Appendix 4.2.2

KODAK BOILER #15 OPERATING PROCEDURES FOR MICRONIZED COAL REBURNING OPERATION

#15 Blr. Reburn System Control Manual

Table of Contents

Start Up of Transport Gas Fan
On #15 Blr. Reburn System

- Note: This fan should be put on as soon as the blr. goes on line. This is very important to ensure the injectors stay clear.

⇒ From #15 blr. Master Graphic Menu select TG detail (ugly brown colored icon).

⇒ From this graphic select control icon @ bottom of graphic. (colored gray).

⇒ This brings up #15 blr. reburn transport gas system. Select both E/W bypass station controls and adjust to 20% open.

⇒ Then select the TG fan control icon (colored gray) @ bottom of the graphic (left side). This will bring up the fan start / stop graphic.

⇒ Select another work window and go to the graphic menu.

⇒ From the graphic menu, select TG detail graphic. Using the cursor select the TG fan detail icon (purple) @ bottom left side of the graphic.

⇒ This will bring up #15 blr. TG Fan Detail Graphic.

⇒ Arrange both work windows on the screen so you can start the fan and watch the dampers open and the fan actually start.

⇒ On #15 Blr. TG Fan graphic, make sure the TG Fan damper station control is in auto. Check status window on control. If not then select Damper control and select the auto button . Status window should now show auto.

⇒ Check for no permissives in.

Start Up of Transport Gas Fan
On #15 Blr. Reburn System

⇒ Select Start / Stop control and look at trip status to see if it is in. If trip status is in then select the stop button and depress and this will clear the trip.

⇒ After the trip status clears then select the start button and start fan.

⇒ The fan starts up and the dampers slowly open. Note: while dampers are moving, traveling will show up in there status windows.

⇒ Then select the control icon @ the bottom of the graphic (colored gray) and this brings up #15 blr. Reburn transport gas system controls graphic.

V cooling fans.

⇒ From this graphic select both east / west bypass station controls and adjust output % until fan averages 300 amps. Remember that as the flue gas gets hotter the fan doesn't have to work as hard and the amps can be increased accordingly (300 amp avg.).

⇒ When first starting the TG fan it would be good practice to assign a group trend and monitor the vibrations and temps., of the bearings and stator for at least 12 hours.. This fan has shown that the vibrations tend to settle out after the fan has been on for any length of time. This is comparing vibrations to the initial start up. It is speculated the the fan shaft warps from sitting any length of time especially after being hot and after it is stopped it just comes to rest and sits.

<u>These are the alarms and trips on the Transport gas Fan.</u>

1. Vibration in <u>mills</u> on motor.

A) x axis: High alarm is ~~.45~~ .50 Low alarm is -0.10 Dead Band is .20 Trip is ?

B) y axis: High alarm is .25 Low alarm is -0.10 Dead Band is ~~.20~~ .05 Trip is ?

Start Up of Transport Gas Fan
On #15 Blr. Reburn System

2. Vibration on fan in mills.

A) x axis: High alarm is 5.0 Low alarm is -0.50 Dead Band is .20 Trip is ?

B) y axis: High alarm is 5.0 Low alarm is -0.50 Dead Band is .20 Trip is ?

3. Fan bearing temperatures.

A) Inboard High alarm is 180 F Low alarm is -5.0 Dead Band is 2.0 Trip is ?

B) Outboard High alarm is 180 F Low alarm is -5.0 Dead Band is 2.C Trip is ?

4. Motor bearing temperatures.

A) Inboard High alarm is 212 F Low alarm is ? Dead Band is ? Trip is 248 F

B) Outboard is High alarm is 212 F Low alarm is ? Dead Band is ? Trip is 248 F

5. Motor stator temperature.

A) High alarm is ? (still waiting on some of these values)

Shutdown of Transport Gas Fan
On #15 Blr. Reburn System

⇒ Note: The reason for taking the transport gas fan off should be because of blr. Coming off. If fan is coming off because of high bearing temps, flue gas leaks, stator temps or vibration, keep in mind that the Emergency Cooling Fan will start up automatically only if the Emergency Cooling fan is in auto start. Check the EC fan start graphic to verify. If EC fan is not wanted to start, then make sure on the same graphic that the EC fan start and damper control is in manual (verified by status window). This will allow the transport gas fan to stop without the EC fan starting. The emergency cooling fan isn't capable of anything more than keeping the injectors cool. Either way you still have to proceed as follows.

⇒ Make sure all the reburn systems are off and that the mills are not in warm up mode.

⇒ After reading above note, make a decision on action to take and verify. Then select graphic menu on one of the work screens. From this menu select the Transport Gas Detail icon (ugly brown).

⇒ This will bring up #15 Blr. Transport Gas Detail Graphic. From this graphic select the emergency cooling fan by using the poke field.

⇒ This will bring up the emergency cooling fan control Graphic.

Shutdown of Transport Gas Fan
On #15 Blr. Reburn System

⇒ Verify or select and change the auto / man start status of the emergency cooling fan.

⇒ From this graphic select the control icon (gray) at bottom of graphic. This will bring up #15 blr. Reburn transport gas system graphic.

⇒ From this graphic select both the east and west bypass station controls and take the output percentage to zero output. This will take the load off the transport gas fan.

⇒ From this graphic select the TG fan control icon (gray) at the bottom of the graphic. This will bring up #15 blr. Transport Gas Fan Graphic.

⇒ From this graphic verify the transport gas fan dampers are in Auto. (Shown in status window on control).

⇒ Select start / stop control and select stop button.

⇒ Fan will stop. Watch same graphic and damper status windows, (inlet and outlet) will show dampers traveling until fully closed.

⇒ Bring up another work screen and select the master graphic menu. From this graphic select the Transport Gas Detail graphic.

⇒ From this graphic select the TG Detail icon (purple). This will bring up #15 Blr. Transport Gas Detail Graphic. Resize both graphics so you can watch both as dampers open and close as fans start and stop.

Shutdown of Transport Gas Fan
On #15 Blr. Reburn System

⇒ Again if the emergency cooling fan is to remain on then select the control icon (gray) on the bottom of 15 Blr. TG Fan Detail Graphic. This will bring up #15 Blr. Reburn Transport Gas System Graphic.

⇒ From this graphic you can adjust both east and west bypass station controls to about 30% output but not to exceed 62 amps. Which is high alarm. There is an amp indication on the same graphic under the bypass station controls. This will be the required flow through the injectors, to keep them cool, and from plugging up with slag.

⇒ Also these injectors should be physically checked for pluggage every 4 hours with the emergency cooling fan on or off. If needed these injectors will have to be rodded out if they start plugging up. Follow plugged injector procedure.

⇒ <u>Important:</u> If the blr. is to remain on line with no Transport Gas fan or emergency cooling fan on, then the operator has to pay constant attention to the injector temperatures and adjust aspirating air accordingly. These 8 injectors should be on a trend. Pluggage of these injectors, is very likely.

Start-Up

#15 Blr. Micromill Warm Up Procedure

(To be done while mills are not on or in standby.)

⇒ The Trasnsport Gas Fan should already be running, if not proceed to the transport Gas fan start Up Procedure.

⇒ From #15 Blr. Master Graphic Menu, select Transport Gas System Controls "icon" (center column, 3rd from the bottom, colored in red) This brings up #15 Blr. Reburn Transport Gas System Graphic which has the East / West TG Mill Flow Controls and the East / West Micromill Bypass Station Controls on it. From this graphic, select by placing cursor into position (over controller,in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then adjust East / West TG Mill Flow Control to 8% output by (with the controller in manual) using the cursor and the left side of the trackball to adjust the up or down arrow (on controller) which will increase or decrease output percentage. This is to be done to which ever mill (East / West) is to be placed in warm up.

⇒ From this same graphic, select East / West Micromill Bypass Station Control and place cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then adjust East / West Micromill Bypass Station Control to 30% output by (with the controller in manual) using the cursor and the left side of the trackball to adjust the up or down arrow (on controller) which will increase or decrease output percentage.

⇒ Next, take your cursor to the Micro Coal Detail "icon" (purple) @ bottom of graphic and select. This brings up #15 Blr. Micro Coal Detail Graphic.

⇒ From this graphic, using the poke fields you can place the trackball cursor on the Micromill, Classifier, either starseal, or the SSV, and

Start-Up
#15 Blr. Micromill Warm Up Procedure
(To be done while mills are not on or in standby.)

click (left side of trackball). Anyone of these selections will bring up #15 Blr. East / West Reburn System Startup Graphic.

⇒ From this graphic Select micromill cooling water control and make sure the water is in Auto. If not select the control, place cursor into position (over Auto button) and click on the left side of the trackball. Next check the air valve controller to the lube oil mist system and make sure it is open. If valve is closed you have to select and put any one of the feeder or starseal controls for that Micromill in Manual by placing cursor into position (over Manual button) and click on the left side of the trackball. After control is in manual then select the East / West Micromill Air Valve Control, place cursor into position (over Open button) and click on the left side of the trackball. After the air valve is open, remember to put the feeder or starseal control back in Auto by re-selecting whichever control was placed in manual and adjusting cursor into position (over Auto button) and click on the left side of the trackball. Next, check and make sure the Demister is on. If not, select the control and place cursor into position (over Start button) and click on the left side of the trackball. (Note: the Demister is common between both mills and can be started from either).

⇒ Next, select the micromill warm-up "icon" (yellow) @ bottom center of graphic by placing cursor into position (over Icon) and click on the left side of the trackball. This brings up #15 Blr. Micromill Warm-up Graphic.

⇒ Open another work screen and go to #15 blr. Master Graphic Menu and select the Micro Mill Detail "icon" (black) center column middle of page. This brings up #15 Blr. Micro Mill Detail Graphic. From this graphic you watch what takes place when system goes into warm up.

Start-Up

#15 Blr. Micromill Warm Up Procedure

(To be done while mills are not on or in standby.)

⇒ From #15 blr. Reburn Warm Up Graphic, select East / West, Start / Stop Control, place cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Check permissives and trips, and if all are clear the status box will read "ready". Then by adjusting cursor into position (over Start button) and click on the left side of the trackball. The Warm Up Procedure will start.

⇒ By watching #15 Blr. Micromill Detail Graphic, the following takes place. The East / West SSV will open and the East / West TG Mill Flow indicator at bottom of graphic will show flow in ~~ACFM~~. KPPH

After warm-up has started the Transport Gas Fan may alarm in high amps. To reduce amps you first have to go to the #15 Blr. Micro Mill Detail Graphic and select the poke field on Either East / West TG MILL Flow Control Valves or East / West Micromill Bypass station Control Valves. This will bring you to #15 Blr. Reburn Transport Gas System Controls. From this graphic, select East / West TG Mill Flow Control by adjusting cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then adjust East / West TG Mill Flow Control (with the controller in manual) using the cursor and the left side of the trackball to adjust the down arrow (on controller) which will decrease output percentage. Adjust output percentage to maintain a kpph under 2. If Transport Gas Fan amps are still high then select East / West Micromill Bypass Station Control by adjusting cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then adjust East / West Micromill Bypass Station Control (with the controller in manual) using the cursor and the left side of the trackball to adjust the down arrow (on controller) which will decrease output percentage. This lowers the Transport Gas Flow which also lowers the Transport Gas Fan amps. The alarm for high TG Fan amps is 328 and we avg. About 300.

Start-Up

#15 Blr. Micromill Warm Up Procedure

(To be done while mills are not on or in standby.)

⇒ The status box on #15 blr. Reburn Warm Up Graphic will now show the warm-up procedure as Active.

⇒ Allow the Micromill to warm-up at least 30-40 minutes before any micromill is started. Monitor upper & lower bearing temps on the micromill detail graphic and make sure they are out of alarm before starting a micromill.

⇒ Note: What we have found through testing is that when the mills are in warm-up they seem to not trip on high vibration when started. Bearing temps. are a main contributor & the reburn system doesn't build up inside with the junk from condensing flue gas. Starseals, valves, piping etc.

Shut Down
#15 Blr. Micromill Warm Up Procedure

⇒ From #15 Blr. Master Graphic Menu, select East / West Reburn Startup "icons" (both end columns, very bottom corners, colored in yellow). This brings up #15 Blr. East / West Reburn System Startup Graphics.

⇒ From this graphic select the (yellow) icon @ bottom center of graphic by placing cursor into position (over Icon) and click on the left side of the trackball. This brings up #15 Blr. Reburn warm-up graphic. Select either East / West Micromill Warm-up Controller and place cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then by adjusting cursor into position (over Stop button) and click on the left side of the trackball. This should stop the Warm-up procedure.

⇒ Next, select the Micro Coal Detail(purple) icon @ bottom center of graphic by placing cursor into position (over Icon) and click on the left side of the trackball. This will then bring up #15 Blr. Micro Coal Detail Graphic.

⇒ From this graphic, using the poke fields you can place the trackball cursor on the East / West TG Mill Flow Controls or the East / West Micromill Bypass Station Controls. This will bring up #15 Blr. Reburn Transport Gas System Graphic. From this graphic, select by placing cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then adjust East / West TG Mill Flow Control to 40% output by (with the controller in manual) using the cursor and the left side of the trackball to adjust the up arrow (on controller) which will increase output percentage. This is to be done to which ever mill (East / West) is to be shut down from warm up.

Shut Down

#15 Blr. Micromill Warm Up Procedure

⇒ Note: The Bypass Station Control has to be increased because the transport gas flow through the mill was additional flow on that side. When the warm-up was shut down, the flow was reduced and most likely the transport gas flow is low enough to be in alarm because the flow is under a total of 25K. This is one of the permissives to overcome when a micromill is to be started. Also, after shutting down the warm-up cycle, the air valve to the lube mist system closes. The air is always to be on when the mills are off, secured for repair, or in warm-up. So proceed with next step.

⇒ Next, take your cursor to the Micro Coal Detail "icon" (purple) @ bottom of graphic and select. This brings up #15 Blr. Micro Coal Detail Graphic.

⇒ From this graphic, using the poke fields you can place the trackball cursor on the Micromill, Classifier, either starseal, or the SSV, and click (left side of trackball). Anyone of these selections will bring up #15 Blr. East / West Reburn System Startup Graphic.

⇒ Next check the air valve controller to the lube oil mist system and make sure it is open. If valve is closed you have to select and put any one of the feeder or starseal controls for that Micromill in Manual by placing cursor into position (over Manual button) and click on the left side of the trackball. After control is in manual then select the East / West Micromill Air Valve Control, place cursor into position (over Open button) and click on the left side of the trackball. After the air valve is open, remember to put the feeder or starseal control back in Auto by re-selecting whichever control was placed in manual and adjusting cursor into position (over Auto button) and click on the left side of the trackball.

East / West Micromill Start-up Procedure
#15 Blr. Reburn System

⇒ From #15 Blr. Master Graphic Menu, select East / West Reburn Startup "icon" (yellow) @ bottom corners of graphic by placing cursor into position (over Icon) and click on the left side of the trackball. This brings up #15 Blr. East / West Reburn Startup graphic.

⇒ Next, select the micromill warm-up "icon" (yellow) @ bottom center of graphic by placing cursor into position (over Icon) and click on the left side of the trackball. This brings up #15 Blr. Micromill Warm-up Graphic.

⇒ This graphic will show if mills are in warm-up, by the status box which should read Active in red. If mill isn't in warm -up the status box will read ready.

⇒ Which ever mill, East / West, is to be started, the first thing to be done is to shutdown the warm up procedure. Refer to mill warm-up shutdown procedure. If mill isn't in the warm-up and is cold , then refer to the start-up of the warm-up cycle and allow mill to warm-up for about 30-40 minutes before starting. Other wise proceed as follows.

⇒ From #15 blr. Reburn Warm Up Graphic, select East / West, Start / Stop Control, place cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then by adjusting cursor into position (over Stop button) and click on the left side of the trackball. The Warm Up Procedure will stop.

⇒ Note: When the warm-up procedure is stopped it closes the SSV and the air valve to the lube mist system. This air valve should be open at all times.

East / West Micromill Start-up Procedure
#15 Blr. Reburn System

⇒ Select East / West Reburn Startup "icon" (yellow) @ bottom center of graphic by placing cursor into position (over Icon) and click on the left side of the trackball. This brings up #15 Blr. East / West Reburn Startup graphic.

⇒ From this graphic Select micromill cooling water control and make sure the water is in Auto. If not select the control, place cursor into position (over Auto button) and click on the left side of the trackball. Next check the air valve controller to the lube oil mist system and make sure it is open. If valve is closed you have to select and put any one of the feeder or starseal controls for that Micromill in Manual by placing cursor into position (over Manual button) and click on the left side of the trackball. After control is in manual then select the East / West Micromill Air Valve Control, place cursor into position (over Open button) and click on the left side of the trackball. After the air valve is open, remember to put the feeder or starseal control back in Auto by re-selecting whichever control was placed in manual and adjusting cursor into position (over Auto button) and click on the left side of the trackball. Next, check and make sure the Demister is on. If not, select the control and place cursor into position (over Start button) and click on the left side of the trackball. (Note: the Demister is common between both mills and can be started from either).

⇒ Observe the permissives flagged in red on the left side of graphic. These have to be cleared for the mill to start.

⇒ Next, place your cursor on the Micro Mill Detail "icon" (purple) @ bottom of graphic and select. This brings up #15 Blr. Micro Mill Detail Graphic.

East / West Micromill Start-up Procedure
#15 Blr. Reburn System

⇒ From this graphic, and by using the poke fields on East / West Mill, you can select by placing the cursor on the Bypass station control or the mill flow control and click on the left side of the trackball. Either one of these poke fields will bring up #15 Blr. Reburn Transport Gas System Graphic.

⇒ From this graphic, on mill to be started, select East / West Micromill Bypass Station Control and place cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then adjust East / West Micromill Bypass Station Control to 45% output by (with the controller in manual) using the cursor and the left side of the trackball to adjust the up or down arrow (on controller) which will increase or decrease output percentage.

⇒ Also From this graphic, on mill Not to be started you don't have to do anything because it should be in the warm-up cycle. If it isn't then you have to proceed as follows. Select East / West Micromill Bypass Station Control and place cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then adjust East / West Micromill Bypass Station Control to 45% output by (with the controller in manual) using the cursor and the left side of the trackball to adjust the up or down arrow (on controller) which will increase or decrease output percentage.

⇒ From this same graphic, on mill to be started, select East / West TG Mill Flow Control by placing cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Adjust this controller to 45% (With the controller in manual), using the cursor and the left side of the trackball to adjust the up or down arrow (on controller) which will increase or decrease output percentage.

East / West Micromill Start-up Procedure
#15 Blr. Reburn System

⇒ Next place the cursor over the Overfire Air Controls "icon" (looks like a control colored gray) and click with the left side of the trackball. This brings up #15 Blr. Reburn Overfire Air controls Graphic.

⇒ From this graphic, select both East & West OFA flow Station Controls by placing cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then place cursor into position (over Auto button) and click on the left side of the trackball. (Both controls are to be in auto.

⇒ Next select the Overfire Air Flow Control (center) by placing cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then Adjust this controller to 15% output by (With the controller in manual), using the cursor and the left side of the trackball to adjust the up or down arrow (on controller) which will increase or decrease output percentage. This output percentage should give you a total overfire airflow of approximately 30 KPPH. This shows as process signal (in green) on controller. Overfire air <5KPPH is new permissive. We do know that the overfire air leaks by the dampers approximately 20Kpph.

⇒ Now, on which ever mill is to be started, you place the cursor on east or west reburn start-up "icon" (yellow) at bottom of graphic and click on the left side of the trackball.

⇒ This will bring up East / West Reburn System Startup Graphic. From this graphic first check all the permissives on the left side of the graphic to see if anything is highlighted in red. If so, then that

East / West Micromill Start-up Procedure
#15 Blr. Reburn System

particular permissive has to be cleared for system to start. If all are clear then the next thing to do is select the E/W micromill Sequence Start / Stop controller by placing cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then by adjusting cursor into position (over Stop button) and click on the left side of the trackball. If you look at the bottom right corner of the graphic there is a E / W MCML TRIP Status box. In this box the mill should show a trip indication. By clicking on the stop button on the Start / Stop Sequence Controller, it resets the trip on the micromill. Status box then reads ready.

⇒ Next you select the E / W Classifier Starseal, E / W MCML Starseal, and the Air Fail Reset controls and reset all by placing cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then place the cursor on the reset button and click on the left side of the trackball.

⇒ You now should be ready to reburn. All permissives should be met. The trip status should be reset. All controls should be in auto. The oil demister should be on. The cooling water valve should be in auto. The air valve should be open (if not then the valve should open when the start button is activated on mill to be started, watch whenstarted). If there is a trip alarm still highlighted on the right side of the graphic just ignore for now because it will clear when mill is started.

⇒ Now you select E/W micromill Sequence Start / stop controller by placing cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then by adjusting cursor into position (over Start button) and click on the left side of the trackball.

East / West Micromill Start-up Procedure
#15 Blr. Reburn System

⇒ After pressing start sequence button the following takes place.

⇒ The air valve opens.

⇒ The SSV valve (Safety Stop Valve) will open & the mill timer will start counting backwards from 3 minutes. (Observe on another window with the mill detail graphic selected. Here everything can be watched as it's sequencing).

⇒ After 3 minutes the mill starts up and will wind up to 3000 rpm's.

⇒ 1.3 minutes after the mill starts the Classifier starseal starts up.

⇒ 2.1 minutes after the Classifier starseal starts then the Feeder starseal starts up.

⇒ Then from this graphic select the mill detail "icon" (purple) bottom left corner of graphic by placing the cursor over it and clicking on the left side of the trackball. This will bring up #15 Blr. Micro Mill Graphic.

⇒ From this graphic and by using the poke fields, select the E / W mill flow control by placing the cursor on the control and clicking on the left side of the trackball. This will bring up #15 blr. Reburn Transport Gas System graphic.

⇒ You then select E / W TG Mill Flow Control by placing cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then place cursor into position (over Auto button) and click on the left side of the trackball. The kpph (thousand pounds per hour) will come down to the set point of 11kpph in white on controller which will show in green which is the process. This step can be done right

East / West Micromill Start-up Procedure
#15 Blr. Reburn System

after the mill starts up and your waiting for the classifier and mcml starseals to sequence through there timers.

Then adjust the bypass Station on running side to 25% open to prevent upsets when the mill is shut down the next time.

⇒ From this graphic select the Reburn MSTR/Coal Controls "icon" (looks like a control, colored gray) at bottom right side of graphic, by placing the cursor on it and click with the left side of the trackball. This brings up #15 Blr. Reburn Master/O2/Coal Graphic.

⇒ From this graphic select East / West Reburn Coal Feeder Station Control by placing cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. You then proceed to adjust the controller to 12% output by (with the controller in manual) using the cursor and the left side of the trackball to adjust the up arrow (on controller) which will increase output percentage. This will start the screw feeder. The rule of thumb is that on both E/W coal flow controls for every 12 % output on controller you get 1K# of coal flow. Note: You increase coal flow 1K# every minute until desired flow rate. This control is limited with a ramp rate of coal flow when controls are in auto. What takes place is the overfire air and blr. Reburn master both will increase to desired reburn master equivelent to blr. Master. The coal flow rate will increase, just not as fast , so the mill isn't overloaded. This means, on full blr. Load, the ramp rate would take 8 minutes for the mcml to get to a coal flow of 8KPPH. This system is set up for the cyclones to take the brunt of any increase or decrease of blr. Load. The the reburn coal flow will slowly adjust to blr. load.

⇒ Right about this time the start sequence incomplete alarm comes in. What brings this in is a timer of 9 minutes that starts counting down when the first start button is pushed. This timer can be observed from the start up graphic under the mcml feeder timer. This timer also has a status box that will read incomplete at this time. All this is telling you is that coal flow rate wasn't established before timer

East / West Micromill Start-up Procedure
#15 Blr. Reburn System

⇒ timed out. This alarm will clear when coal flow rate is increased to 2K#.

⇒ Most important!!!! The coal flow vs overfire air flow curve isn't used any more. If the overfire air control is to be used in manual, then you have to calculate the next increment of overfire air flow to reburn coal flow increase. For example, you want to increase the reburn coal flow from 1k# to 2K#. You then take the 2K and multiply by 10.08 (theoretical air) and multiply again by 1.15 (excess air). The sum of this calculation is the total overfire air flow needed (or set point for the overfire air flow controler) for the reburn coal flow increase. Overfire air flow is always increase first. If you don't want to fool around then just place the overfire air control in auto as long as the set point and process are close.

⇒ Place Reburn Controls in Auto:

1. Overfire Air Flow control
2. East / West Reburn Coal Feeder Station
3. Reburn Coal Flow Control
4. Reburn Master Bias Control
5. Overfire Air O2 Trim Control

The cyclone O2 trim controls are both O/S and the O2 is now controlled by the overfire air O2 Trim Control which is on the #15 Blr. Reburn Overfire Air Graphic. This control, trims the overfire air to the reburn system by maintaining the average blr. O2 set point. This is part of the new O2 system and it now has a overall O2 avg. value and this value is the process variable for the overfire air trim control while reburning. Also, there is an east / west excess air station which is located on the blr. east / west cyclone graphics. This control is usually adjusted between 5% and 7% to increase the air flow to the cyclones depending on the coal btu's. This control is only in service while reburn system is operating. The cyclones O2 trim

control is O.O.S. (out of service). This control is in service and functional when reburn is off.

East / West Micromill Shutdown Procedure
#15 Blr. Reburn System

⇒ Decide on micromill to be shutdown. If only one mill is running, O.K., if both are running, select one.

⇒ Most Important: Remember that when shutting down a micromill you always reduce Reburn Coal Flow first then Over Fire Air Flow. Never to reduce Overfire Air Flow under 5K#, (permissive to keep reburn system running) this should never happen because the dampers leak by about 20K.

⇒ From #15 Blr. Master Graphic Menu, select Reburn Mstr / Coal Controls Icon, (located in first column 2nd red colored) by placing the cursor on the icon and click on the left side of the trackball.

⇒ This brings up #15 Blr. Reburn Master / O2 / Coal Graphic.

⇒ From this graphic select East / West Reburn Coal Feeder Station, place cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. You then proceed to adjust the controller by (with the controller in manual) using the cursor and the left side of the trackball to adjust the down arrow (on controller) which will decrease output percentage. For every 12 percent off the output you get an approximate 1K# reduction of reburn coal flow. Reburn coal flow can be watched on the process (green) output on this controller.

⇒ If controls are in auto then as blr. Load decreases the reburn coal flow and overfire air will decrease also. If the controls are in manual then after every 1 kpph of coal reduction you have to calculate the reduction of the equivalent overfire air by taking the remaining reburn coal flow total and multiply by 10.08 (theoretical air) and

East / West Micromill Shutdown Procedure
#15 Blr. Reburn System

multiply by 1.15 (excess air) and the sum is the required overfire air for the remaining coal flow.

⇒ Note: You only reduce the Reburn Coal Flow 1K# and the equivalent Overfire Air Flow (do not go lower than 5K# {permissive}) every 10 minutes, to make sure the cyclones settle out and re-adjust to load demand.

⇒ To do this you select the Overfire Air Controls "icon" (looks like a controller on graphic colored in gray at bottom of graphic), by placing the cursor over the icon and click on the left side of the trackball.

⇒ This brings up #15 Blr. Reburn Overfire Air Graphic.

⇒ From this graphic select the Overfire Air Flow Control by placing cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. You then proceed to adjust the controller (with the controller in manual) by using the cursor and the left side of the trackball to adjust the down arrow (on controller) which will decrease output percentage. Observe the process output (in green) on controller. This is the total overfire air flow in the blr. Adjust output Percentage to desired equivalent Overfire Air Flow shown on graph. Don't go any lower than 5Kpph#.

⇒ Repeat the last six bullets until all the Reburn Coal Flow is off the Micromill to be shutdown.

⇒ After all Reburn Coal Flow is off on micromill to be shutdown, then select Mill Detail icon (purple) From #15 Blr. Reburn Master / O2 / Coal Graphic.

East / West Micromill Shutdown Procedure
#15 Blr. Reburn System

⇒ This brings up #15 Blr. Micro Mill Detail Graphic.

⇒ From this graphic by using the poke fields on East / West Reburn System , you can select by placing the cursor on the Micromill, Classifier, micromill starseal, and classifier starseal and click on the left side of the trackball. Either one of these poke fields will bring up #15 Blr. East / West reburn System Startup Graphic.

⇒ Next select the East / West Micromill Sequence Start / Stop Controller by placing cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Then by adjusting cursor into position (over Stop button) and click on the left side of the trackball. This starts a cleanout cycle.

⇒ The following takes place:

1. Micromill Starseal stops running
2. 10 minute timer on same graphic (stop sequence at bottom of graphic) will begin to count down.
3. During this cleanout the micromill still is running and the classifier starseal is still running. The mill and classifier are being emptied and purged of any micronized coal.
4. After timer is complete the mill should automatically shutdown.

⇒ Micromill shuts off and the Micromill Detail Graphic shows it spinning. It takes approximately 7 minutes to stop. When mill comes to rest then the zero speed alarm comes in. Note: When running the micromill spins 3000 RPM'S and the weight of the back plate and blade is 750#'S.

East / West Micromill Shutdown Procedure
#15 Blr. Reburn System

⇒ If at this time both micromills are off, and the micromills have gone through the cleanout cycle, then the next thing to do is get all the Overfire Air out of the blr.

⇒ From #15 Blr. Reburn Transport Gas System Graphic, select the Overfire Air Controls "icon" (looks like a controller on graphic colored in gray at bottom of graphic), by placing the cursor over the icon and click on the left side of the trackball.

⇒ This brings up #15 Blr. Reburn Overfire Air Graphic.

⇒ From this graphic select the Overfire Air Flow Control by placing cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. You then proceed to adjust the controller (with the controller in manual) by using the cursor and the left side of the trackball to adjust the down arrow (on controller) which will decrease output percentage. Observe the process output (in green) on controller. This is the total overfire air flow in the blr. Adjust output Percentage to zero.

⇒ Note: If the Overfire Air Flow was left on and there was no reburning, then the 30K# of air going through the Overfire Air Nozzles is air that is being robbed from the cyclones. Make sure the controller output percentage goes to zero. This makes the O2's at the cyclone lower than set point and could possibly effect tapping.

East / West Micromill Shutdown Procedure
#15 Blr. Reburn System

⇒ The SSV (Safety Shutoff Valve) closes.

⇒ The East / West Micromill Bypass Valve opens.

⇒ Remember Micromill Transport Gas Flow Controller is in Auto and will go to 100% open because SSV closed and no flow will be going through the micromill.

⇒ Select the Micro Coal Detail icon (purple) and click on the left side of the trackball. This brings up #15 Blr. Micromill detail. Use the poke field and placing the cursor on either East / West TG Flow Control and click on the left side of the trackball. This will bring up #15 Blr. Reburn Transport Gas System Graphic.

⇒ Select East / West TG Mill Flow Control by placing cursor into position (over controller, in yellow box) and click on the left side of the trackball. The controller outlines in red when selected. Adjust this controller to 12% (With the controller in manual), using the cursor and the left side of the trackball to adjust down arrow (on controller) which will decrease output percentage. This will setup valve position for the warm-up procedure.

⇒ Also keep in mind, if the mill that was just shutdown was the only mill running, then the East & West Average O2 Cyclone Trim Control which is on the Reburn Master / O2 / Coal Graphic (this control, controls the two East & West O2 Bias Station Controls which were trimming the fuel to each cyclone) switches back to the original cyclone individual O2 controls. Check and make sure controls are in auto.

East / West Micromill Trip
On #15 Blr. Reburn System

⇒ During a micromill trip everything shuts down and closes.

⇒ The SSV closes

⇒ The screw feeder goes to zero output and will remain @ zero when restarted.

⇒ Bypass stays closed.

⇒ The micromill stops, micromills starseal stops, and the classifier starseal stops.

⇒ The mill flow controller still in auto will go to 100% open. Place controller in manual and back it down to 45 % output for the mcml to restart.

⇒ Over fire air is in manual and will still be on and equivalent to whatever coal flow rate was at time of trip.

⇒ Reduce over fire air flow to 30K#'s for restart which is start up permissive.

⇒ Check micromill trips on the left side of the graphic (reburn start up graphic) to see what caused the trip. The first out is outlined in red with a one in a red circle.

⇒ Trips that would discourage reburn startup on that mill are: mcml vibration trip & Mcml motor stall.

⇒ The micromill will have to go through a cleanout before starting reburn again or placing mill in warm up.

East / West Micromill Trip
On #15 Blr. Reburn System

⇒ We also have found that when the reburn system trips due to going to oil on either east / west cyclones everything shuts down. This includes the mcml bypass valve. This valve doesn't open again until you select the East / West mcml E-Trip Control (emergency) & select trip button. This should reset the bypass valve and valve should open.

⇒ If in doubt, place micromill in warm up and place back up micromill in service.

51 Day Test, Daily Operating Concerns:

Blr. Load vs. Nox. Alarm, see graph in operating manual, index # 13.

Blr. Load vs Reburn Coal Flow see graph in operating manual, index #13.

Maintain overfire air O2 trim control from 2.5 -3.0%.

The excess air controls on the cyclones adjust no lower than 5% (call Bruno or Kevin first if there appears to be a need).

Operators are responsible for the L.O.I. samples, taken once a day after the 1pm sootblow and before the 5pm sootblow. These sample bottles are to be labeled and data filled in completely. Samples are to be stored in control room. These samples are eventually being sent to Consol for analysis.

During this test, nothing can be taken for granted. Operating this reburn system in automatic could be a great challenge at times. It's almost like firing another furnace in the same blr. Please take the extra time to constantly check and compare reburn performance to projected graphs.

If there are any questions or concerns feel free to call Bill Newman @ 334-3276.

#15 Blr. Reburn Changes (May 28, 1998)

➔ Gentlemen there have been some changes on the reburn system that you all should know.

1. The transport gas flow has been changed from ACFM (actual cubic feet minute) to KPPH (thousand pounds per hour).
2. The tg mill flow set point which was 3900 ACFM is now 11.0 KPPH.
3. The tg mill flow low alarm was 2500 ACFM and is now 7.5 KPPH.
4. The low tg flow trip alarm was > 2425 Acfm and is now 7.0 KPPH.

➔ The Nox. Alarm is now variable, based on blr. Load.

	Steam Flow	Nox
1.	400	.60
2.	380	.65
3.	370	.72
4.	360	.80
5.	350	.90
6.	340	1.0
7.	330	1.05

This means that from now on if the Nox. Is in alarm at any given load , or the Nox. Is lower than the corresponding curve (Nox vs. Blr. Load) then the reburn coal flow should be biased ahead or behind to maintain Nox. Limit.

➔ Overfire Air O2 Trim control

The new O2 system now has a overall O2 avg. Value and this is now the process variable for the overfire air trim control when reburning.

➔ The old O2 probes are no longer being used and will be dismantled at a future date. The purge control for the old O2 probes has been deleted from the cyclone graphs. There is no more purging of the O2 controls because the new O2 system goes through a daily calibration.

Control Changes on #15 blr.

1. New Control-- Overfire Air O2 Trim Control which trims the overfire air while reburn is running ..
2. The overfire air graphic has been modified. These are the controls as seen: Overfire air O2 trim control, Overfire air flow control, East OFA flow station, West OFA flow station, East outer OFA damper station, East inner OFA damper station, West inner OFA damper station, & West outer OFA damper station.
3. Note: The excess air control is still in service controlling excess air to the cyclones when reburning.
4. When reburn isn't running the overfire air O2 trim control & excess air control both go o.o.s (out of service) & turn gray colored. The cyclone O2 trim controls both east and west are returned to service and trimming the fuel on the cyclones.
5. Another change is to the cyclone coal feeder controls both east and west, has a low limit of 10%. These controls will not go below 10% even when the control is in manual. The only way to get the feeder to zero is to stop the control with the stop button. This was done to prevent a possible mistake like last time when the master went to zero and tripped the blr. You also have to remember that when the feeder is started @ any time it will start with the control at 10%. This will be anytime, when starting up the blr. and when going back to coal after a starseal pluggage.

Permissive Changes

1. TG flow is now a total of 25K (it use to be <10 K on both east and west). <25 K will trip the reburn or will prevent the reburn from starting.
2. Overfire air flow <5K (it use to be <13K both east and west). <4K will trip the reburn or will prevent the reburn from starting.

#15 Blr. Reburn System Controls in Automatic

1) Listed here is the control scheme on #15 blr. Reburn system as of 04/30/98. Remember there will be a few changes made in the near future so none of this is in concrete.
2) If your not already aware there were three changes made to three of the graphics. They are: (1) The reburn master graphic no longer has a average O2 controller. (2) The transport gas graphic no longer has the heater controls on it because there are no heaters anymore. (3) The east and west cyclone control graphics now have an excess air control instead of the O2 bias control.

Before going any further lets familiarize ourselves with a few definitions.

Theoretical Air: The exact quantity (100%) of air required to provide the perfect amount of oxygen for combustion with no losses and no excess O2 (example: the O2 for a combustion process operating at theoretical air would be 0.0%, this is sometimes called theoretical O2). The theoretical air required for one pound of fuel will vary with fuel type because of the different percentages of each combustible element.

Excess Air: The air quantity delivered to the combustion system that is greater than that required for theoretical combustion. For example, 10% excess air is 10% more air than theoretically needed. Because ideal combustion cannot exist, some amount of excess air is always required. Excess air is not the same as O2. The amount of O2 in 10% excess air would be about 2% during the combustion of coal or natural gas. The relationship between the percent O2 and the percent excess air can be found on the graph posted on the partician.

Total Air: The amount of theoretical air plus the excess air delivered to the combustion equipment. For instance, 10% excess air is 110% total air.

Stoichiometric: Another term for theoretical air.

Stoichiometry: A term for the ratio of total air quantity delivered to a combustion divided by the theoretical amount required. For example, a combustion process operating at theoretical air would have a stoichiometry of 1.0, (100/100) while a process operating at 110% total air (10% excess) would have a stoichiometry of (110/100) or 1.1. In the same fashion, if only 90% of the theoretical air is delivered to the combustion equipment then the stoichiometry is (90/100) or .9. When the stoichiometry falls below 1.0 the term sub-stoichiometric is often used.

Overfire Air: Air that is added above the main combustion zone to bring the total air quantity added to the system up to the amount required for complete combustion. Overfire air is normally part of a staged combustion process and is normally added through overfire air ports.

So now lets talk controls:

Excess air Control:

1) This control is scaled 0 to 30 and has no bias or auto / man station. It's strictly manually increased or decreased with arrow buttons..
2) This control will be in service, always, with reburn running and out of service when reburn is off. With reburn off the cyclone O2 trim control is in service.
3) This control still controls trims the fuel.
4) Here is the sequence that takes place when this control is adjusted:

- The control setting is increased or decreased.
- This will increase or decrease the coal flow to the cyclones.
- Next the header pressure will increase or decrease.

- Then the plant master will increase or decrease to adjust for header pressure.
- Then the plant master will increase or decrease the air flow to the cyclones which will increase or decrease the O2 out of the cyclone.

5) A way to check the excess air flow is to take the coal flow X 10 which is stoichiometric and how this system is set up. Then take the air flow of the cyclone to be adjusted and divide by the stoichiometric air and the sum will be the excess air. Anything above the stoichiometry of 1.0 is excess air. Here is an example: The coal flow on the west cyclone is 14.6. Multiply this by 10. Then take the air flow to the west cyclone, which is 156. Take the 156 and divide by the 146 and the total is 1.07. Then subtract the stoichiometry of theoretical air which is 1.0. The result is .07. This is your excess air which is equivalent to 7 %.
6) Then the calculation for O2 is to take the stoichiometry figure from above and with the excess air divide by 5 (5 is used at the lower end of the O2 scale). You take the 7% and divide by 5 and the sum is 1.4 which is the O2 at the cyclones.
7) Note: If the reburn is off then the O2 trim controls will be in service and we want them in manual with an output percentage of 20% on both cyclones. This will keep coal flow even to both cyclones and the load swings should be evenly controlled on both cyclones.

<u>Reburn Master Control</u>:

1) This control has a auto / manual and bias station.
2) This control, controls the reburn fuel and the overfire air.
3) The demand signal increases as the load increases. Starting at zero K with a Blr. Load of 320K#s and 10K with a blr. Load of 440k#(the reburn coal is limited to 10k and will not go any higher). With the blr. Load at 400k# the reburn fuel will be 6.7k#s.
4) This curve was established with a NOX of 1.0 at 1K and .6 at full load of 400K#.
5) The percentage of output is on a full scale of 16 and creates the set point on the coal flow control. This is done by taking the output

percentage X 16 which gives the set point on the coal flow control. The rate of change with the coal flow control will only be 1K# a minute.

6) What usually happens is the demand increases and the output increases to the same. The set point to the coal flow control ramps up at 1K# a minute, so during higher load swings the cyclones take the swing and the reburn catches up and the cyclones will back down to 325K#s. This will repeat with any increase or decrease in load. Actually there is quite a smooth transition between the two with very little upset.

7) The ramp of 1K# of coal a minute is the same in auto and manual and with load increase or decrease.

Overfire Air Control:

1) This control has an auto / manual station.

2) The overall O2 average is the process variable for the overfire air O2 trim control.

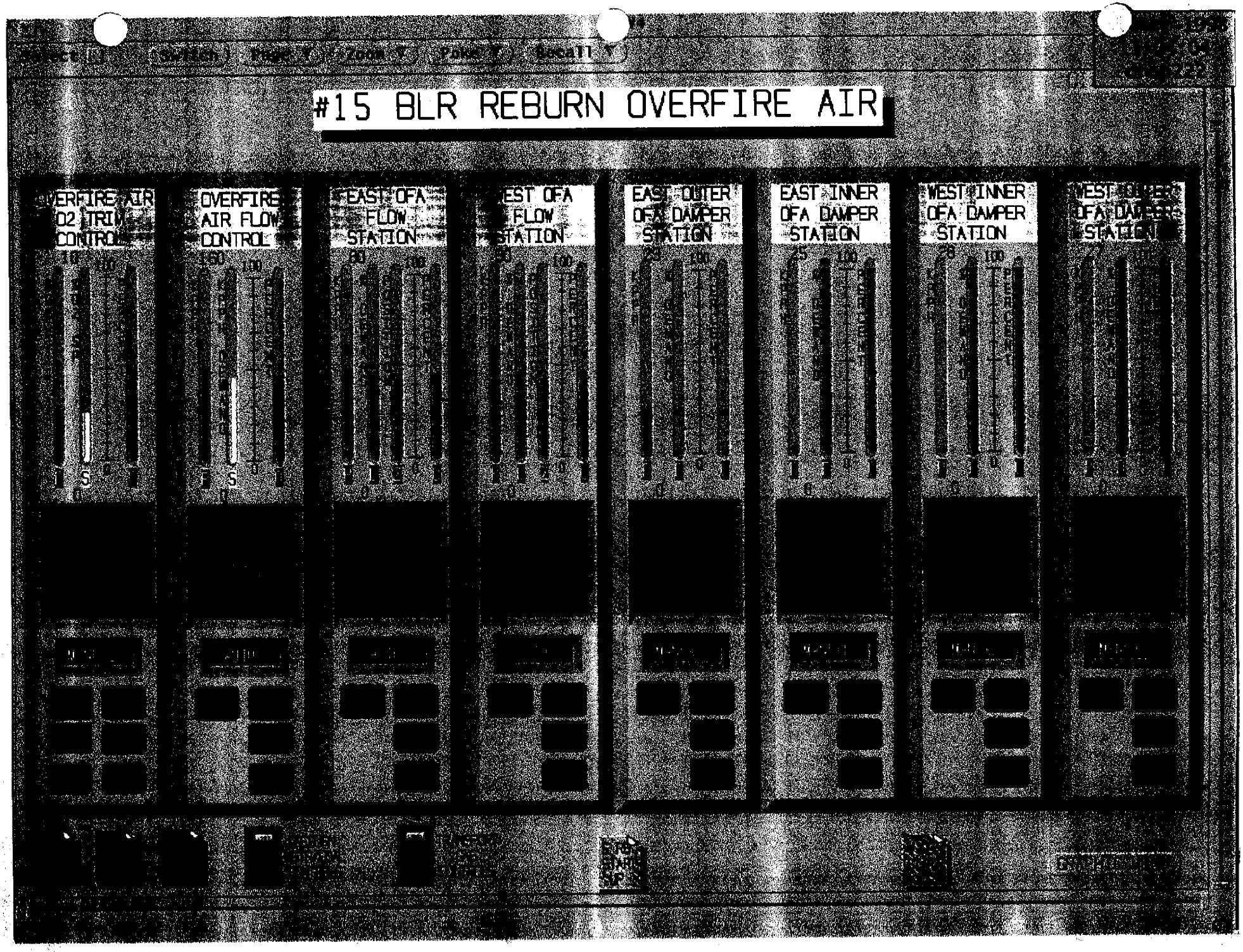
3) This is calculated by taking the reburn coal flow + cyclone coal flow X 10.08 (theoretical air) X 1.15 (excess air). 15% excess air gives you a 3% O2 for complete combustion. Then you take the total cyclone air flow and subtract from the above sum and the difference should be the set point on the overfire air control. Or you can take the output percentage on the master reburn control and multiply by 185.5 and this will give you the set point total. This calculation is used for reburn only.

4) The bias control will increase and decrease by 1K#s per increment which will increase or decrease the final blr. O2.

5) Example: O2

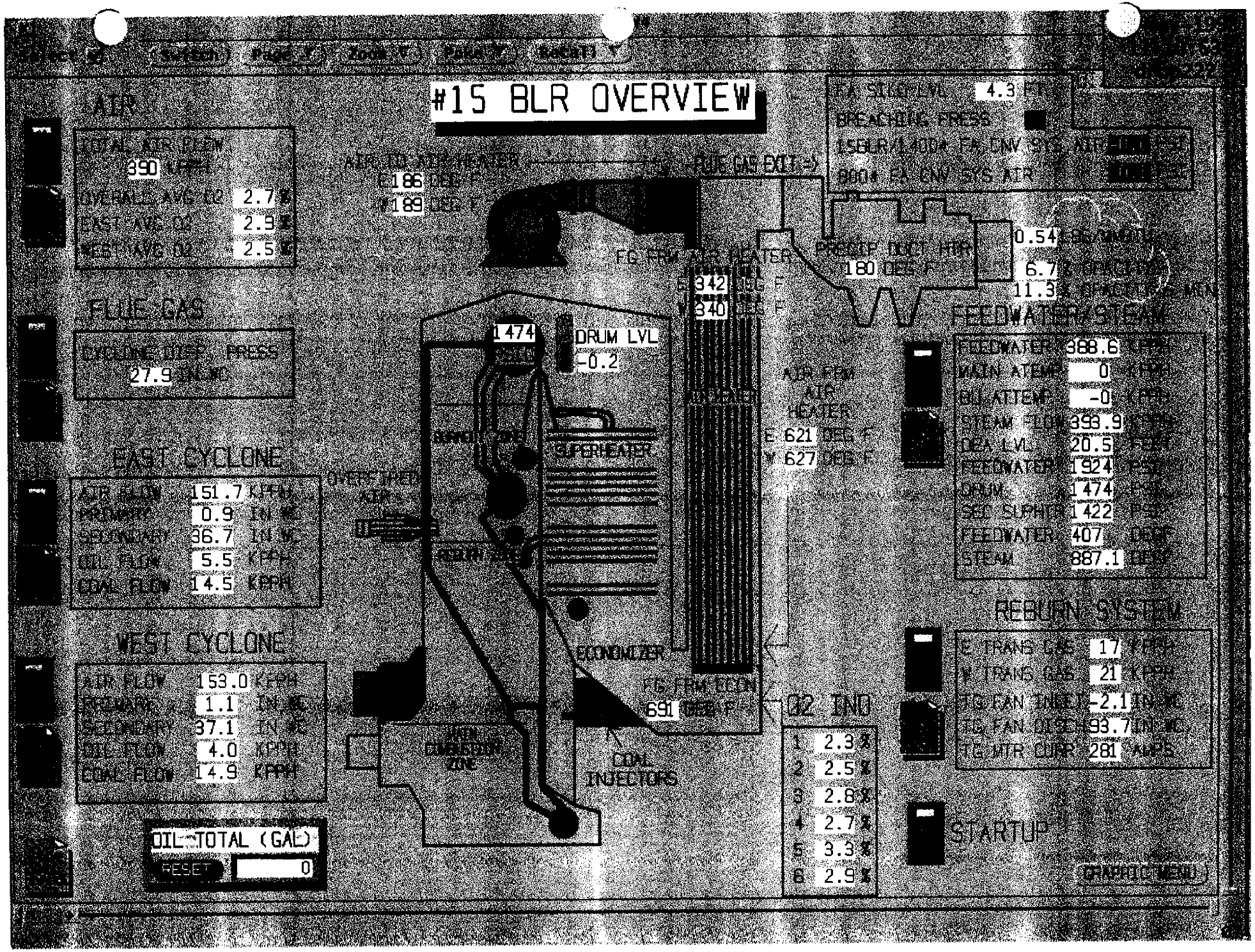
With 80% at the cyclone @ 1.4% and 20% of reburn at 3% then the average final O2 is approx. 2.5%


#15 BLR REBURN MASTER/02/COAL
REBURN
MASTER BIAS
STATION
EAST REBURN
COAL FEEDER
STATION
REBURN
COAL FLOW
CONTROL
WEST REBURN
COAL FEEDER
STATION
REBURN FLOW
19.1


#15 BLR REBURN OVERFIRE AIR
OVERFIRE AIR O2 TRIM CONTROL
OVERFIRE AIR FLOW CONTROL
EAST OFA FLOW STATION
WEST OFA FLOW STATION
EAST OUTER OFA DAMPER STATION
EAST INNER OFA DAMPER STATION
WEST INNER OFA DAMPER STATION
WEST OUTER OFA DAMPER STATION


#15 BLR WEST CYCLONE
O2 AVG
2.2
WEST CYCL EXCESS AIR STATION
WEST CYCL SEC AIR FLOW CONTRL
WEST COAL FLOW CONTROL
WEST OIL RATIO CONTROL
WEST OIL FLOW CONTROL
APPROX AIR/COAL RATIO
10.5
WEST O2 PURGE
OFF
EAST BOILER CONTROLS


#15 BLR EAST CYCLONE
E & W O2 AVG
2.3
EAST CYCL EXCESS AIR STATION
EAST CYCL 2 SEC AIR FLOW CONTRL
EAST COAL FLOW CONTROL
EAST OIL RATIO CONTROL
EAST OIL FLOW CONTROL
APPROX AIR/COAL RATIO
10.8
EAST O2 PURGE
OFF


#15 BLR OVERVIEW
AIR
TOTAL AIR FLOW
390 KPPH
OVERALL AVG O2 2.7 %
EAST AVG O2 2.9 %
WEST AVG O2 2.5 %
FLUE GAS
CYCLONE DIFF PRESS
27.9 IN WC
EAST CYCLONE
AIR FLOW 151.7 KPPH
PRIMARY 0.9 IN WC
SECONDARY 36.7 IN WC
OIL FLOW 5.5 KPPH
COAL FLOW 14.5 KPPH
WEST CYCLONE
AIR FLOW 153.0 KPPH
PRIMARY 1.1 IN WC
SECONDARY 37.1 IN WC
OIL FLOW 4.0 KPPH
COAL FLOW 14.9 KPPH
OIL TOTAL (GAL)
RESET 0
AIR TO AIR HEATER
E 186 DEG F
W 189 DEG F
FLUE GAS EXIT
FG FRM AIR HEATER
E 342 DEG F
W 340 DEG F
1474 PSIG
DRUM LVL
-0.2
SUPERHEATER
OVERFIRED AIR
SECONDARY AIR
ECONOMIZER
FG FRM ECON
691 DEG F
ASH EMBEDDIN ZONE
COAL INJECTORS
AIR FRM AIR HEATER
E 621 DEG F
W 627 DEG F
FA SILO LVL 4.3 FT
BREACHING PRESS
1&2BLR/1&2CA FA CNV SYS AIR
3&4BLR/1&2CA FA CNV SYS AIR
PRECIP DUCT HTR
180 DEG F
0.54 LBS/MMBTU
6.7 % OPACITY
11.3 % OPACITY 6 MIN
FEEDWATER/STEAM
FEEDWATER 388.6 KPPH
MAIN ATEMP 0 KPPH
BU ATTEMP -0 KPPH
STEAM FLOW 398.9 KPPH
DEA LVL 20.5 FEET
FEEDWATER 1924 PSI
DRUM 1474 PSI
SEC SUPHTR 1422 PSI
FEEDWATER 407 DEG F
STEAM 887.1 DEG F
O2 IND
1 2.3 %
2 2.5 %
3 2.8 %
4 2.7 %
5 3.3 %
6 2.9 %
REBURN SYSTEM
E TRANS GAS 17 KPPH
W TRANS GAS 21 KPPH
FG FAN INLET -2.1 IN WC
FG FAN OUTLET 3.7 IN WC
FG MTR CURR 281 AMPS
STARTUP
GRAPHIC MENU

51 Day Test, Daily Operating Concerns:

Blr. Load vs. Nox. Alarm, see graph in operating manual, index # 13.

Blr. Load vs Reburn Coal Flow see graph in operating manual, index #13.

Maintain overfire air O2 trim control from 2.5 -3.0%.

The excess air controls on the cyclones adjust no lower than 5% (call Bruno or Kevin first if there appears to be a need).

Operators are responsible for the L.O.I. samples, taken once a day after the 1pm sootblow and before the 5pm sootblow. These sample bottles are to be labeled and data filled in completely. Samples are to be stored in control room. These samples are eventually being sent to Consol for analysis.

During this test, nothing can be taken for granted. Operating this reburn system in automatic could be a great challenge at times. It's almost like firing another furnace in the same blr. Please take the extra time to constantly check and compare reburn performance to projected graphs.

#15 Boiler Reburn System
Routine Checks Per Shift

⇒ Check reburn system for any micronize coal leaks, flue gas leaks and any unusual noises.

⇒ If there are any coal leaks in the piping, submit a work request. If there is micronize coal leaking from the packing glands on valves or on the packing glands on the star seals then use a wrench and tighten up on the nuts a flat at a time.

⇒ Check oil levels on micromills. Remember that the mcml that is off is still using oil and this mcml is also your back up. This mcml must always be in the ready mode and reliable.

⇒ If the oil cans are low please fill them and don't set up the next guy.

⇒ Check for air on the micromill lubemist system. (Should be on at all times).

⇒ Check the demister tank level for draining.

⇒ Make sure micromill that is not in service is in warm up unless it's secured for repair. Air should still be on the lube mist system.

⇒ Empty tramp iron gates. This is to be done once every 24 hrs., preferably @ 1000 hrs. This is done by opening the upper gate at a consistent pace and closing at the same pace. Reason we do this is to rid of any debris that was to heavy to be carried into the micromill. Usually metals. Note: this can be done while the micromill is running. The only way the mill can trip is if both tramp iron gates are opened at the same time or you leave one gate open and happen to open the other. Either way the blr. Operator should be aware of this by observing the graphics when this takes place and be able to stop a trip from happening. Then proceed to the outside tramp iron gate

#15 Boiler Reburn System
Routine Checks Per Shift

and make sure the sock is in place and open the gate to rid of debris. This sock will fill with about a 5 gallon pail of micronize coal and whatever else comes out with it. Close gate and proceed to take sock off with the aid of a screwdriver. There are new socks in the control room with tie wraps to secure the used socks. Secure the used sock with a tie wrap. Secure a new sock in place on piping with strap. Dispose of the full sock into any 800# blr. Through the rear access door.

⇒ If there is anything in question submit a work request.

L.O.I. Sampling

1. **The L.O.I. sample should be taken once a day after the 1pm sootblow and before the 5pm sootblow. This sample is the responsibility of #15 blr. Operator and he is also responsible for filling out the data on the labels. These labels are located in #15 blr. Control room in a manila folder marked L.O.I. labels. After samples are taken we will store them in one of the sample bottle boxes when they are empty.**
2. **This sample is taken from the discharge flyash conveying line from #15 blr. Precip. To the flyash silo. The sample location is on top of the flyash silo and the sampler is a canister assembly mounted on top of the silo.**
3. **This canister consists of a funnel, a pail, a clean out gate (at the bottom), and a hinged top with several tightening knobs.**
4. **The flyash conveying line has a valve assembly welded onto the wear back of the line.**
5. **Also mounted and connected to the canister is a venturi assembly which has a air line mounted to one end and a air hose with a stainless steel tubing on the other.**
6. **This venturi assembly also has a valve where the pressurized air hose is connected with a pressure gauge near by.**
7. **To obtain a sample follow this procedure:**

- **First as you go up the stairway to the silo, stop before the door and to your right , you will see the boxes of sample bottles. Take one.**
- **Once on top of the silo take the hose with the tubing and open the valve on the flyash line and insert the tubing several times and pull it back out and wait for the line to blow freely before re-inserting the tubing all but 6 inches. Then take the air valve on the venturi assembly and crack it open and watch the pressure gauge and open the valve until the pressure goes to 15#'s. This is ready for taking the sample. This sample should be collected for 15 minutes.**
- **After 15 minutes, pull out the tubing and shut the valve on the wear back on the flyash line before your feet get dirty.**
- **Then close the air valve on the venturi assembly.**
- **Next loosen and then back off all the tightening knobs holding the top of the canister assembly.**
- **Open the top.**
- **Grab and shake the ash off the funnel and take funnel out.**
- **Then take pail out of canister and proceed to fill a sample bottle to the top and cover.**
- **Dump the remaining ash from the pail back into the canister.**
- **Wipe the sides of the canister with a gloved hand and close the top of canister.**

- **Open the gate valve at bottom of the canister and close the top and all the remaining flyash is sucked back into the silo.**
- **Close the gate valve**
- **Insert the pail with the funnel.**
- **Close the top and tighten all the knobs. Believe me they all have to be used or flyash will blow everywhere.**
- **Double check and make sure that everything is off, closed, and securely tightened for the next sample.**
- **Bring sample to #15 blr. Control room.**
- **#15 blr. Operator is responsible for sample from there.**

Securing Procedure Of Air Cannons On #15 Blr. Reburn System

Reason for securing air cannons is either maintenance on them or loss of coal flow on E / W reburn systems and an operator has to physically open access doors on stock valve to dislodge bridged over coal.

By using the PA phone or portable radios the field operator will contact #15 blr. Operator.

The field operator will then secure the air line supply guard valve to the air cannon system.

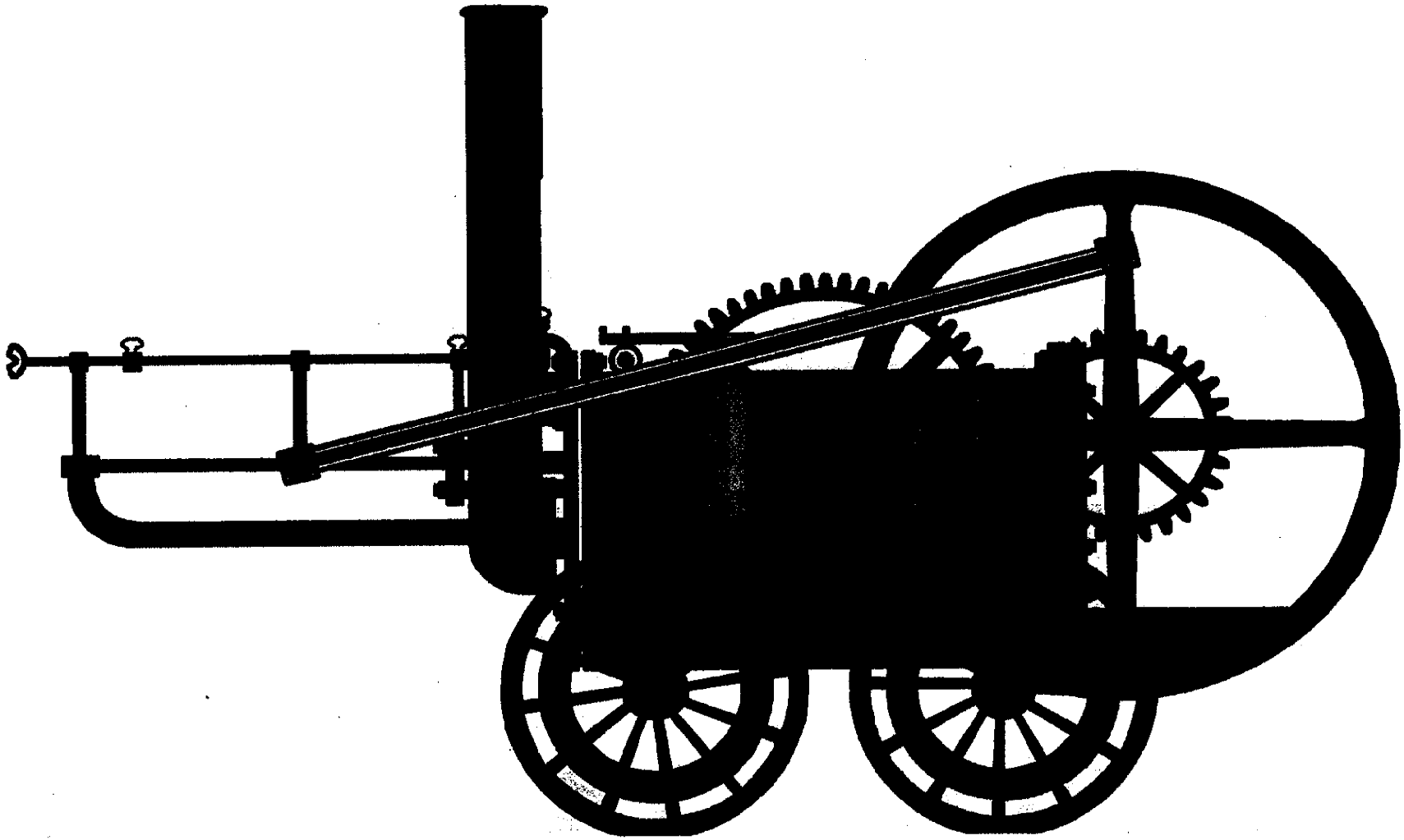
The field operator will then have the blr. operator bring up both east and west air cannon graphic and controls, and have him place the controls in manual.

While the field operator is watching the pressure gauges (Located on each yellow tank per cannon) on these air cannons he will then ask the blr. operator to manually fire these cannons with the controls.

After these cannons are discharged the field operator will then verify that the pressure is off these cannons by visual observation of the pressure gauges reading zero.

The field operator will then open an air line drip which will depressurize the air supply line.

Don't forget to check the oil!!!



Fill Lube Mist Lubricator East Micromill On #15 Blr. Micromill Reburn System

⇒ The lube mist assembly has a low level alarm to indicate when the reservoir needs to be refilled. If the operator does not shut the system down within ten minutes after the alarm, an automatic sequenced stop will occur. At the sound of the alarm , approximately two (2) hours of lubricant remains.

⇒ Note: The addition of oil to the lube mist system can be done when the MicroMill System is operating.

⇒ The lubricating oil for the lube mist system should be a synthetic based SAE 20W. This oil is a Mobil synthetic and has an ISO viscosity grade of 68. This oil is superior to all mineral oils and outperforms then in many aspects, and should be used in this application. Any oil that matches the Mobil SHC 626 specifications is adequate. This is the same synthetic oil that we use in the stoker turbines on the 800's.

⇒ You need a small crescent wrench to do this job.

⇒ Unscrew hex plug on the top of the lube mist head oil storage tank. If mill is on or off, air will be on the lube mist system. When the plug is unscrewed a vapor (mist) will come out of the fill hole. This is O.K.!!!!

⇒ Fill storage tank to 1/4 inch from the top. Use sight glass to watch level. This storage tank will hold approx. 1 gallon of oil.

⇒ Replace plug.

⇒ Note: Always make sure the Demister is on, when air is on, the Lube Mist System.

Fill Lube Mist Lubricator East Micromill On #15 Blr. Micromill Reburn System

⇒ Routine Checks:

1. Lubrication air pressure should be approx. 10#'s on the regulator (gauge) but most important is to check the capsihelic gauge and to maintain 20 inches H2O to upper and lower bearings.
2. Seal air pressure must maintain 7#'s at all times. This acts as a buffer at the bearing housing to keep flue gas away. This is hard piped before the solenoid valve so air will always stay on the bearing housing with mill on or off.

Fill Lube Mist Lubricator West Micromill On #15 Blr. Micromill Reburn System

⇒ The lube mist assembly has a low level alarm to indicate when the reservoir needs to be refilled. If the operator does not shut the system down within ten minutes after the alarm, an automatic sequenced stop will occur. At the sound of the alarm, approximately two (2) hours of lubricant remains.

⇒ Note: The addition of oil to the lube mist system can be done when the MicroMill System is operating.

⇒ The lubricating oil for the lube mist system should be a synthetic based SAE 20W. This oil is a Mobil synthetic and has an ISO viscosity grade of 68. This oil is superior to all mineral oils and outperforms then in many aspects, and should be used in this application. Any oil that matches the Mobil SHC 626 specifications is adequate. This is the same synthetic oil that we use in the stoker turbines on the 800's.

⇒ Unscrew knurled plug on the top of the lube mist head, on oil storage tank. If mill is on or off, air will still be on, the lube mist system. When the plug is unscrewed a vapor (mist) will come out of the fill hole. This is O.K.!!!!

⇒ Fill storage tank to 1/4 inch from the top. Use sight glass to watch level. This storage tank will hold approx. 1 gallon of oil.

⇒ Replace plug.

⇒ Note: Always make sure the Demister is on, when air is on, the Lube Mist System.

Fill Lube Mist Lubricator West Micromill On #15 Blr. Micromill Reburn System

⇒ Routine Checks:

1. Lubrication air pressure should be approx. 10#'s on the regulator (gauge) but most important is to check the capsihelic gauge and to maintain 20 inches H2O to upper and lower bearings.
2. Seal air pressure must maintain 7#'s at all times. This acts as a buffer at the bearing housing to keep flue gas away. This is hard piped before the solenoid valve so air will always stay on the bearing housing with mill on or off.

Lube Oil Collection Tank For Both East / West Micromill On #15 Blr. Micromill Reburn System

⇒ This tank has a sight glass mounted on its side to see present level of tank.

⇒ Tank holds 5 gallons of oil.

⇒ This oil is not re-used.

⇒ On the bottom of this tank is a drain line with a ball valve.

⇒ Drain used oil into a container.

⇒ Place used oil from container into used oil drum in oil room.

East / West Micromill Plugged Coal Chute On #15 Blr. Reburn System

⇒The East/West Micromill feeder 0 speed alarm comes in.

⇒Have the field op go up and verify at the motor control center at the E/W feeder control box to see if the LED is flashing O.L. This means the feeder tripped on overload. There is a 99% chance that the coal chute is plugged below the screw feeder.

⇒The field op should call the boiler operator and have him shutdown the plugged micromill, by selecting the "Micromill Sequence Stop" button on the start / stop graphic.

⇒ Start up the other Micromill if it is available.

⇒The micromill will go through a 10 minute cleanout and automatically shutdown. It will be approx another 10 minutes before the micromill zero speed switch alarm comes in, which means the micromill has stopped.

⇒Do not put this Micromill system in warm-up.

⇒The field op has to close the two manual knife gate valves on either E/W micromill, whichever is plugged.

⇒He then has to open the disconnects on the E/W screw feeder and the E/W MCML starseal.

⇒If manpower is low, it is allowable to call Bill Newman and/or some Coal Gang members to come in and help unplug the chute. See the call in list for phone numbers. This is really a three person job.

⇒Using a crescent wrench and socket set, remove the end section cover of E/W screw feeder. (Many bolts) It is your discretion if you still want to verify a pluggage by removing the smaller observation door on top of this screw feeder cover.

East / West Micromill Plugged Coal Chute On #15 Blr. Reburn System

⇒ NOTE: A face mask with yellow/purple combination cartridge or a bullard hood must be worn because of the flue gas leaks from the system. Do NOT even attempt to do any work without one or the other.

⇒Use vacuum or scoop coal out by hand from the plugged chute.

⇒There are steel rods used for poking the chutes located on the motor controller center level.

⇒Take the cover off the clean out on the MCML starseal.

⇒Remove the coal from the starseal by vacuum or by hand.

⇒There is an air turbine, loaned to us by the pipe fitters, that works very well on plugged chutes. The boiler gang also has a great vacuum cleaner we can use.

⇒After the chute is unplugged, check the gaskets on the covers, secure the covers in place and check for flue gas leaks.

⇒Raise the disconnects, reset the button on the control box @ the feeder control center and open the manual knife gate valves.

⇒Place MCML in warm-up for at least 30 minutes and until the bearing temperatures rise above the alarm setpoint and clear.

⇒If needed, place MCML back in service following normal startup procedure. Otherwise, leave in warm-up.