

Automated Recovery Boiler Sootblowing Control System

Barbara G. Haley
Floyd I. Lawrence
Brad S. Carlberg, P.E.
Ford, Bacon & Davis, LLC
Mobile, AL

James Johnson
Ford, Bacon & Davis, LLC
Monroe, LA

ABSTRACT

In the Automated Recovery Boiler Sootblower Control System package, the sootblowers are controlled by two redundant PLCs and monitored from the DCS operator interface and a redundant plasma, touch-screen operator interface terminal via six (6) separate display screens, Sootblowing Control, Manual Mode Blower Select, Automatic Sequence Blower Out of Service, Limit Switch Monitoring, Alarm Notification and Help screens. The plant had to upgrade from a pre-existing, stand-alone sootblower panel and its associated hard-wired field devices. Plant operators now have greater access to process data and are better able to select a specific sootblowing sequence and to quickly find and troubleshoot failed field devices from the Alarm Notification display on the DCS. By operating in either Steam Mode Automatic or Continuous Mode, the sootblower optimization control system package, utilizing strategic sootblowing sequences, ensures that the plant only blows soot when it needs to, and only in the necessary locations; improving heat transfer and overall boiler efficiency, balancing blowing sequences to avoid unnecessary steam usage, increasing plant equipment life, and avoiding forced outages due to soot accumulation.

INTRODUCTION

Sootblower Operation

Power plants must balance the need for maximum heat transfer with minimum operating costs. As a boiler accumulates excess soot, boiler walls and heat exchanger surfaces become clogged and inhibit heat transfer. While the common solution is sootblowing, a fixed sootblowing schedule often fails to clean surfaces when heat transfer rates are degrading, or wastes steam by blowing soot before it is necessary. This approach to sootblowing wastes resources and creates significant costs. By operating in either Steam Mode Automatic or Continuous Mode, the sootblower optimization, utilizes strategic sootblowing sequences, ensuring that a plant only blows soot when it is needed, and only in the necessary locations. Automated and/or smart sootblowing delivers up to a 0.5% heat rate improvement, minimizes soot accumulation, improves heat transfer rates, improves overall boiler efficiency, balances blowing sequences, avoids unnecessary steam usage, avoids opacity spikes, extends plant equipment life, and avoids forced outages due to soot accumulation.

Benefits of Automation

By transferring the sootblowing control from the pre-existing, stand-alone sootblower panel and its associated hard-wired field devices to the redundant PLCs and DCS, which continuously collect the plant's real-time process data, the operators have greater access to that real-time process data and are better able to select the best specific, strategic sootblowing sequence to operate under, to quickly find and troubleshoot failed field devices from the alarm display, and, in short, better control the sootblowers, and, thus, optimally operate the recovery boiler.

The operator interface systems are fully functional operator windows to the automated recovery boiler sootblower system. While the redundant, plasma screen operator interface does have some limitations with respect to the DCS operator interface, the #4 Recovery Boiler Sootblowers can be monitored and controlled from either operator interface. Although the automated recovery boiler sootblower system operates basically the same on both the DCS operator interface and the redundant, plasma screen operator interface; this paper will describe the functionality of both operator interface systems. The operator interface and the DCS are talking to the same PLC and reading the same points. The PLC does not care which system sends it information, it will simply process the information as it is received.

Both operator interfaces, the DCS and the redundant plasma, touch-screen operator interface terminal, are organized into four (4) separate display screens, Sootblowing Control, Manual Mode Blower Select, Automatic Sequence Blower Out of Service, and Limit Switch Monitoring. There are also Help and Alarm screens.

All screens are accessible using the Screen Selector Buttons, which are located on each screen (an example is shown below on the #4 Recovery Boiler Sootblowing Control Screen).

PREV will return you to the Previous Screen.

OOS will call up the Automatic Sequence Blower Out of Service Screen.

HLP will call up Page 1 of the Help Screen (PG 2 of the Help Screen is accessible from PG 1).

BLWR will call up the Manual Mode Blower Select Screen.

ALMS call up the Alarm History Listing.

LS will call up the Limit Switch Monitoring Screen.

CONTR (not shown in the example below) will call up the Sootblowing Control Screen.

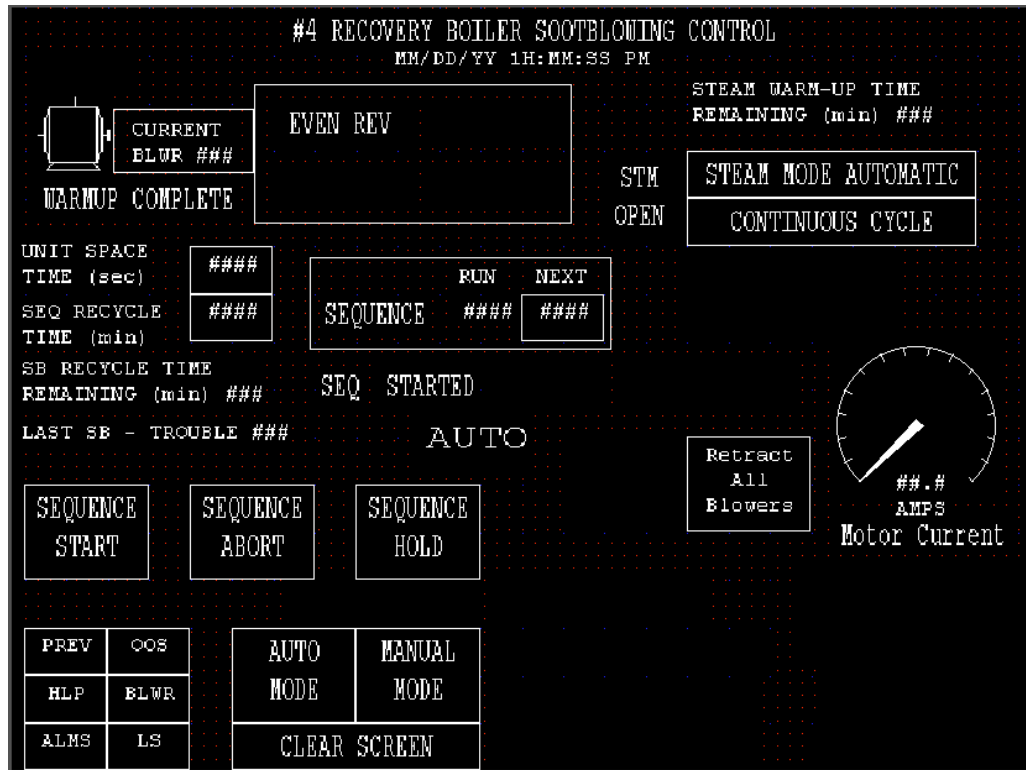
CENTRAL OPERATING DISPLAY

The following is the #4 Recovery Boiler Sootblowing Control Screen. This is the central operating display for this system.

Sootblowers are started and can be manually retracted and alarms are reset from this screen. Steam mode and Sootblower cycles are selected from this screen. It monitors the current Sequence status, travel status, and tells which Sootblower is running and which Sootblower is experiencing trouble. It also shows the status of steam warm-up time and shows if the steam valve is open (STM OPEN). The Sequence Status is also shown and you can select the next Sequence from this screen. Sequences can be put in Auto or Manual modes. The current mode is reflected on the screen. You can Start, Abort or Hold a Sequence from this screen. This screen is used to set the Unit Space Time and Sequence Recycle time. The Sootblower Sequence Recycle Time Remaining is also displayed on this screen.

The Motor Current Amps for the Sootblower currently running are displayed on this screen.

Screen Selector Buttons



STEAM MODE AUTOMATIC CONTROL

When a sequence is started by an Operator, and the steam system control is in Automatic, the cleaning medium header is pressurized. This is done by opening an air operated control valve. STM OPEN will be displayed when the steam valve opens.

As the valve is opened, an internal timer called the Steam Warm-up timer is engaged. The screen will display WARMING.

The Warm-up timer is an interval that allows condensate to properly drain from the header piping through temperature controlled valves into the plant's condensate recovery or removal system. The STEAM WARM-UP TIME REMAINING displays the time remaining until the warm-up interval is complete. When the timer is complete, the WARMING display will disappear and WARMUP COMPLETE will be displayed.

When the steam system control is in Automatic, at the end of an operating sequence, the header control valve will close and the Warm-up timer will be reset for the next cycle.

Selecting the STEAM MODE AUTOMATIC / STEAM MODE CONTINUOUS button allows the operator to toggle between the two steam mode selections. The same is true for SINGLE CYCLE / CONTINUOUS CYCLE, toggle to select the appropriate Sequence cycle.

STEAM MODE CONTINUOUS CONTROL

This header control method will open the valve, cycle the timer, and maintain the header's steam pressure and temperature whether or not the Sootblowers are being operated. If the steam header is to be energized at all times, STEAM MODE CONTINUOUS must be selected.

SEQUENCE CONTINUOUS CYCLE

When CONTINUOUS CYCLE is selected, the Sootblower Sequence will continue to run until it is aborted. At the end of the current Sequence, the Next Sequence will be started after the SEQ RECYCLE TIME has timed out. If the NEXT Sequence is the same as the one that was just completed, it will run that Sequence again.

SEQUENCE SINGLE CYCLE

When SINGLE CYCLE is selected, the Sootblower Sequence will stop after the current Sequence is run. To start the Sequence again or start another Sequence, choose the desired Sequence number, then select SEQUENCE START.

OTHER SYSTEM STATUS AND CONTROL INFORMATION

CURRENT BLWR NUMBER – This indicates the Sootblower that is currently running.

EVEN REV, ODD REV, EVEN FWD, and ODD FWD indicate the direction of the Sootblower. When the system is in the RETRACT MODE, you will see both EVEN REV and ODD REV displayed until the Sootblowers are fully retracted.

ALL RETRACTED – This indicates that all Sootblowers are retracted and in the rest position.

SEQUENCE RUN # - This indicates the current Sequence running.

SEQUENCE NEXT # - This indicates the next Sequence selected to run when the current Sequence is completed. Click on the number to bring up the Keypad for entering another Sequence. This allows the Operator to select a predefined Sequence between 1 and 9.

UNIT SPACE TIME # - This allows the Operator to set the desired time between Sootblower activation. Click on the number to bring up the Keypad for entering the Unit Time Space. This allows the Operator to configure the time between 6 and 60 seconds.

SEQUENCE RECYCLE TIME – This allows the Operator to select the time interval between the end of one Sequence and the start of the next. This is only active if the operator has selected CONTINUOUS CYCLE. Click on the number to bring up the Keypad. The Operator can select a timed interval between 1 and 60 minutes.

Once the Sootblower Sequence has been completed, the SEQ RECYCLE TIME timer begins and the SB RECYCLE TIME REMAINING displays the time remaining. When the timer has timed out, the next Sootblower Sequence will start.

SEQ STARTED – This indicates that a Sequence has been started. If all other conditions are right, the Sequence will be activated.

SEQ FINISHED – This indicates the end of a Sequence.

SEQUENCE START – Select this button to start a Sequence.

SEQUENCE ABORT – Select this button to abort the current sequence. SEQUENCE ABORT stops the current Sequence and re-initializes it, but it does not affect the currently operating Sootblower. Once it has fully retracted from the Boiler, the Sequence is terminated and FINISH will be shown on the screen.

SEQUENCE HOLD – This is a toggle switch to put the Sequence on hold or resume the Sequence. This will allow the Operator to intentionally suspend an operating Sequence and then continue operating the Sequence at a later time. Once the Sootblower has fully retracted from the Boiler, the Sequence will remain suspended until either Sequence Start or Sequence Hold is selected.

The system must be in HOLD or SEQ FINISHED before putting the system into a Manual mode to blow a single Sootblower.

RETRACT ALL BLOWERS – This button allows the Operator to remotely retract the operating Sootblower. When the Sootblower is traveling forward (inserting) into the Boiler, RETRACT ALL BLOWERS will cause the Sootblower to retract immediately. The Sequence is then put in HOLD and will remain suspended until either SEQUENCE START or SEQUENCE HOLD is selected.

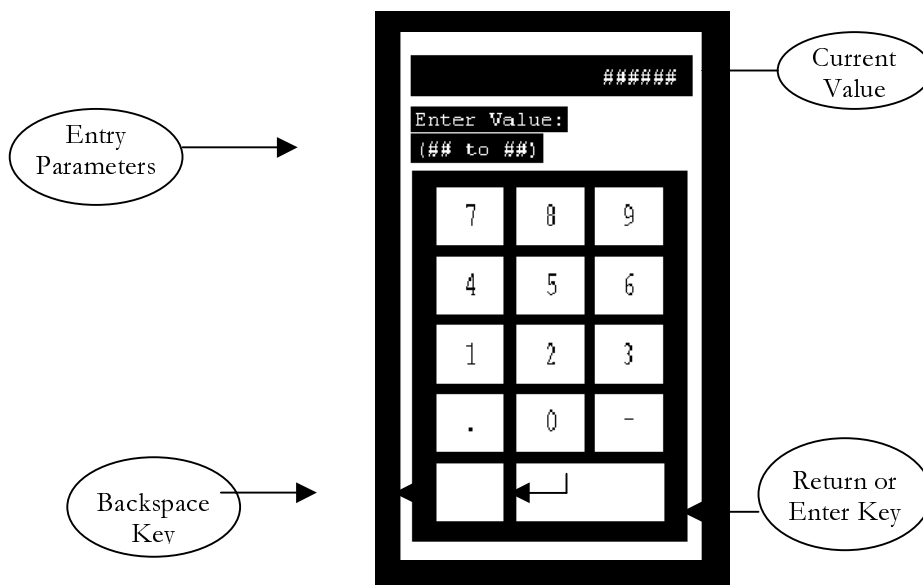
KEYPAD ENTRY

The numeric keypad opens in the center of the screen when a numeric entry control is selected. The top of the keypad shows the current value entered (it shows 0 if no value is entered). Below the current value is the range of values the operator can enter. This range is specific to the point selected.

The keypad is used to enter values for UNIT SPACE TIME, SEQ RECYCLE TIME, and SEQUENCE NEXT.

If the keypad is selected in error, select the Backspace Key until the keypad disappears.

To enter a value, select the number, confirm value entered, if OK, select Enter Key. If you need to adjust the number entered, select Backspace Key until you have erased the undesired number, then re-enter the number you want. Select the Enter Key to accept your changes.



MANUAL MODE BLOWER SELECT

Sootblowers can be individually selected to run from this screen by toggling the number of the desired Sootblower. MANUAL MODE must be selected and ALL RETRACTED must appear on the screen before the selected Sootblower will run.

This screen can also be used to monitor the Current Sootblower. It shows the physical location of the Sootblower and indicates which Sootblower is running and the travel state (EVEN/ODD FWD or EVEN/ODD REV) of the blower.

#4 RECOVERY BOILER MANUAL MODE BLOWER SELECT MM/DD/YY 1H:MM:SS PM										
01 03	05 07 09	33 47	SELECT				48 34	10 08 06	04 02	10th
11 13	15 17 19	35 49	SCOTBLOWER				50 36	20 18 16	14 12	9th
21 23	25 27 29	37	TO START				38	30 28 26	24 22	8th
31	NORTH SIDE		41 39	MANUAL		40 42	SOUTH SIDE		32	7th
7th		ODD FWD		43 51	45	46	6th		6th	
PREV	OOS	AUTO MODE		MANUAL MODE		Retract All Blowers				
HLP	CONTR	CLEAR SCREEN								
ALMS	LS									

AUTOMATIC SEQUENCE SOOTBLOWER OUT OF SERVICE

Sootblowers can be placed in and out of service by toggling the Sootblower Number. Out of Service (OOS) means that these Sootblowers will be restricted from operating within any blowing sequence.

This bypass function allows the sequence to operate without running a particular Sootblower. The screen indicates which Sootblowers have been put into OOS mode.

#4 RB AUTOMATIC SEQUENCE BLOWER OUT OF SERVICE						
MM/DD/YY 1H:MM:SS PM						
NORTH SIDE				SOUTH SIDE		
01	03	05		02	04	06
07	09	11		08	10 OOS	12
13	15	17		14	16	18
19	21	23		20	22	24
25	27	29 OOS	AUTO	26	28	30
31	33	35		32	34	36
37	39	41		38	40	42
43	45	47		44 OOS	46	48
49		51		50		52
SELECT SOOTBLOWER TO PLACE OUT OF SERVICE. THIS WILL PLACE THE SOOTBLOWER OUT OF SERVICE IN AUTOMATIC SEQUENCE BLOW ONLY.						
PREV	CONTR					
HLP	BLWR					
ALMS	LS					
<div style="text-align: center; border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">CLEAR SCREEN</div>						

LIMIT SWITCH MONITORING

#4 RECOVERY BOILER SOOTBLOWER LIMIT SWITCH MONITORING												
CURRENT	LAST SB - TROUBLE ###											
BLWR ###												
LSF	01	02	03	04	05	06	07	08	09	10	11	13
LSR-D	01	02	03	04	05	06	07	08	09	10	11	13
LSR-G	01	02	03	04	05	06	07	08	09	10	11	13
LSF	14	15	16	17	18	19	20	21	22	23	24	26
LSR-D	14	15	16	17	18	19	20	21	22	23	24	26
LSR-G	14	15	16	17	18	19	20	21	22	23	24	26
LSF	27	28	29	30	31	32	33	34	35	36	37	39
LSR-D	27	28	29	30	31	32	33	34	35	36	37	39
LSR-G	27	28	29	30	31	32	33	34	35	36	37	39
LSF	40	41	42	43	44	45	46	47	48	49	50	52
LSR-D	40	41	42	43	44	45	46	47	48	49	50	52
LSR-G	40	41	42	43	44	45	46	47	48	49	50	52
PREV	OOS	ALMS	PROBE TIME ELAPSED ###									
CONTR	BLWR	HLP	CLEAR SCREEN									

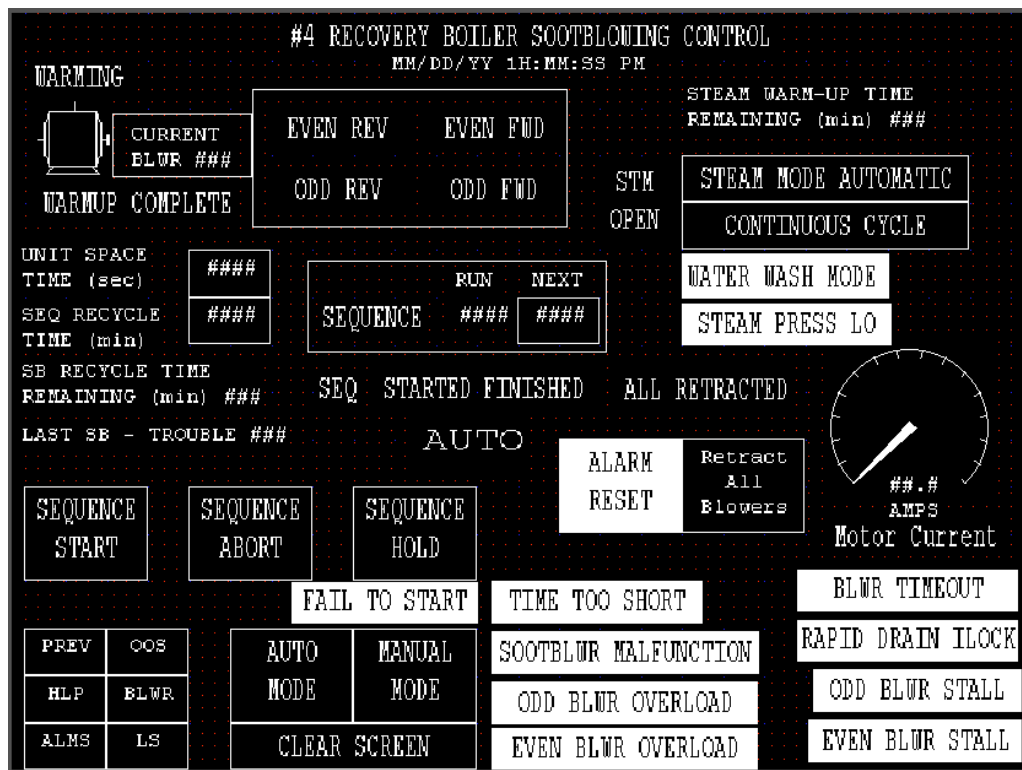
This screen is used to monitor the Limit Switches. The reverse graphic indicates that the switch is closed. The Current Sootblower Number is indicated. It also displays the Last Sootblower that had trouble. The Probe Time Elapsed indicates the time that the current Sootblower takes to travel from the start position to the rest position. If this time is too long, an alarm will be triggered.

ALARM NOTIFICATION SCREEN

To protect the Sootblowers from abnormal operating conditions that can result in physical damage, the system utilizes a series of alarm conditions. These alarm conditions produce automatic retraction of any Sootblower from the Boiler, the Sequence will be suspended, and an appropriate alarm message will appear on the control panel.

When a shutdown alarm condition exists, the system will require that the condition be fully corrected before the Operator can initiate ALARM RESET and resume operation of the sequence.

The screen below shows the various alarm states, modes and status indicators that are included on the main control screen. Other alarms appear on the Pop-Up Alarm Screen detailed in the next section.



POP-UP ALARM SCREEN

This is a sample of the Pop-Up Alarm Screen. This screen only appears when an alarm is triggered. The message that appears depends on the alarm triggered. In some instances, two or three alarm messages will appear from one alarm trigger. The screen is cleared from the display when the Operator presses the Ack or Ack All button.

SOOTBLOWER TIME EXCEEDED

Ack

Ack
All

ALARM LISTING

The Alarm Listing Screen maintains a record of all triggered alarms. The maximum number in a list is 100. If the Alarm List is full when an alarm is triggered, the most recent alarm is added to the top of the list and the oldest alarm is removed.

Clear Alarm List clears the alarm list even though an alarm condition may exist. Be careful to read all alarms before clearing the list.

Ack All acknowledges all alarms in the Alarm List. It closes the Alarm Pop-up Screen even though an alarm condition may still exist.

#4 RECOVERY BOILER SOOTBLOWER ALARM LISTING
MM/DD/YY 1H:MM:SS PM

MM/DD/YY	1H:MM:SS	PM	ALARM DESCRIPTION
MM/DD/YY	1H:MM:SS	PM	FAIL TO START
MM/DD/YY	1H:MM:SS	PM	ODD BLWR OVERLOAD
MM/DD/YY	1H:MM:SS	PM	ODD BLWR STALL
MM/DD/YY	1H:MM:SS	PM	EVEN BLWR OVERLOAD
MM/DD/YY	1H:MM:SS	PM	EVEN BLWR STALL
MM/DD/YY	1H:MM:SS	PM	ODD BLWR STALL
MM/DD/YY	1H:MM:SS	PM	RAPID DRAIN ILOCK
MM/DD/YY	1H:MM:SS	PM	SOOTBLOWER FAIL
MM/DD/YY	1H:MM:SS	PM	SOOTBLOWER SYSTEM TROUBLE
MM/DD/YY	1H:MM:SS	PM	STEAM LOW
MM/DD/YY	1H:MM:SS	PM	PLC BATT LOW
MM/DD/YY	1H:MM:SS	PM	PLC RACK 3 FAULT ALARM
MM/DD/YY	1H:MM:SS	PM	PLC RACK 4 FAULT ALARM
MM/DD/YY	1H:MM:SS	PM	PLC RACK 10 FAULT ALARM
MM/DD/YY	1H:MM:SS	PM	PLC RACK 11 FAULT ALARM
MM/DD/YY	1H:MM:SS	PM	BLWR TIMEOUT

Clear Alarm List Ack All System Reset Return

ALARM MESSAGES

ALARM RESET – You will receive this alarm when one of the following alarm conditions have been met; FAIL TO START, BLWR TIMEOUT, TIME TOO SHORT, SOOTBLOWER MALFUNCTION, EVEN BLWR OVERLOAD/ODD BLWR OVERLOAD, EVEN BLWR OVERLOAD/ODD BLWR STALL or RAPID DRAIN ILOCK. When the system conditions that caused alarms have been cleared, selecting ALARM RESET will clear the system so that normal operations can continue.

ALARM RESET will not appear until the Sootblowers have been retracted.

FAIL TO START – When the system commands a Sootblower to operate and it does not actually leave its rest position, FAIL TO START will be displayed on the Control Screen, you will receive a pop-up warning indicating SOOTBLOWER SYSTEM TROUBLE and FAIL TO START. This alarm will cause the operating Sootblower to retract from the Boiler and the Sootblower sequence to be suspended. After all Sootblowers have retracted and you see the ALL RETRACTED message displayed on the screen, ALARM RESET will be displayed. You must acknowledge these alarms before proceeding. These alarms will not clear until the problem has been fixed. When the problem has cleared, press ALARM RESET to continue operations. The alarms are also recorded in the Alarm Listing screen.

STEAM PRESS LO – This displays the current status of the steam header pressure. When the system requires the steam header to be pressurized and the pressure is low, STEAM PRESS LO will be displayed on the Control Screen, you will receive a pop-up warning indicating SOOTBLOWER SYSTEM TROUBLE and STEAM PRESS LO. You must acknowledge these alarms before proceeding. These alarms will not clear until the problem has been fixed. The alarms are also recorded in the Alarm Listing screen.

BLWR TIMEOUT – A Sootblower requires a fixed amount of time to operate. This is because of mechanical gear ratios and its overall length. When a Sootblower does not fully retract from the Boiler in a preset time, you will receive a pop-up warning indicating SOOTBLOWER SYSTEM TROUBLE and BLWR TIMEOUT. This alarm will cause the operating Sootblower to retract from the Boiler and the Sootblower sequence to be suspended. After all Sootblowers have retracted and you see the ALL RETRACTED message displayed on the screen, ALARM RESET will be displayed. You must acknowledge these alarms before proceeding. These alarms will not clear until the problem has been fixed. When the problem has cleared, press ALARM RESET to continue operations. The alarms are also recorded in the Alarm Listing screen.

TIME TOO SHORT – When a Sootblower starts its reverse travel less than 60 seconds from the beginning of the forward travel, you will receive a pop-up warning indicating SOOTBLOWER SYSTEM TROUBLE and TIME TOO SHORT. This alarm will cause the operating Sootblower to retract from the Boiler and the Sootblower sequence to be suspended. After all Sootblowers have retracted and you see the ALL RETRACTED message displayed on the screen, ALARM RESET will be displayed. You must acknowledge these alarms before proceeding. These alarms will not clear until the problem has been fixed. When the problem has cleared, press ALARM RESET to continue operations. The alarms are also recorded in the Alarm Listing screen.

EVEN BLWR OVERLOAD/ODD BLWR OVERLOAD – During the operation of a Sootblower, its electrical motor will normally run smoothly and quietly and consume a small amount of electrical power. If the amount of electrical power consumed becomes excessively high an OVERLOAD signal will be initiated. When a motor overload signal is detected, the transfer circuits will be deactivated and you will receive a pop-up indicating either EVEN BLWR OVERLOAD or ODD BLWR OVERLOAD, depending on which motor has the problem. This alarm will cause the operating Sootblower to retract from the Boiler and the Sootblower sequence to be suspended. After all Sootblowers have retracted and you see the ALL RETRACTED message displayed on the screen, ALARM RESET will be displayed. You must acknowledge these alarms before proceeding. These alarms will not clear until the problem has been fixed. When the problem has cleared, press ALARM RESET to continue operations. The alarms are also recorded in the Alarm Listing screen.

EVEN BLWR STALL/ODD BLWR STALL - When a Sootblower becomes stalled, it will automatically stop at that point and you will receive a pop-up indicating either EVEN BLWR STALL or ODD BLWR STALL, depending on which

motor has the problem. This alarm will cause the operating Sootblower to retract from the Boiler and the Sootblower sequence to be suspended. After all Sootblowers have retracted and you see the ALL RETRACTED message displayed on the screen, ALARM RESET will be displayed. You must acknowledge these alarms before proceeding. These alarms will not clear until the problem has been fixed and the magnetic overload relays have been reset. When the problem has cleared, press ALARM RESET to continue operations. The alarms are also recorded in the Alarm Listing screen.

RAPID DRAIN ILOCK – This indicates that a RAPID DRAIN has occurred. In a RAPID DRAIN situation, the steam valve will be closed, any Sootblower that is in the boiler will be retracted, and the system will be locked out until the RAPID DRAIN contact clears and the ALARM RESET button is selected.

SOOTBLOWER MALFUNCTION – This is a Watchdog Alarm that indicates if one of the Sootblowers has a malfunction. It monitors the retract position and will alarm if one of the limit switches does not go to the rest position at least every five minutes.

This alarm will generate a pop-up warning indicating SOOTBLOWER MALFUNCTION. This alarm will cause the operating Sootblower to retract from the Boiler and the Sootblower sequence to be suspended. After all Sootblowers have retracted and you see the ALL RETRACTED message displayed on the screen, ALARM RESET will be displayed. You must acknowledge these alarms before proceeding. These alarms will not clear until the problem has been fixed. When the problem has cleared, press ALARM RESET to continue operations. The alarms are also recorded in the Alarm Listing screen.

OOS - When a Sootblower is put Out of Service (OOS), an alarm will be triggered. This will confirm to the Operator that the Sootblower was actually placed Out of Service. This alarm message is a notification message only. It does not halt operations.

WATER WASH MODE – This indicates that the system is in Water Wash Mode.

HELP SCREEN – PAGE 1

This screen gives a brief overview of the two Steam Modes.

#4 RECOVERY BOILER SOOTBLOWER HELP PG 1 OF 2
MM/DD/YY 1H:MM:SS PM

STEAM MODE CONTINUOUS

Selecting this target will set the Steam Mode Selector to "AUTOMATIC". When the Steam Mode Selector is in "CONTINUOUS" the steam header valve will remain "OPEN" unless there is a boiler trip condition.

STEAM MODE AUTOMATIC

Selecting this target will set the Steam Mode Selector to "CONTINUOUS".

The Steam Header Valve can be OPENED in three ways:

- (1) Steam Mode Selector in "CONTINUOUS"
- (2) Selecting "SEQUENCE START" AND Steam Selector in "AUTOMATIC".
- (3) Sequence in "CONTINUOUS" and Steam Selector in "AUTOMATIC".

The Steam Header Valve can be CLOSED in two ways:

- (1) A Boiler Trip Alarm
- (2) All sequences "FINISHED" AND Steam Selector in "AUTOMATIC".

See Page 2 for Sootblower Sequence Information.

PREV	OOS	CONTR
PG 2	BLWR	ALMS
	LS	

Configuration Screen - Authorized Access Only
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CLEAR SCREEN

HELP SCREEN PAGE 2

This screen shows the details of the various Sequences.

#4 RECOVERY BOILER SOOTBLOWER HELP PG 2 OF 2
MM/DD/YY 1H:MM:SS PM

THE SOOTLOWER SEQUENCES ARE USER DEFINABLE. THE FOLLOWING ARE THE SEQUENCES CURRENTLY DEFINED:

SEQUENCE 1 IS ALL OF THE SOOTBLOWERS BLOWING IN ASCENDING SEQUENTIAL ORDER.

SEQUENCE 2 IS THE ECONOMIZER SEQUENCE (1-32, THEN 1-52).

SEQUENCE 3 IS THE GENERATOR PLUGGING SEQUENCE (5, 6, 7, 8, 15, 16, 17, 18, 25, 26, 27, 28, 1-52)

See Page 1 for Steam Mode Information.

PREV	QOS	CONTR
PG 1	BLWR	ALMS
	LS	

CLEAR SCREEN

CONCLUSIONS

By transferring the sootblowing control from the pre-existing stand-alone sootblower panel and its associated hard-wired field devices to the redundant PLCs and DCS, the plant saved resources (i.e.; steam) and reduced plant operating costs significantly. By operating in either Steam Mode Continuous or Continuous Cycle mode, and utilizing the strategic sootblowing sequences, the plant only blows soot when it is needed, and only in the necessary locations. The automated sootblowing improves boiler heat rate, minimizes soot accumulation, improves overall boiler efficiency, and balances blowing sequences. The plant is able to avoid unnecessary steam usage and opacity spikes, plant equipment life was extended, and the plant now avoids forced outages due to soot accumulation. Further, with the sootblower optimization, the operators can use the additional real-time process data and alarm management display to schedule sootblowing sequences and optimally operate the recovery boiler; and maintenance staff can quickly find and troubleshoot failed field devices.

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