.248	.232	.261	.236	.271	.105	.107	.109	.114
	R	.101	.098	.098	.097	.106	.250	.268	.249	.253	.254	.238	.258	.240	.251	.247	.260	.107	.113	.110	.111
0' @ Bricks	L	.120	.097	.102	.096	.129	.098	.232	.254	.249	.243	.241	.245	.251	.269	.268	.237	.105	.111	.107	.110
	C	.101	.101	.100	.101	.103	.105	.242	.237	.244	.255	.241	.258	.244	.260	.248	.258	.124	.109	.106	.123
	R	.101	.108	.101	.102	.101	.096	.241	.249	.246	.260	.247	.247	.259	.258	.263	.246	.109	.107	.108	.119

UTT SURVEY RESULTS		LEGEND	OBSTRUCTIONS	
HIGH	.275		OL - OVERLAY	NC - NOT CLEAN
AVG	.179		HS - HEAT SHIELD	RF - REFRACTORY
LOW	.096		ST - STRUCTURE	RT - RECESSED

APPLIED TECHNICAL SERVICES, INC.

UNIVERSITY OF MAINE ORONO - BOILER NO. 6

FURNACE LEFT WALL

thicker pipe wall

LOCATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
5' From Bricks	L	.118	.110	.115	.114	.112	.240	.256	.266	.251	.239	.251	.252	.260	.247	.247	.110	.109	.114	.142	RF	NA
	C	.117	.117	.127	.112	.111	.261	.257	.245	.254	.237	.258	.252	.255	.244	.244	.109	.107	.116	.119	RF	NA
	R	.115	.111	.106	.110	.109	.256	.250	.246	.247	.237	.241	.251	.270	.241	.241	.107	.106	.109	.112	RF	NA
4' From Bricks	L	.114	.111	.118	.115	.127	.245	.263	.249	.240	.274	.242	.257	.254	.257	.267	.237	.103	.106	.122	.110	NA
	C	.112	.111	.115	.108	.107	.241	.253	.242	.241	.260	.250	.242	.236	.267	.239	.108	.102	.109	.125	.125	NA
	R	.116	.111	.108	.108	.105	.265	.249	.252	.239	.250	.248	.241	.243	.271	.235	.107	.107	.124	.113	.107	NA
3' From Bricks	L	.118	.112	.112	.114	.108	.248	.256	.248	.241	.252	.261	.250	.258	.244	.235	.106	.109	.109	.105	.107	NA
	C	.115	.112	.113	.107	.106	.250	.258	.246	.235	.247	.246	.241	.237	.258	.235	.107	.107	.111	.126	.105	NA
	R	.115	.110	.110	.103	.107	.248	.249	.251	.231	.257	.238	.249	.246	.268	.239	.110	.104	.107	.104	.105	NA
2' From Bricks	L	.117	.114	.110	.107	.105	.257	.261	.237	.241	.258	.239	.247	.259	.245	.240	.104	.102	.106	.106	.107	NA
	C	.115	.111	.112	.108	.111	.264	.255	.236	.255	.262	.247	.247	.241	.248	.230	.101	.103	.103	.105	.113	NA
	R	.115	.109	.109	.104	.106	.254	.241	.238	.244	.259	.238	.238	.246	.248	.255	.103	.102	.102	.110	.109	NA
1' From Bricks	L	.117	.114	.111	.108	.106	.225	.249	.245	.239	.263	.243	.250	.269	.245	.255	.104	.100	.105	.106	.111	NA
	C	.115	.107	.110	.105	.107	.243	.251	.240	.243	.265	.233	.240	.272	.251	.232	.104	.103	.101	.119	.111	NA
	R	.117	.105	.109	.104	.105	.243	.254	.241	.244	.262	.251	.261	.243	.250	.232	.106	.103	.104	.125	.108	NA
0' @ Bricks	L	.114	.113	.109	.111	.109	.245	.255	.253	.246	.274	.248	.240	.261	.240	.238	.128	.102	.106	.117	.109	NA
	C	.117	.107	.127	.118	.107	.249	.250	.249	.253	.260	.238	.240	.249	.266	.233	.104	.107	.123	.108	.111	NA
	R	.117	.111	.112	.110	.108	.253	.260	.259	.265	.266	.240	.260	.251	.263	.250	.107	.107	.116	.106	.110	NA

UTT SURVEY RESULTS		LEGEND	OBSTRUCTIONS	
HIGH	.274		OL - OVERLAY	NA - NO ACCESS
AVG	.181		HS - HEAT SHIELD	RF - REFRACTORY
LOW	.100		ST - STRUCTURE	RT - RECESSED

APPLIED TECHNICAL SERVICES, INC.

UNIVERSITY OF MAINE ORONO - BOILER NO. 6

1ST PASS BAFFLE (FIRE SIDE)

LOCATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
5' From Bricks	L	.108	.103	.103	.104	.102	.104	.106	.099	.100	.103	.114	.118	.110	.117	.112	.115	.108	.115	.108	.112	.112	.108	.110	.117	.109
	C	.105	.103	.100	.105	.105	.102	.101	.102	.100	.103	.107	.109	.105	.116	.110	.109	.108	.107	.107	.110	.111	.112	.116	.116	.115
	R	.104	.104	.103	.102	.112	.102	.100	.102	.102	.102	.108	.111	.110	.114	.114	.109	.110	.111	.109	.114	.117	.113	.112	.114	.112
4' From Bricks	L	.103	.105	.103	.100	.104	.106	.105	.102	.101	.103	.108	.113	.115	.115	.112	.109	.110	.112	.105	.111	.113	.109	.112	.115	.112
	C	.105	.105	.103	.102	.100	.102	.103	.103	.100	.102	.111	.116	.114	.116	.110	.113	.112	.108	.103	.115	.114	.114	.112	.119	.118
	R	.103	.111	.100	.100	.100	.102	.103	.104	.100	.103	.119	.119	.113	.117	.114	.114	.115	.109	.109	.115	.115	.113	.111	.118	.118
3' From Bricks	L	.115	.108	.110	.109	.108	.106	.103	.105	.107	.103	.118	.119	.116	.110	.116	.116	.113	.111	.106	.112	.107	.109	.112	.111	.110
	C	.110	.108	.108	.107	.104	.106	.105	.106	.107	.108	.120	.119	.119	.113	.117	.110	.117	.110	.107	.112	.109	.109	.111	.114	.112
	R	.107	.104	.106	.106	.105	.105	.105	.105	.108	.105	.122	.123	.118	.112	.116	.116	.118	.110	.108	.119	.112	.111	.115	.116	.114
2' From Bricks	L	.106	.101	.105	.103	.104	.101	.101	.100	.099	.100	.109	.111	.110	.111	.117	.105	.111	.105	.105	.112	.105	.106	.112	.107	.108
	C	.105	.102	.108	.100	.100	.100	.096	.098	.100	.102	.112	.112	.111	.107	.109	.105	.106	.105	.103	.110	.110	.109	.110	.112	.112
	R	.106	.101	.101	.103	.107	.102	.102	.100	.110	.103	.116	.119	.117	.111	.111	.106	.111	.106	.105	.114	.113	.109	.111	.116	.116
1' From Bricks	L	.103	.102	.100	.103	.108	.104	.099	.100	.101	.104	.110	.108	.109	.113	.108	.103	.111	.099	.100	.110	.106	.105	.113	.107	.111
	C	.102	.101	.105	.100	.100	.100	.114	.098	.100	.102	.109	.108	.110	.109	.105	.103	.107	.102	.104	.111	.110	.099	.114	.110	.111
	R	.100	.109	.108	.104	.104	.107	.100	.100	.102	.101	.111	.109	.110	.114	.110	.104	.111	.104	.107	.113	.112	.105	.115	.114	.113
0' @ Bricks	L	.097	.101	.099	.096	.097	.097	.096	.097	.094	.096	.102	.105	.102	.105	.107	.097	.102	.105	.093	.101	.100	.098	.110	.105	.106
	C	.112	.096	.101	.099	.095	.096	.092	.096	.097	.096	.103	.106	.098	.107	.104	.101	.107	.096	.102	.099	.101	.099	.109	.110	.107
	R	.097	.095	.097	.092	.097	.107	.103	.101	.098	.095	.105	.104	.104	.108	.106	.105	.106	.097	.099	.109	.103	.103	.106	.113	.107

UTT SURVEY RESULTS		LEGEND	OBSTRUCTIONS	
HIGH	.123		OL - OVERLAY	TC - TUBE CUT OUT
AVG	.107		NS - NO STAGING	RF - REFRACTORY
LOW	.092		ST - STRUCTURE	RT - RECESSED

APPLIED TECHNICAL SERVICES, INC.

UNIVERSITY OF MAINE ORONO - BOILER NO. 6

1ST PASS BAFFLE (Cold Side)

LOCATION		25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
5' From Bricks	L	.113	.111	.120	.109	.110	.120	.113	.116	.112	.118	.111	.120	.122	.118	.121	.123	.116	.123	.123	.126	.115	.123	.126	.123	.124
	C	.117	.112	.118	.107	.111	.112	.110	.110	.111	.113	.110	.118	.122	.116	.123	.120	.116	.118	.121	.124	.117	.120	.125	.125	.125
	R	.118	.117	.120	.110	.113	.113	.113	.111	.117	.114	.112	.114	.117	.123	.124	.119	.117	.116	.124	.125	.115	.128	.123	.124	.126
4' From Bricks	L	.118	.109	.121	.113	.112	.118	.112	.114	.116	.115	.118	.123	.110	.119	.116	.118	.117	.122	.122	.126	.115	.123	.124	.121	.125
	C	.115	.110	.116	.109	.111	.112	.111	.111	.110	.110	.121	.118	.115	.116	.119	.118	.120	.121	.121	.124	.116	.121	.126	.119	.124
	R	.116	.120	.119	.108	.113	.114	.114	.112	.113	.114	.120	.115	.116	.117	.123	.121	.118	.119	.122	.124	.115	.132	.124	.121	.124
3' From Bricks	L	.121	.121	.119	.118	.116	.120	.120	.121	.122	.123	.121	.122	.112	.123	.117	.121	.122	.116	.120	.119	.111	.118	.122	.122	.119
	C	.122	.121	.121	.120	.124	.122	.118	.122	.126	.120	.123	.127	.112	.120	.117	.120	.115	.122	.118	.117	.109	.116	.119	.124	.121
	R	.123	.125	.120	.115	.121	.119	.122	.119	.123	.121	.124	.119	.114	.125	.122	.118	.116	.117	.123	.119	.111	.120	.116	.128	.118
2' From Bricks	L	.122	.125	.121	.120	.121	.120	.125	.120	.121	.120	.124	.122	.118	.121	.119	.122	.119	.111	.120	.129	.117	.119	.124	.123	.124
	C	.122	.121	.122	.116	.123	.122	.123	.127	.120	.120	.124	.122	.124	.120	.118	.120	.116	.111	.122	.127	.116	.119	.120	.126	.125
	R	.123	.124	.120	.114	.123	.120	.122	.119	.121	.120	.123	.122	.119	.120	.123	.122	.119	.113	.125	.120	.113	.122	.124	.129	.125
1' From Bricks	L	.120	.120	.123	.118	.129	.122	.123	.123	.123	.122	.122	.126	.117	.121	.120	.124	.118	.109	.123	.126	.110	.126	.124	.124	.127
	C	.126	.120	.122	.122	.131	.123	.121	.124	.124	.124	.125	.125	.120	.122	.117	.124	.115	.113	.125	.124	.121	.122	.124	.125	.124
	R	.122	.122	.123	.116	.127	.121	.123	.123	.122	.123	.122	.124	.122	.123	.121	.122	.117	.116	.125	.124	.116	.126	.125	.126	.127
0' @ Bricks	L	.127	.125	.127	.128	.129	.126	.127	.128	.129	.130	.126	.127	.123	.130	.122	.128	.125	.112	.128	.132	.124	.134	.132	.130	.123
	C	.131	.129	.127	.127	.129	.129	.127	.130	.130	.130	.125	.128	.125	.125	.126	.130	.123	.112	.131	.131	.124	.133	.133	.131	.123
	R	.126	.127	.126	.119	.128	.126	.125	.124	.124	.128	.124	.122	.124	.125	.127	.122	.121	.113	.128	.127	.123	.128	.131	.131	.126

UTT SURVEY RESULTS		LEGEND	OBSTRUCTIONS	
HIGH	.134		OL - OVERLAY	TC - TUBE CUT OUT
AVG	.121		NS - NO STAGING	RF - REFRACTORY
LOW	.107		ST - STRUCTURE	RT - RECESSED

APPLIED TECHNICAL SERVICES, INC.

UNIVERSITY OF MAINE ORONO - BOILER NO. 6

2ND PASS BAFFLE (FIRE SIDE)

LOCATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
7' From Bricks	L	.099	.099	.100	.101	.102	.099	.098	.098	.098	.098	.097	.098	.098	.098	.098	.099	.097	.098	.101	.098	.097	.101	.098	.100	.097
	C	.100	.100	.100	.100	.100	.106	.096	.096	.098	.097	.097	.096	.096	.096	.095	.095	.096	.095	.095	.096	.097	.096	.096	.100	.096
	R	.100	.104	.097	.100	.100	.100	.094	.107	.103	.096	.096	.095	.097	.097	.095	.097	.095	.095	.097	.099	.097	.095	.097	.097	.095
6' From Bricks	L	.106	.106	.105	.103	.104	.102	.102	.102	.100	.095	.098	.094	.097	.098	.099	.102	.097	.099	.093	.096	.097	.096	.099	.098	.094
	C	.105	.109	.105	.106	.108	.107	.105	.103	.099	.098	.102	.097	.099	.096	.096	.095	.095	.101	.095	.094	.095	.097	.096	.099	.096
	R	.108	.105	.106	.106	.103	.105	.100	.100	.095	.096	.093	.095	.100	.096	.097	.098	.093	.098	.099	.098	.094	.095	.096	.095	.096
5' From Bricks	L	.103	.098	.098	.096	.098	.098	.095	.095	.096	.093	.095	.093	.094	.097	.099	.097	.096	.095	.094	.095	.096	.097	.095	.097	.097
	C	.100	.099	.099	.098	.101	.098	.098	.094	.093	.099	.093	.099	.096	.099	.093	.099	.097	.096	.096	.096	.096	.095	.101	.094	.095
	R	.099	.100	.096	.098	.100	.096	.096	.097	.095	.094	.096	.095	.099	.096	.095	.095	.094	.094	.093	.094	.094	.097	.098	.098	.096
4' From Bricks	L	.100	.098	.096	.099	.097	.097	.105	.098	.105	.102	.102	.100	.101	.100	.099	.094	.091	.098	.095	.095	.105	.104	.101	.098	.100
	C	.099	.101	.094	.099	.098	.098	.097	.096	.104	.100	.101	.099	.092	.094	.090	.093	.091	.093	.092	.095	.096	.094	.097	.099	.099
	R	.099	.098	.096	.099	.099	.096	.097	.096	.095	.093	.097	.103	.093	.095	.091	.109	.092	.095	.105	.096	.100	.101	.099	.102	.098
3' From Bricks	L	.101	.096	.097	.097	.096	.096	.098	.100	.083	.090	.093	.091	.091	.090	.088	.090	.091	.095	.094	.092	.097	.096	.094	.096	.094
	C	.104	.098	.096	.096	.099	.096	.098	.095	.081	.081	.087	.082	.086	.088	.092	.087	.090	.089	.094	.094	.090	.094	.092	.095	.095
	R	.098	.097	.098	.097	.100	.098	.096	.102	.101	.083	.084	.084	.089	.088	.088	.091	.092	.093	.093	.093	.095	.097	.100	.094	.096
2' From Bricks	L	.098	.098	.100	.096	.096	.097	.098	.096	.098	.098	.096	.095	.093	.097	.095	.095	.097	.095	.096	.097	.094	.097	.097	.096	.101
	C	.104	.102	.097	.098	.100	.099	.099	.096	.097	.102	.095	.095	.094	.095	.094	.095	.094	.096	.094	.094	.091	.095	.097	.096	.096
	R	.104	.099	.096	.101	.095	.099	.101	.098	.093	.094	.097	.093	.097	.095	.096	.095	.094	.097	.092	.095	.094	.097	.097	.095	.096
1' From Bricks	L	.099	.111	.096	.102	.094	.096	.098	.097	.097	.096	.100	.098	.097	.099	.097	.099	.101	.099	.098	.097	.097	.098	.097	.099	.096
	C	.098	.100	.102	.102	.100	.099	.096	.098	.098	.096	.101	.098	.097	.097	.098	.096	.098	.094	.097	.096	.097	.099	.099	.097	.096
	R	.100	.099	.100	.103	.102	.099	.100	.097	.093	.095	.101	.105	.097	.100	.097	.098	.099	.094	.098	.097	.100	.100	.100	.100	.098
0' @ Bricks	L	.097	.102	.095	.093	.093	.091	.097	.092	.091	.096	.092	.093	.090	.094	.091	.094	.094	.096	.091	.091	.093	.092	.096	.094	.097
	C	.103	.102	.094	.094	.095	.093	.095	.094	.096	.094	.092	.093	.091	.110	.096	.094	.090	.089	.094	.091	.095	.094	.096	.093	.092
	R	.100	.103	.095	.096	.094	.093	.094	.094	.098	.094	.091	.093	.091	.092	.093	.092	.092	.096	.094	.093	.094	.092	.096	.095	.094

UTT SURVEY RESULTS		LEGEND	OBSTRUCTIONS	
HIGH	.111		OL - OVERLAY	TC - TUBE CUT OUT
AVG	.097		NS - NO STAGING	RF - REFRACTORY
LOW	.081		ST - STRUCTURE	RT - RECESSED

APPLIED TECHNICAL SERVICES, INC.

UNIVERSITY OF MAINE ORONO - BOILER NO. 6

UPPER GEN LEAD (LEFT)

LOCATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
0' @ C/L Of Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
1' From Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
2' From Upper Bend	L	.099		.097			.099			.107			.089			.126			.196			.114			.082			.072			.095			.086			.096
	C	.101		.102			.095			.102			.095			.104			.105			.116			.090			.093			.089			.103			.106
	R	.100		.106			.098			.100			.088			.093			.081			.077			.125			.102			.103			.121			.104
3' From Upper Bend	L	.089		.074			.100			.081			.118			.076			.076			.095			.103			NA			NA			NA			NA
	C	.105		.076			.106			.106			.070			.089			.105			.099			.077			NA			NA			NA			NA
	R	.075		.081			.092			.080			.101			.067			.091			.107			.114			NA			NA			NA			NA

UTT SURVEY RESULTS		LEGEND	OBSTRUCTIONS	
HIGH	.196		OL - OVERLAY	NA - NO ACCESS
AVG	.097		HS - HEAT SHIELD	RF - REFRACTORY
LOW	.067		ST - STRUCTURE	RT - RECESSED

APPLIED TECHNICAL SERVICES, INC.

UNIVERSITY OF MAINE ORONO - BOILER NO. 6

UPPER GEN LEAD (RIGHT)

LOCATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
0' @ C/L Of Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
1' From Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
2' From Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
3' From Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA

UTT SURVEY RESULTS		LEGEND	OBSTRUCTIONS	
HIGH	.000		OL - OVERLAY	NA - NO ACCESS
AVG	#DIV/0!		HS - HEAT SHIELD	RF - REFRACTORY
LOW	.000		ST - STRUCTURE	RT - RECESSED

APPLIED TECHNICAL SERVICES, INC.

UNIVERSITY OF MAINE ORONO - BOILER NO. 6

UPPER GEN TRAIL (LEFT)

LOCATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
0' @ C/L Of Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
1' From Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
2' From Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
3' From Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA

UTT SURVEY RESULTS		LEGEND	OBSTRUCTIONS	
HIGH	.000		OL - OVERLAY	NA - NO ACCESS
AVG	#DIV/0!		HS - HEAT SHIELD	RF - REFRACTORY
LOW	.000		ST - STRUCTURE	RT - RECESSED

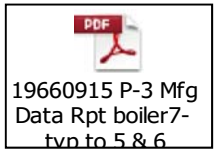
APPLIED TECHNICAL SERVICES, INC.

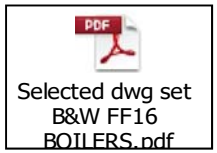
UNIVERSITY OF MAINE ORONO - BOILER NO. 6

UPPER GEN TRAIL (RIGHT)

LOCATION		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
0' @ C/L Of Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
1' From Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
2' From Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
3' From Upper Bend	L	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	C	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
	R	NA		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA

UTT SURVEY RESULTS		LEGEND	OBSTRUCTIONS	
HIGH	.000		OL - OVERLAY	NA - NO ACCESS
AVG	#DIV/0!		HS - HEAT SHIELD	RF - REFRACTORY
LOW	.000		ST - STRUCTURE	RT - RECESSED





Boiler 7 wall tube size and thickness: (typical to boilers #6 & 5, ksd UM 20180827)
dia 2.5", 0.109" & 0.134" & 0.148" & 0.240"
dia 4.0", 0.240"

Boiler 7, boiler tube size and thickness: (typical to boilers #6 & 5, ksd UM 20180827)
dia 2.0", 0.095"
dia 2.5", 0.109"

The following 7 pages of information/drawings have been added by UM for context.
Generally Boiler 7 info/data are considered typical to boilers 5 & 6 (topic of this inspection report.)
ksd 20180828

Boiler #7 (Typical to UM Boilers #5 & #6 Also) #7

FORM P-3 MANUFACTURERS' DATA REPORT FOR WATER-TUBE BOILERS, SUPERHEATERS, WATERWALLS, AND ECONOMIZERS

2141-3072

As Required by the Provisions of the ASME Code Rules

1. Manufactured by The Babcock & Wilcox Company Barberton, Ohio
(Name and address of manufacturer)

2. Manufactured for University Of Maine Orono, Maine
(Name and address of purchaser)

Integral Furnace

3. Identification Bent Tube Boiler (Type of boiler, superheater, waterwall, economizer) Boiler No. BW-22293 (Mfrs. Serial No.) 5787 ME (State and State No.) 22293 (Natl. Board No.) Year Built 1966

4. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, construction, and workmanship conform to ASME Rules. Section I (I or IV) Addenda 12-31-65 Dated 1965

Remarks: Manufacturers' Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report:
(Name of Part—Item number, manufacturer's name, and identifying stamp)

We certify the statement in this data report to be correct.

Date July 14, 1966 Signed The Babcock & Wilcox Co. (Manufacturer) By John T. Black (Representative)

Certificate of Authorization Expires December 31, 1967

CERTIFICATE OF SHOP INSPECTION

BOILER MADE BY The Babcock & Wilcox Company at Wilmington, North Carolina

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors ~~and/or the State of~~ _____ and employed by The Hartford S. B. I. & I. Co. of Hartford, Connecticut

(All Tubes Shop Welds Only)

have inspected parts of this boiler referred to as data items 5a, 6a, 10 and 11 and have examined manufacturer's partial data reports for items _____

and state that, to the best of my knowledge and belief, the manufacturer has constructed this boiler in accordance with the applicable sections of the ASME BOILER AND PRESSURE VESSEL CODE.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the boiler described in this manufacturer's data report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date AUG 3 1966 19____

Inspector _____ Commissions NB-5271 (Nat'l Board or State and No.)

We certify that the field assembly of all parts of this boiler conforms with the requirements of SECTION I or IV of the ASME BOILER AND PRESSURE VESSEL CODE.

Date 9-15 1966 Signed The Babcock & Wilcox Co (Assembler) By _____ (Representative)

Our Certificate of Authorization to use the S (A) or (S) Symbol expires Dec. 31, 1967

CERTIFICATE OF FIELD ASSEMBLY INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State of _____ and employed by Hartford S. B. I & I Co of Hartford, Conn.

have compared the statements in this manufacturer's data report with the described boiler and state that the parts referred to as data items 5b, 6b and 12 _____, ~~not included in the certificate of shop inspection~~ have been inspected by me and that to the best of my knowledge and belief the manufacturer and/or the assembler has constructed and assembled this boiler in accordance with the applicable sections of the ASME BOILER AND PRESSURE VESSEL CODE. The described boiler was inspected and subjected to a hydrostatic test of 1240 psi.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the boiler described in this manufacturer's data report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date Sept. 15 1966

L. E. Mundell Inspector

Commissions NB 1711 (Nat'l Board or State and No.)

Pg 1 of 2

Form P-3 (back)

5(a). DRUMS 241-3072

No.	Nominal diameter, in.	Length Ft	Length In.	Shell plates: Brand	Shell plates: Material spec. no.	Shell plates: Thickness	Shell plates: Inside radius	Tube sheets: Thickness	Tube sheets: Inside radius	Tube Hole Ligament Efficiency, %: Longitudinal	Tube Hole Ligament Efficiency, %: Circumferential
1	36 Mud Drum	17	-2 1/8	F.B.	SA-212 B	19/32	17 13/16	19/32	17 13/16	.4261	.2927
2											
3	54 Steam Drum	19	-2 1/8	F.B.	SA-212 B	23/32	26 15/16	23/32	26 15/16	.4267	.284
4											
5											

No.	Longitudinal joints: No. & type*	Longitudinal joints: Efficiency	Circum. joints: No. & type	Circum. joints: Efficiency	Heads: Brand	Heads: Material spec. no.	Heads: Thickness		Heads: Type**	Heads: Radius of dish	Heads: Manholes No. Size	Hydro. state test, lb
1	1 #2	.90	2 #2	.90	FLG	SA-212 B	3/4	9/16	#2	35 5/8	1--12x16	
2												
3	1 #2	.90	3 #2	.90	FLG	SA-212 B	13/16	13/16	#2	53 7/8	2--12x16	
4												
5												

*Indicate if (1) Seamless; (2) Fusion welded, (3) Forge welded, (4) Riveted. **Indicate if (1) Flat; (2) Dished; (3) Ellipsoidal; (4) Hemispherical

5(b) Boiler tubes

Diameter	Thickness	Material specification no.
2	.095	SA-178 A
2 1/2	.109	SA-178 A

5(c) Headers No. _____ (Box or sinuous, Mat. spec. no.; Thickness)

Heads or Ends _____ Hydro. Test, Lb (Shape, Mat. spec. no.; Thickness)

5(d) Staybolts _____ (Mat. spec. no.; Diameter; Size telltale, Net area)

Pitch _____ Net Area _____ Max. S.W.P. _____ (Supported by one bolt)

5(e) Mud Drum _____ Heads or Ends _____ Hydro. Test, Lb
(For sect. header boilers State Size, Shape; Mat. spec. no.; Thickness) (Shape; Mat. spec. no.; Thickness)

6(a) Waterwall Headers

No.	Size and shape	Material spec. no.	Thickness	Heads or Ends: Shape	Heads or Ends: Thickness	Heads or Ends: Material spec. no.	Hydro. test, lb
3	7 1/4" Sq.	SA-106 B	5/8	Flat	5/8	SA-106 B	

6(b) Waterwall Tubes

Diameter	Thickness	Material Spec. No.
2 1/2	.148	SA-178 A
2 1/2	.109	SA-178 A
2 1/2	.240	SA-210
2 1/2	.134	SA-178 A
4	.240	SA-210

7(a) Economizer Headers

8(a) Superheater Headers 8(b) Superheater Tubes

9(a) Other Parts (1) _____ (2) _____ (3) _____ 9(b) Tubes for Other Parts

1											
2											
3											

10 Openings (1) Steam 1--8" Flange Connection (No., size, and type of nozzles or outlets)

(2) Safety Valve 3--3" Flange Connections (No., size, and type of nozzles or outlets)

(3) Blowoff 1--2 1/2" Threaded Conn. (No., size, and type of nozzles or outlets)

(4) Feed 1--2 1/2" Threaded Conn. Steam Shel (No., size, and type and location of connections)

11	Max Allowable working press	Code Par. and/or Formula on Which MAWP Is Based	Shop hydro. test	Heating Surface
a Boiler	160	P-27(b)(3)		6472
b Waterwall				579
c Economizer				
d Superheater				
e Other parts				

Heating surface to be stamped on drum heads.

This heating surface not to be used for determining minimum safety valve capacity.

12 Field hydro. test
240

pg 2 of 2

54417C

REVISIONS			MICROFILM
DASH NO.	DATE	DESCRIPTION	ORIGINAL
1	4/11/61	A6-ADDED CONT. FF-2884 RMB	
2	5/19/61	M.V.-ADDED EXP. JOINT IN CONT FF-2884 RMB	
3	3/14/64	M.D. ADDED CONT. FF-3072	

1-3"SAFETY VALVE CONSOL Nº 1511M 4"SCRD OUTLET

2-3"SAFETY VALVES CONSOL Nº 1511M 4" SCRD OUTLET

½" P.T. FOR STEAM GAGE CONN. (CONT. FF-2884) (CONT. FF-3072)

3/8" PT. FOR STEAM GAGE CONN. (CONT. FF-2735)

3"SOOT BLOWER CONN. (SCRD)

8" STEAM OUTLET

¾" VENT

2½" FEED CONN (SCRD) FEED VALVES TO BE SET SO THAT PUMP PRESSURE COMES UNDER THE DISC.

MANHEAD ON CONTRACTS FF-2884 AND FF-3072

2-1" F.W. REG CONNS. (SCRD)

¾" CHEM. FEED CONN. (SCRD)

NORMAL WATER LEVEL

MANHEAD ON CONTRACTS FF-2735, FF-2884 AND FF-3072

Nº 42 Nº 30R Nº 31 Nº 32R Nº 33R Nº 43 Nº 34

1" CONT. BLOWDOWN CONN (SCRD)

16'-1½" ℄ TO ℄ SIDEWALL TUBES

9¼"

℄ BOILER Nº 5 (FF-2735) ℄ BOILER Nº 6 (FF-2884) ℄ BOILER Nº 7 (FF-3072)

STEAM GAGE

15'-7" FACE TO FACE OF SIDEWALL HEADERS

18"x18" NATURAL DRAFT DOOR

℄ BURNERS

DATUM LINE

FLOOR LINE

FRONT VIEW

SECTION "D-D"

SECTION "E-E"

℄ BOILER

DRILLING IN DAMPER BOX & EXPANSION JOINT. SECTION "O-O"

EXP JOINT FOR CONTRACTS FF-2884 AND FF-3072

NOTICE TO PURCHASER: REFER TO CONTRACT FOR MATERIAL TO BE SUPPLIED BY THE BABCOCK & WILCOX COMPANY. MATERIAL SHOWN UPON THIS DRAWING NOT INCLUDED IN THE CONTRACT WILL NOT BE SUPPLIED WITHOUT SUPPLEMENTARY AGREEMENT.

2½" BLOWOFF CONN 7½" DIA. FLG. DRILLED OFF ℄ FOR 8-¾" BOLTS ON 5⅞" B.C.

8" STEAM OUTLET 15" DIA. FLG. DRILLED OFF ℄ FOR 12-⅞" BOLTS ON 13" B.C.

(7) 1⅛ DIA. DAMPER SHAFT EXTENDED FOR AUTOMATIC CONTROL (LOWER SHAFT ONLY)

(8) 5" Nº 1 FIREBRICK 2½" K-20 FIREBRICK ¼" ASBESTOS MILLBOARD 6" HOLLOW TILE (3 ROWS) BY BRICKWORK CONTRACTOR

(9) BRICK CONTRACTOR MUST EXERCISE EXTREME CARE IN INSTALLING HOLLOW TILE UNDER FURNACE FLOOR TO ASSURE CONTINUOUS AND UNRESTRICTED AIR FLOW.

(10) SEAL AROUND TUBES WITH PLASTIC REFRACTORY BY BRICKWORK CONTRACTOR

Approved for Fels Company by E.L. Williams 3/22/66 PRC 4/1/66

L.H. BOILER SHOWN
R.H. BOILER OPPOSITE

1-L.H. BOILER REQ'D-CONT. FF-2735
1-R.H. BOILER REQ'D-CONT. FF-2884 } EXCEPT AS NOTED
1-R.H. BOILER REQ'D-CONT. FF-3072 }

FOR UNIVERSITY OF MAINE ORONO, MAINE

DO NOT SCALE-USE DIMENSIONS ONLY

FRONT VIEWS FF-16 Nº 52 BOILER WITH 15½" B&W OIL BURNERS (FUTURE SPREADER STOKER)

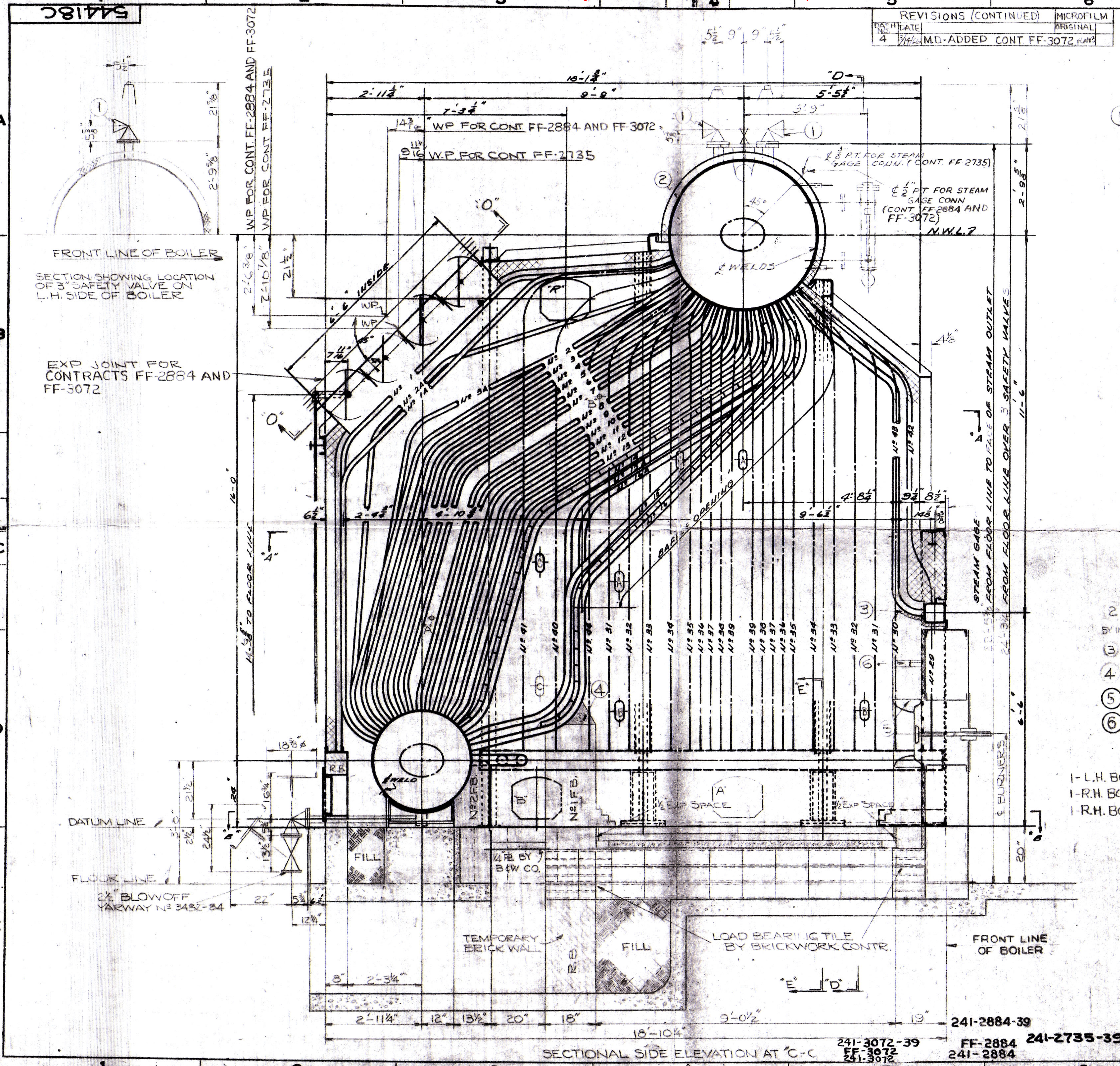
DWN BY RZ LCC	PASSED BY	SCALE ½"=1'-0"	
CHKD BY	APPROVED BY	DATE 5-17-68	
JOB NO. 241-2735 FF-2735		DWG NO. 54417 C-3	

241-3072-39 FF-3072 241-3072

241-2884-39 FF-2884 241-2884

241-2735-39

dwg set B&W FF16 BOILERS.pdf



REVISIONS (CONTINUED)			MICROFILM
DASH NO.	DATE		ORIGINAL
4	3/14/62	M.D.-ADDED CONT FF-3072	

REVISIONS			MICROFILM
DASH NO.	DATE	DESCRIPTION	ORIGINAL
1		RdH- NOTED FLOOR SUPPORT R BY B.&W. CO. & SOOT BLOWERS ON BOTH SIDES G.R.	
2	4/11/61	AE - ADDED CONT FF-2884	
3	5/9/61	MV - ADDED EXP. JT. FOR FF 2884	

(1) MAX ... B & W CO'S WORK ... WITH SAFETY VALVE OUTLET TO PREVENT INJURY TO ANYONE COMING IN CONTACT WITH STEAM OR WATER DISCHARGED FROM SAFETY VALVES. CUSTOMER SHOULD PROVIDE DISCHARGE PIPING FROM VALVE OUTLET.

THE PIPING MUST NOT BE SUPPORTED BY THE VALVE BUT SHOULD BE ARRANGED AS SHOWN SINCE EXPANSION STRAINS MAY INJURE ... E.

BRICKWORK & INSULATION BY B&W. CO.

PIPING & BREECHING CONNECTIONS TO PROVIDE FOR 1" UPWARD MOVEMENT OF BOILER DUE EXPANSION DURING OPERATION.

ALL BAFFLES MUST BE GAS TIGHT. BAFFLE TILE TO BE LAID UP IN AIRSET MORTAR.

REFRACTORY FOR REFRACTORY LINED DOORS AS NOTED BY THE B. & W. CO INSTALLED BY BRICKWORK CONTRACTOR.

R= REFRACTORY LINED DOOR ON BOTH SIDES

DOORS MARKED "A" ON L. H. SIDE

DOORS MARKED "C" ON R. H. SIDE.

DOORS MARKED "B" ON BOTH SIDES

3' x 7" INSPECTION DOORS

15" x 18" ACCESS DOORS

TERMINAL FLANGES TO BE 300# AMER. STD. 1/16" RAISED FACE SMOOTH FINISH, EXCEPT AS NOTED

SOOT BLOWERS ON BOTH SIDES.

SOOT BLOWER UNITS FURNISHED BY THE B. & W. CO.

SOOT BLOWER PIPING, VALVES & FITTINGS NOT FURNISHED BY THE B. & W. CO

FOUNDATION NOT BY THE B. & W. CO.

(2) 2½" 85% MAGNESIA, ½" FINISH CEMENT BY INSULATION CONTRACTOR

(3) ASBESTOS PACKING BY BRICKWORK CONTRACTOR

(4) KAOCRETE ON 30° SLOPE BY BRICKWORK CONTRACTOR

(5) BURNER TILE BY B. & W. CO. INSTALLED BY BRICK CONTRACTOR.

(6) BONDING TILE & HOLDERS BY THE B. & W. CO INSTALLED BY BRICK CONTRACTOR

L.H. BOILER SHOWN
R.H. BOILER OPPOSITE

1-L.H. BOILER REQ'D. -CONT. FF-2735
1-R.H. BOILER REQ'D- CONT FF-2884 } EXCEPT AS NOTED
1-R.H. BOILER REQ'D- CONT. FF-3072 } EXCEPT AS NOTED

FOR
UNIVERSITY OF MAINE
ORONO, MAINE

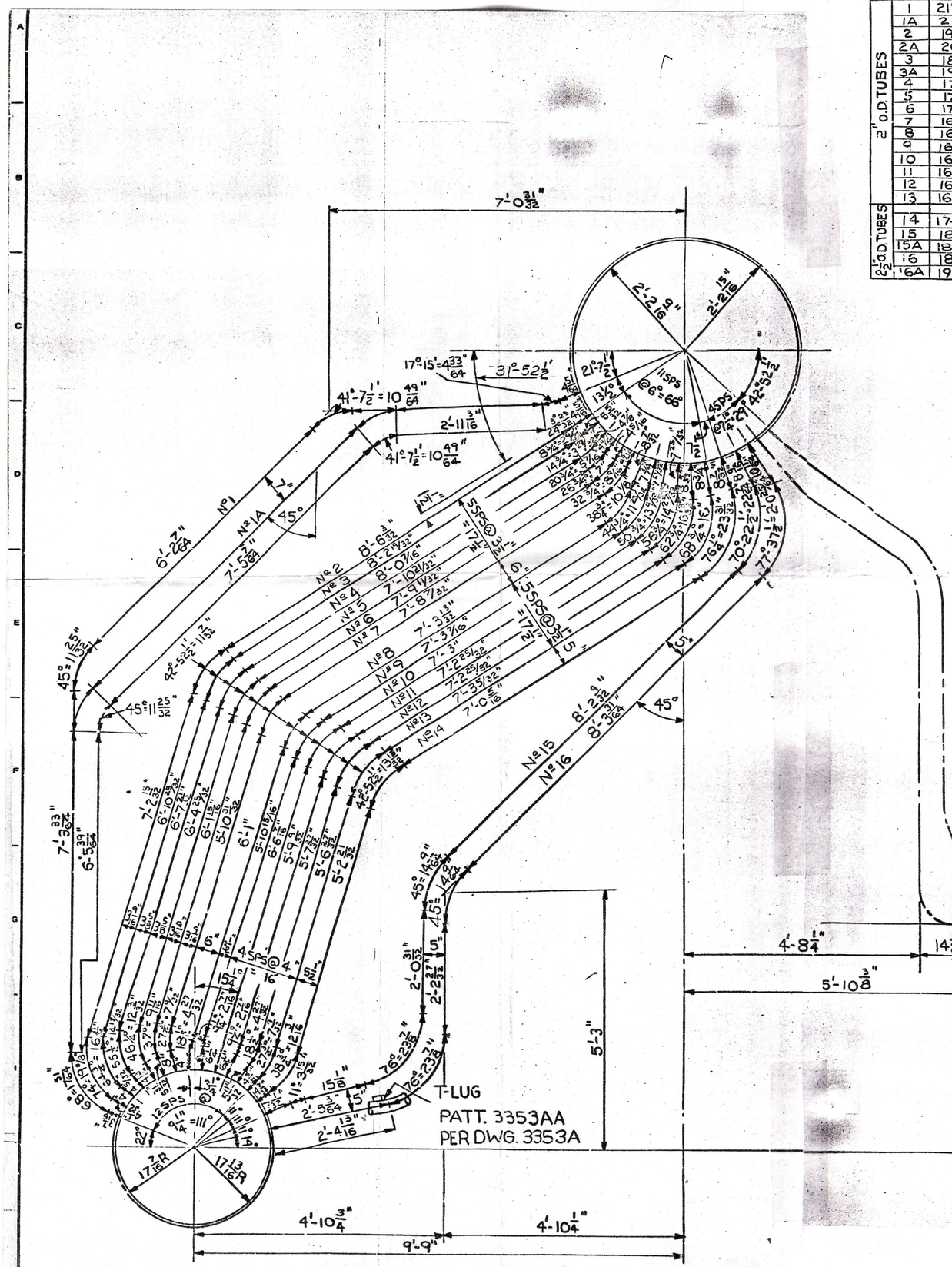
DO NOT SCALE-USE DIMENSIONS ONLY

SECTIONAL SIDE VIEW
FF-16 Nº 52 BOILER
WITH
15½ B&W OIL BURNERS
(FUTURE SPREADER STOKER)

DWN BY R.Z. LEE
CHKD BY
PASSED BY
APPROVED BY
SCALE ½"=1'-0"
DATE 3-17-58
JOB NO. 241-2735 FF-2735
DWG. NO. 54418C-4

	TUBE №	FINISHED LGTH.	CUTTING LGTH
2" O.D. TUBES	1	21'-8 7/32"	21'-7 3/4"
	1A	21'-3"	21'-2 1/4"
	2	19'-0 7/32"	18'-11 3/4"
	2A	20'-4 1/8	20'-3 1/2"
	3	18'-5"	18'-4 5/8"
	3A	19'-0 11/16"	19'-0 1/8"
	4	17'-10 23/32"	17'-10 1/4"
	5	17'-5 9/16"	17'-5 1/8"
	6	17'-1 15/32"	17'-1 1/8"
	7	16'-10 13/32"	16'-10"
	8	16'-6 15/16"	16'-6 1/2"
	9	16'-5 3/4"	16'-5 3/8
	10	16'-5 19/32"	16'-5 1/4"
	11	16'-6 19/32"	16'-6 1/4"
	12	16'-8 19/32"	16'-9 1/8"
	13	16'-11 7/8"	16'-11 3/8"
2 1/2" O.D. TUBES	14	17'-5 1/32"	17'-4 1/8"
	15	18'-1 9/16"	18'-0 5/8
	15A	18'-10 53/64"	18'-9 3/4"
	16	18'-11 15/16"	18'-11"
	16A	19'-8 27/32"	19'-7 7/8"

5	CHG'D ORD. LG. TO CUTTING LG.	12-13-60	EPM	X
6	CORR. DIM. TUBES MK-15A-16-16A	1-4-62	EPM/PCG	X
7	REDRAWN NO CHGS	9-65	JLH/RC	X
8				



NOTE –

TUBES №1A, №2A, №3A, & №1-№13 INCL. ARE 2" O.D. ALL 2" O.D. TUBES BENT TO 15" R TUBES №14-№16 INCL., №15A & №16A ARE 2 1/2" O.D. ALL 2 1/2" O.D TUBES BENT TO 18" R. FOR DET'L OF 2" O.D. TUBES SEE C-137888 & C-137889. FOR DET'L OF 2 1/2" O.D. TUBES SEE C-137890 THIS DWG. SUPERCEDES D-64381

DWN. BY	RTR	
CHKD. BY	MGL	
PASSED BY	WNG	
APPVD. BY		
STD. | SPL. | DATE	4/20/65	

TUBE SECTION FOR CLASS FF-16 / 54 BOILER

DWG. NO. D-70900 REV. 8

FIRST CONT. F-821

54419C

DASH NO.	DATE	REVISIONS DESCRIPTION	MICROFILM ORIGINAL
1	7/24/58	R.H. CAST SOOT BLOWERS. TO BOTH SIDES. G.R.	X
2	4/11/61	AG ADDED CONT. FF-2884 RAB	X
3	8/19/61	AG - REMOVED MANHEAD NOTES FROM MUD DRUM. R.H.G.	
4	3/4/64	M.D. - ADDED CONT. FF-3072 R.H.G.	

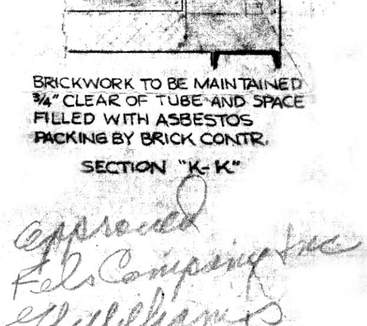
NOTICE TO PURCHASER - REFER TO CONTRACT FOR MATERIAL TO BE SUPPLIED BY THE BABCOCK & WILCOX COMPANY. MATERIAL SHOWN UPON THIS DRAWING NOT INCLUDED IN THE CONTRACT WILL NOT BE SUPPLIED WITHOUT SUPPLEMENTARY AGREEMENT.

CASING FURNISHED BY THE B. & W. CO.

(11) SEE SSD-290889
(12) SEE SSD-290894
(13) SEE SSD-290895
(14) SEE SSD-290896

} BY INSULATION CONTRACTOR

FOR SUPPLY AND APPLICATION OF BRICKWORK, INSULATION AND ATTACHMENTS SEE DWG. # SSD-310307



Approved
Fels Company Inc
Williams
3/22/66
PSC 4/4/66

L.H. BOILER SHOWN
R.H. BOILER OPPOSITE

1-L.H. BOILER REQ'D.-CONT. FF-2735
1-R.H. BOILER REQ'D.-CONT. FF-2884 } EXCEPT AS NOTED
1-R.H. BOILER REQ'D.-CONT. FF-3072

FOR
UNIVERSITY OF MAINE
ORONO, MAINE

DO NOT SCALE-USE DIMENSIONS ONLY

SECTIONAL PLAN VIEW AT "A-A"
FF-16 № 52 BOILER
WITH
15½" B&W OIL BURNERS
(FUTURE SPREADER STOKER)

DWN BY RZLee	PASSED BY	SCALE ½"=1'-0"
CHKD BY D. Johnson	APPROVED BY	DATE 5-17-58
JOB NO. 241-2735 FF-2735	DWG. NO. 54419C-4	

241-3072-39
FF-3072
241-3072

241-2884-39
FF-2884
241-2884

241-2735-39

J. H. WEIL & CO., PHILA.