

TEXT#404

POWER 1 SYNGAS START-UP PROCEDURE
BOILER 4

REVISED 4/12/89

IN ORDER TO BURN SYNGAS ON BOILER 4, THE HYDROGEN BURNER MUST BE INSTALLED IN BURNER NUMBERS 9, 10, 11 AND 12. BURNING OF BOTH SYNGAS AND HYDROGEN OR SYN-GAS AND FUEL GAS ON THESE FOUR BURNERS IS NOT PERMITTED.

IF HYDROGEN IS BEING BURNED, MANUALLY BACK HYDROGEN FLOWS DOWN TO MINIMUM LOAD. THEN TURN THE BURNER DECK SWITCH "OFF" FOR THE APPROPRIATE BURNER PAIR.

ONCE A BURNER SET FLAMES OUT, A PURGE AND PRESSURE TEST OF THE BURNER FRONT SSO VALVES ARE INITIATED BY THE MODICON.

AT THIS TIME, IF A RELITE OF HYDROGEN BURNERS IS REQUIRED, PURGING FROM THE SYN GAS PRV STATION IS NOT REQUIRED. ONCE "LITE OFF READY" IS DISPLAYED, LITE THE IGNITOR/PILOT. THEN THAT BURNER SET CAN BE LITE FROM THE BURNER DECK START SWITCH.

IF BURNING SYNGAS IS DESIRED, PURGING FROM THE SYNGAS PRV VALVES IS REQUIRED. THIS NITROGEN PURGE WILL CLEAR HYDROGEN FROM THE PRV STATION THROUGH THE BURNERS. THIS PURGE SEQUENCE INCLUDES A PRESSURE TEST OF THE PRV ISOLATION VALVES, HYDROGEN ISOLATION VALVES AND THE BURNER FRONT SSO VALVES. (PURGE SEQUENCE 4,5,6) AFTER THIS PURGE AND PRESSURE TEST IS COMPLETE, LITE OFF ON SYN GAS IS REQUIRED WITHIN ONE HOUR OR THIS PURGE SEQUENCE MUST BE REPEATED.

BEFORE PRESSURIZING THE MAIN SYN GAS HEADER FROM POWER 2, THE HEADER MUST BE PURGED WITH NITROGEN TO ASSURE IT IS OXYGEN FREE.

PREPURGE CHECK LIST

1. USE GX-2000 COMBUSTIBLE GAS ANALYZER TO DETECT SYNGAS IN THE LINE. CHECK AT POWER 1 AND AT POWER 2 ENDS OF THE LINE.
2. CHECK FOR LIQUIDS IN THE KNOCK OUT POT.
ASSURE PIPELINE MANUAL BLOCK VALVES ARE OPEN

LOCATIONS: UPSTREAM OF PRV STATION
UPSTREAM OF KNOCK OUT POT
POWER 2 TIE POINT
DOWNSTREAM OF PRV STATION (LINE TO BURNERS 9 & 10)
(LINE TO BURNERS 11 & 12)
BLOCKS UPSTREAM AND DOWNSTREAM OF 1" BYPASS AT PWR 2

NOTE: IF SYN GAS IS DETECTED IN THE LINE, THE NITROGEN PURGE MUST BE TO THE POWER 2 GAS TURBINES OR THE LGTI FLARE.

3. IF NO SYN GAS IS DETECTED, NITROGEN CAN BE PURGED INTO THE TWO INCH VENT LINE AT POWER 2.

NOTE: THE MODICON WILL PROMPT THE OPERATOR TO CHOOSE THE PURGE SEQUENCE TO THE GAS TURBINES/FLARE OR PURGE TO THE VENT.

4. NOTIFY POWER 2 AND LGTI OF PURGING DIRECTION.

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5. CHECK HIGH PRESSURE NITROGEN HEADER PRESSURE WHEN PLAN INVOLVES PURGING INTO THE GAS TURBINES. HIGH PRESSURE NITROGEN PRESSURE MUST BE HIGHER THAN POWER 2'S SYN GAS HEADER PRESSURE. PURGE FLOW AT POWER 2 IS THROUGH THE 1 INCH BY-PASS VALVE AROUND THE 8 INCH EBV.
6. BEGIN PURGE SEQUENCE BACK TO POWER 2. PURGE SEQUENCE IS A TIMED FUNCTION. AT THE END OF THE SEQUENCE, AN ALARM WILL INDICATE THE PURGE COMPLETE, BUT THE OPERATOR IS REQUIRED TO STOP THE PURGE. BEFORE CONFIRMING PURGE COMPLETE, CHECK THE POWER 2 END FOR COMBUSTIBLES.

"CONFIRM PURGE COMPLETE"

THE MODICON WILL BLOCK THE POWER 2 SIDE PURGE VALVE AND THE HIGH PRESSURE NITROGEN SUPPLY. IF THE PRESSURE IS ABOVE 5 PSIG, THE 2 INCH VENT AT POWER 2 WILL OPEN AND BLEED PRESSURE DOWN TO 5 PSIG. 5 PSIG PRESSURE SWITCH IS LOCATED DOWNSTREAM OF THE KNOCKOUT POT.

NOTE: HEADER PRESSURIZING WITH SYN GAS MUST BEGIN WITHIN ONE HOUR OF NITROGEN PURGING COMPLETE OR A REPURGE IS NECESSARY.

PERSONELL WORKING AROUND THE BOILER 4 SYN GAS AREA MUST CARRY A CARBON MONOXIDE ANALYZER ONCE PRESSURIZING BEGINS.

7. SELECT SYNGAS
8. PLACE THE HYDROGEN FLOW / PRESSURE CONTROL SWITCH IN THE "PRESSURE" POSITION.
9. MODICON WILL PROMPT OPERATOR " PRESSURIZE SYNGAS HEADER"
MODICON PERMISSIVES TO PRESSURIZE HEADER:
 1. PRV UPSTREAM EBV'S ARE CLOSED
 2. 2 INCH VENT CLOSED
 3. HYDROGEN TIES DOUBLE BLOCK AND BLEED
 4. HIGH PRESSURE N2 VALVE CLOSED
 5. 8 INCH EBV AT POWER 2 CLOSED

PRESSURIZING GAS WILL FLOW THROUGH THE 1 INCH BY-PASS VALVE AT POWER 2.

HIGH
PRESS
START

IF POWER 2'S PRESSURE DROPS BELOW 260 PSIG DURING THE TIME POWER 1'S LINE IS BEING PRESSURIZED, THE 1 INCH BYPASS VALVE WILL CLOSE. OPERATOR WILL RESTART PRESSURIZATION AFTER ALLOWING POWER 2'S SIDE OF THE LINE TO INCREASE PRESSURE.

LOW
PRESS
START

A LOW PRESSURE START IS DEFINED AS LGTI STARTING UP AND POWER 2 IS NOT USING SYN GAS. AT LEAST 90 PSIG IS REQUIRED ON THE SYNGAS LINE FOR POWER 1 TO BURN LOW PRESSURE GAS.

ONCE BOTH SIDES OF THE LINE ARE EQUALIZED, OPERATOR WILL OPEN THE 8 INCH EBV LOCATED POWER 2 BY PUSH BUTTON ON MODICON.

SYN GAS IS NOW BLOCKED AT UPSTREAM EBV OF PRESSURE REDUCING STATION.

AT THIS TIME, POWER 2 SHOULD HAVE TRANSFERED THE PRESURE CONTROLLING GAS TURBINE OFF SYNGAS. LGTI SHOULD HAVE AT LEAST 100 MMBTU /HR ON THE FLARE. WHEN POWER 1 INCREASES SYN FUEL RATES, FUEL SHOULD BE TAKEN FROM THE FLARE.

*** BOTH SETS OF BURNERS WILL BE LIT USING THE MIN-FLOW VALVE. ***

PERMISSIVES FOR BURNER LITE OFF

1. TWO MAIN PRV'S CLOSED (OPERATOR MUST CLOSE)
2. BURNER HEADER PURGE COMPLETED WITHIN 1 HOUR
3. HYDROGEN LINE DOUBLE BLOCK AND BLEED
4. VENTS CLOSED
5. LOW PRESSURE NITROGEN CLOSED.
6. BURNER FRONT CONTROL VALVE OPEN 25%

OPERATOR TO SET MIN-FLOW START UP VALVE ON VIDEOSPEC TO 7 PSIG. PUT MIN-FLOW CONTROLLER IN AUTOMATIC. (PC 3762)
(MAX FLOW PER BURNER SET WHILE ON PRV = 10,000 LB/HR)

ASSURE MANUAL BLOCK VALVES UPSTREAM AND DOWNSTREAM OF MIN-FLOW VALVE ARE OPEN.

OUTSIDE OPERATOR WILL LITE IGNITORS ON ONE SET OF BURNERS

ONCE IGNITOR FLAME IS ESTABLISHED, OUTSIDE OPERATOR WILL TURN THE "LITE OFF READY SWITCH TO THE "ON" POSITION.

EVENTS THAT OCCUR AFTER "LITE OFF READY" BUTTON IS "ON"

1. 90 SEC NITROGEN PURGE BEGINS FROM PRV STATION THROUGH THE BURNER FRONT
2. NITROGEN PURGE COMPLETES AND BURNER FRONT SSO'S OPEN.
3. UPSTREAM EBV'S ON PRV STATION OPEN. FLOW THROUGH THE MIN FLOW VALVE BEGINS.
4. AFTER 10 SECONDS, PILOT BURNER IS TURNED OFF AND THE FIREYE MUST SEE FLAME OR BURNER TRIPS. AFTER A TRIP, A 30 SECOND NITROGEN PURGE IS STARTED BY THE MODICON.
5. LITE SECOND BURNER PAIR

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*** CHECK FUEL AVAILABLE ON THE FLARE / NOTIFY LGTI AND POWER 2
*** THAT POWER 1 INTENDS TO PICK UP RATES

6. THE BURNER FRONT FLOW VALVES CASCADE CONTROL THE UPSTREAM SIDE OF THE PRV VALVES PAGE 4

THE MAIN PRESSURE CONTROLLER AND THE TWO BURNER FLOW CONTROLLERS SHOULD BE IN MANUAL

ADJUST THE PRESSURE CONTROLLER THAT CONTROLS THE 280 PSIG SIDE OF THE HEADER BY LINING UP THE SET POINT OF THE MAIN CONTROLLER WITH THE HEADER PRESSURE. THEN MANUALLY SET THE OUT PUT OF THE MAIN CONTROLLER TO THE SAME FLOW MEASUREMENT INDICATOR POSITIONS OF THE BURNER FLOW CONTROLLERS.

FOR A HIGH PRESSURE START-UP, ALL THREE CONTROLLERS CAN BE PUT IN AUTOMATIC.

FOR A LOW PRESSURE START-UP, BOTH BURNER CONTROLLERS CAN BE PLACED IN AUTOMATIC BUT THE MAIN PRESSURE CONTROLLER SHOULD REMAIN IN AUTOMATIC.

** NOW THE HIGH PRESSURE SIDE OF THE SYN GAS HEADER IS ON PRESS CONTROL.**

NOTIFY LGTI AND POWER 2 THAT POWER 1 IS READY TO PICK UP RATES.

BOTH PRV VALVES SHOULD STILL BE CLOSED.

PLACE THE CONTROLLER IN AUTOMATIC.

BEGIN OPENING LOW FLOW PRV IN ORDER TO PICK SYN FUEL RATES.
(PRESSURE CONTROLLER IS LOCATED ON THE VIDEOSPEC)

MONITOR THE BOILER 4 SYNGAS PIC-SCREEN FOR AVAILABLE SYNGAS THAT IS ON THE FLARE AND COMMUNICATE WITH LGTI WHEN INCREASING SYN GAS RATES.

ON A LOW PRESSURE START UP, POWER 1 WILL CONTROL THE FLOW TO THE BURNERS SUCH THAT LGTI REACTOR PRESSURE IS NOT AFFECTED. THEREFORE CLOSE COMMUNICATION IS REQUIRED BETWEEN THE POWER 1 OPERATOR AND THE LGTI OPERATOR.

IN THE EVENT OF A LGTI TRIP, POWER 1 WILL BURN SYN GAS UNTIL THE PRV CAN NO LONGER HOLD THE BURNER FRONT SETPOINT PRESSURE. AT THIS POINT, THE PRV'S WILL CLOSE AND BURNERS 9, 10, 11 AND 12 WILL FLAME OUT.

MAXIMUM RATES FOR POWER 1
(116,279 LB/HR OR EMISSIONS PERMIT LEVELS)
(SEE BOILER 4 , SYN GAS PIC SCREEN)

***** TRANSFER OFF SYNGAS *****

1. NOTIFY LGTI AND POWER 2 THAT POWER 1 WILL TRANSFER OFF SYNGAS.

2. MIN FLOW VALVE IS SET AT 7 PSIG (CONTROLLER IN AUTO)

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3. WITH THE CONTROLLER STILL IN AUTOMAIC, REDUCE THE CONTROLLER SET POINT FOR THE PRV'S UNTIL OPERATING ON MIN FLOW VALVE. (PRV'S SHOULD BE CLOSED)
4. SEND OUTSIDE OPERATOR TO BURNER DECK TO TURN EACH SET OF BURNERS OFF.
5. BOILER HEADER PURGE / PRESSURE TEST IS STARTED BY PAGE 5 THE MODICON.
6. MODICON WILL PROMPT OPERATOR TO PURGE BACK TO POWER 2 OR LGTI FLARE

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