Procedure to Pressurize and Empty the CLC Detectors

(this is a Safety Procedure)

This procedure outlines the steps to be taken to pressurize the Cherenkov Luminosity Counter (CLC) Detectors. The procedure also details the steps needed to remove flammable gas from the detector before the end plate can be removed. It includes the procedure to inert the detectors with nitrogen gas and fill the detectors with isobutane gas. This procedure is referenced in CDF-II Proc. 13, which details the entire sign-off procedure that is required before flowing flammable gas and turning on high voltage in the CLC detectors.

Editorial Hand-Processed Changes Other Than Spelling
Require Department Head Approval

HPC Number	Date	Section Number	Initials
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_____ _____
(PPD/CDF Department Head) (Date)

_____ _____
(Particle Physics Division Head) (Date)

_____ _____
(Beams Division Head) (Date)

1.0 Controlled Copies of this procedure.

Four controlled copies of this procedure will exist:

1. At the CDF Gas Tech bench in the CDF Assembly Building
2. In the PPD / CDF Department Office
3. In the Particle Physics Division Office
4. In the Beams Division Office

All other copies will be marked, " INFORMATIONAL COPY ONLY"

2.0 The Procedure

This procedure is executed by a trained CDF Gas Technician. A CDF Experimenter may assist the Gas Tech, but the Gas Tech is in charge and is responsible for the checklist.

It is assumed that all safety systems are in place as required in CDF-II Procedure 13. The safety systems include the flammable gas and ODH detection systems. It also assumed that all pressure and leak tests have been performed successfully.

NOTE: This procedure represents a minimal requirement for initiating the CLC detectors. The Gas Technician or Gas Systems Engineer may conduct any additional checks and should note those checks in the comments section of the checklist.

Section 3.1 details the steps to inert the system and fill it with flammable gas. The checklist must be completed before any flow of flammable gas.

1. The Gas Tech completes a copy of the “CLC Detector Gas System Start-Up Checklist” in Section 3.1. The Gas Tech notes each exception to the check list along with the reason for the exception. Refer to drawing 2563.372-MD-382228 for the piping and instrumentation diagram.

2. After completing the checklist, the Gas Tech obtains the CDF Gas System Engineer's signature before initiating flammable gas flow.

3. The Gas Tech posts copies of the completed check list as follows:
   a) on associated subsystem gas control panel on the gas platforms,
   b) in the CDF Gas System log book.

   The Gas Tech places the original check list in the PPD/CDF Department Office with the "Operational Readiness Clearance" documentation.

4. The Gas Tech must inform the CDF Gas Systems Engineer if **any** of the following conditions occur:

   a) O_2 concentration greater than 1000 ppm during isobutane flow,

   b) Leaks occur in a detector or piping system, as evidenced by a repeated drop in pressure greater than 1% nominal within a period of 1 week,

   c) LEL > 20% and this detector system is found to be the cause.

(Report to the CDF Operations Manager if the CDF Gas Systems Engineer can't be contacted immediately.)

Section 3.2 explains the steps that are taken to purge the isobutane gas from a filled detector with an inert gas. This procedure must be followed before the end plate of the detector is removed.

1. The Gas Tech completes a copy of Section 3.2, titled “CLC Flammable Gas System Shutdown.” The Gas Tech notes each exception to the checklist along with the reason for the exception.

2. The Gas Tech completes a copy of the checklist in Section 3.1 of CDF-II Procedure 13, titled “Sign-Off Procedure Required Before Flowing Flammable Gas To or Turning High Voltage on the CDF Detector Subsystems.” The Gas Tech notes each exception to the checklist along with the reason for the exception.

3. After completing both checklists, the Gas Tech obtains the signature of the CLC Gas Engineer and the CDF Gas Engineer before removing the end plate of the detector.

4. The Gas Tech posts copies of the completed check list as follows:
   a) on associated subsystem gas control panel on the gas platforms,
   b) in the CDF Gas System log book.

   The Gas Tech places the original check list in the PPD/CDF Department Office with the "Operational Readiness Clearance" documentation.

3.0 Checklist

The Gas Tech Checklists are on the following page. Copies of the checklists can be found inside the front pocket of the CDF Gas Systems Log Book.

Table of Contents of Checklist Sections

Checklist Section Explanations:

Section 3.1: CDF-CLC Detector Gas System Start-Up Checklist

1. **CLC Flammable Gas System Set-Up:**
   When the CLC Detectors contain air at 0 psig (1 atm), the gas system should be set up in preparation for inerting. This includes the appropriate set-up of the valves in the piping system and the sealing of the detectors.

2. **Purging CLC West with Nitrogen:**
   1 pressure cycle and 4 volume exchanges of nitrogen gas take place to purge the CLC West so that the oxygen level becomes less than 1000 ppm.

3. **Purging CLC East with Nitrogen:**
   1 pressure cycle and 4 volume exchanges of nitrogen gas take place to purge the CLC East so that the oxygen level becomes less than 1000 ppm.

4. **Filling CLC West with Isobutane:**
   5 pressure cycles of isobutane gas take place to fill the CLC West so that the level of isobutane is greater than 99% by volume.

5. **Filling CLC East with Isobutane:**
   5 pressure cycles of isobutane gas take place to fill the CLC East so that the level of isobutane is greater than 99% by volume.

Section 3.2: CDF-CLC Flammable Gas System Shutdown Checklist

1. **Shut Down Flow of Isobutane Gas:**
   Source of isobutane gas is isolated from the system.

2. **Purging CLC West:**
   3 volume exchanges and 1 pressure cycle of nitrogen are used to purge CLC West.

3. **Empty CLC West:**
   Nitrogen is vented out of the detector.

4. **Purging CLC East:**
   3 volume exchanges and 1 pressure cycle of nitrogen are used to purge CLC East.

5. **Empty CLC East:**
   Nitrogen is vented out of the detector.

3.1. CDF-CLC Detector Gas System Start-Up Checklist

(Refer to drawing 2563.372-MD-382228)

1. CLC Flammable Gas System Set-Up

___ Notify the CLC Experimenter
___ Notify the CLC Engineer
___ Check Mechanical and Electrical Connections
___ No unusual ignition sources are present

At the 730-ft platform:
___ On Panel 8, close MV-4700, MV-4704, MV-4702 and MV-4703
___ On Panel 6, close MV-4500, MV-4504, MV-4502 and MV-4503

2. Purging CLC West with Nitrogen Gas

At the cryo control room, open the solenoid valves:
___ In the Intellution Dynamics window (of the iFix software), go to the "CDF Menu"
___ At the CDF Menu, click on the "Login" button
___ At the Login window, click on the "Logout" button; acknowledge successful logout by clicking on "OK"
___ At the Login window, type in your DMACS login name and password. Click on "Login." Acknowledge successful login by clicking on "OK"
___ At the CDF Menu, click on the "Flam. Gas Menu" button
___ At the Gas Systems Menu, click on the "730' Platform" button
___ In the picture of the 730' Platform, click on either "CLC West" or "CLC East"
___ In the picture of the CLC System, click on the "Override" button so that it turns green and reads "Override: True"
___ Open CLC_WESTIN (EV-4700 - to open supply line from CLC West) by clicking on the valve so that it turns green
___ Open CLC_WESTOUT (EV-4701 - to open vent line from CLC West) by clicking on the valve so that it turns green
___ Open CLC_EASTIN (EV-4500 - to open supply line from CLC East) by clicking on the valve so that it turns green
___ Open CLC_EASTOUT (EV-4501 - to open vent line from CLC East) by clicking on the valve so that it turns green
___ Click on the "Gas Menu" button
___ At the Gas Systems Menu, click on the "Login" button
___ At the Login window, click on the "Logout" button; acknowledge successful logout by clicking on "OK"
___ At the Login window, type in "PUBLIC" (leave the password blank). Click on "Login." Acknowledge successful login by clicking on "OK"

At the 730-ft platform, flow 4 volume exchanges of nitrogen:
___ Below the panels, on the main nitrogen line, open MV-4604
___ On Panel 8, open MV-4704 (to open nitrogen supply line from main nitrogen line)
___ Open MV-4702 (to open supply line to CLC West)
___ Adjust PRV-4700 and the manual valve on FI-4700 until PI-4700 reads 15 psig and FI-4700 reads 50 SCFH Air
___ When PI-4701 reads 11 psig, open MV-4703 (to open the vent line)
___ Allow nitrogen gas to flow for at least 40 minutes (to flow 4 volume exchanges)

For 1 nitrogen pressure cycle:
___ Close MV-4702 (close the supply line)
___ When PI-4701 reads less than 1.0 psig, close MV-4703 (close the vent line)
___ Open MV-4702 (open the supply line)
___ When PI-4701 reads 11 psig, close MV-4702 (close the supply line)
___ Hold the pressure for a minimum of 5 minutes
___ Open MV-4703 (open the vent line)
___ When PI-4701 reads less than 1.0 psig, close MV-4703
___ Open MV-4702 (open the supply line)

Flow 1 volume exchange of nitrogen:
___ Adjust PRV-4700 and the manual valve on FI-4700 until PI-4700 reads 15 psig and FI-4700 reads 50 SCFH Air
___ When PI-4701 reads 11 psig, open MV-4703 (open the vent line)
___ Allow nitrogen gas to flow for a minimum of 10 minutes

Check Oxygen Concentration in gas vent line
___ On the return line near the bubblers, open MV-4701 (the line to the oxygen sensor)
___ At the cryo control room, logout of the PUBLIC (or current) account and login to DMACS
___ In the Gas Systems Menu, click on the “O2 Analyzer” button
___ In the O2 Analyzer picture, click in the “MANUAL” box so that it turns green
___ Click on “Zero” so that it turns green
___ When the oxygen level reads less than 5 ppm, click in the “CLCW” box so that it turns green
___ When the time elapsed box reads 20.0 minutes, record the O2 level:
oxygen level was _____ ppm O_2 (if it reads greater than 1000ppm, repeat 1 nitrogen pressure cycle and one volume flow exchange of nitrogen until the oxygen level is at an acceptable level; make a note of it in the “Exceptions” section)

NOTE: When not analyzing the CLC oxygen level, the system should be set on “SCAN” mode so that the oxygen levels of other detectors are analyzed automatically.

___ Click in the “SCAN” box so that it turns green
___ Click on “Close” to close the O2 Analyzer window
____Logout of your DMACS account; login as PUBLIC

Fill with nitrogen at the 730’ platform:
___ On the return line near the bubblers, close MV-4701 (the line to the oxygen sensor)
___ Close MV-4702 (close the supply line)
___ When PI-4701 reads 2.5 psig, close MV-4703
___ Close MV-4704 (close the nitrogen main supply line)

3. Purging CLC East with Nitrogen

At the 730-ft platform, flow 4 volume exchanges of nitrogen:
___ On Panel 6, open MV-4504 (to open nitrogen supply line from main nitrogen line)
___ Open MV-4502 (to open supply line to CLC West)
___ Adjust PRV-4500 and the manual valve on FI-4500 until PI-4500 reads 15 psig and FI-4500 reads 50 SCFH Air
___ When PI-4501 reads 11 psig, open MV-4503 (to open the vent line)
___ Allow nitrogen gas to flow for at least 40 minutes (to flow 4 volume exchanges)

For 1 nitrogen pressure cycle:
___ Close MV-4502 (close the supply line)
___ When PI-4501 reads less than 1.0 psig, close MV-4503 (close the vent line)
___ Open MV-4502 (open the supply line)
___ When PI-4501 reads 11 psig, close MV-4502 (close the supply line)
___ Hold the pressure for a minimum of 5 minutes
___ Open MV-4503 (open the vent line)
___ When PI-4501 reads less than 1.0 psig, close MV-4503
___ Open MV-4502 (open the supply line)

Flow 1 volume exchange of nitrogen:
___ Adjust PRV-4500 and the manual valve on FI-4500 until PI-4500 reads 15 psig and FI-4500 reads 50 SCFH Air
___ When PI-4501 reads 11 psig, open MV-4503 (open the vent line)
___ Allow nitrogen gas to flow for a minimum of 10 minutes

Check Oxygen Concentration in gas vent line
___ On the return line near the bubblers, open MV-4501 (the line to the oxygen sensor)
___ At the cryo control room, logout of the PUBLIC (or current) account and login to DMACS
___ In the Gas Systems Menu, click on the "O2 Analyzer" button
___ In the O2 Analyzer picture, click in the "MANUAL" box so that it turns green
___ Click on "Zero" so that it turns green
___ When the oxygen level reads less than 5 ppm, click in the "CLCE" box so that it turns green
___ When the time elapsed box reads 20.0 minutes, record the O2 level:
oxygen level was _____ ppm O_2 (if it reads greater than 1000ppm, repeat 1 nitrogen pressure cycle and one volume flow exchange of nitrogen until the oxygen level is at an acceptable level; make a note of it in the "Exceptions" section)

NOTE: When not analyzing the CLC oxygen level, the system should be set on "SCAN" mode so that the oxygen levels of other detectors are analyzed automatically.

___ Click in the "SCAN" box so that it turns green
___ Click on "Close" to close the O2 Analyzer window
___ Logout of your DMACS account; login as PUBLIC

Fill with nitrogen at the 730' platform:
___ On the return line near the bubblers, close MV-4501 (the line to the oxygen sensor)
___ Close MV-4502 (close the supply line)
___ When PI-4501 reads 2.5 psig, close MV-4503
___ Close MV-4504 (close the nitrogen main supply line)
___ Below the panels, on the main nitrogen supply line, close MV-4604

Obtain permission to flow flammable gas:
___ Fill out the checklist from Section 3.1 in CDF-II Procedure 13
___ Make sure the HV for the CLC system is turned off
___ Obtain an approval signature from the CDF Gas Engineer to flow flammable gas

4. Filling CLC West with Isobutane Gas

At the 730-ft platform:
___ On Panel 8, close MV-4703 (close the vent line)
___ Close MV-4702 (close the supply line)
___ Close MV-4700 (close the isobutane supply line)
___ On Panel 6, close MV-4503 (close the vent line)
___ Close MV-4502 (close the supply line)
___ Close MV-4500 (close the isobutane supply line)

In the gas shed:
___ Close MV-2901
___ Open MV-2900
___ Open the valve on the isobutane bottle
___ Check that PI-2901 reads 16 psig

At the 730-ft platform, for 5 pressure cycles of isobutane, on Panel 8:
___ Open MV-4703 (open the vent line)
___ Open MV-4700 (open the isobutane supply line from gas shed)
___ Open MV-4702 (open the supply line)
___ Adjust PRV-4700 and the manual valve on FI-4700 to maximize the reading on PI-4700 and FI-4700
Maximum inlet pressure during isobutane fill: _________ psi
Maximum flow rate during isobutane fill: ___________________ SCFH Air
___ When PI-4701 reads 11 psig, close MV-4702 (close the supply line)
___ Hold the pressure for a minimum of 5 minutes
___ Open MV-4703 (open the vent line)
___ When PI-4701 reads less than 1.0 psig close MV-4703 (close the vent line)
___ Open MV-4702 (open the supply line)
___ When PI-4701 reads 11 psig, close MV-4702 (close the supply line)
___ Hold the pressure for a minimum of 5 minutes
___ Open MV-4703 (open the vent line)
___ When PI-4701 reads less than 1.0 psig close MV-4703 (close the vent line)
___ Open MV-4702 (open the supply line)
___ When PI-4701 reads 11 psig, close MV-4702 (close the supply line)
___ Hold the pressure for a minimum of 5 minutes
___ Open MV-4703 (open the vent line)
___ When PI-4701 reads less than 1.0 psig close MV-4703 (close the vent line)
___ Open MV-4702 (open the supply line)
___ When PI-4701 reads 11 psig, close MV-4702 (close the supply line)
___ Hold the pressure for a minimum of 5 minutes
___ Open MV-4703 (open the vent line)
___ When PI-4701 reads less than 1.0 psig close MV-4703 (close the vent line)
___ Open MV-4702 (open the supply line)
___ When PI-4701 reads 11 psig, close MV-4702 (close the supply line)
___ Hold the pressure for a minimum of 5 minutes
___ Open MV-4703 (open the vent line)
___ Open MV-4702 (open the supply line)

Check Oxygen Concentration in gas vent line
___ On the return line near the bubblers, open MV-4701 (the line to the oxygen sensor)
___ At the cryo control room, logout of the PUBLIC (or current) account and login to DMACS
___ In the Gas Systems Menu, click on the "O2 Analyzer" button
___ In the O2 Analyzer picture, click in the "MANUAL" box so that it turns green
___ Click on "Zero" so that it turns green
___ When the oxygen level reads less than 5 ppm, click in the "CLCW" box so that it turns green
___ When the time elapsed box reads 20.0 minutes, record the O2 level:
oxygen level was _____ ppm O_2 (if it reads greater than 1000ppm, repeat 1 nitrogen pressure cycle and one volume flow exchange of nitrogen until the oxygen level is at an acceptable level; make a note of it in the "Exceptions" section)

NOTE: When not analyzing the CLC oxygen level, the system should be set on "SCAN" mode so that the oxygen levels of other detectors are analyzed automatically.

___ Click in the "SCAN" box so that it turns green
___ Click on "Close" to close the O2 Analyzer window
____Logout of your DMACS account; login as PUBLIC

Fill with isobutane at the 730' platform:
___ Close MV-4702 (close the supply line)
___ When PI-4701 reads 2.5 psig, close MV-4703 (close the vent line)

At the cryo control room:
___ At the computer, logout of PUBLIC (or current account) and login as your DMAC name
___ In the picture of the CLC System, check that the "Override" button is green and reads "Override: True"
___ Click on the CLC_WESTIN (EV-4700) and CLC_WESTOUT (EV-4701) valves so that they turn red
___ Click on the "Gas Menu" button
___ Logout of your DMACS account; login as PUBLIC

At the 730-ft platform, set up system to control pressure remotely:
___ Open MV-4702
___ Open MV-4703

5. Filling CLC East with Isobutane Gas

At the 730-ft platform, for 5 pressure cycles of isobutane, on Panel 6:
___ Open MV-4503 (open the vent line)
___ Open MV-4500 (open the isobutane supply line from gas shed)
___ Open MV-4502 (open the supply line)
___ Adjust PRV-4500 and the manual valve on FI-4500 to maximize the reading on PI-4500 and FI-4500
Maximum inlet pressure during isobutane fill: _________ psi
Maximum flow rate during isobutane fill: ____________________ SCFH Air
___ When PI-4501 reads 11 psig, close MV-4502 (close the supply line)
___ Hold the pressure for a minimum of 5 minutes
___ Open MV-4503 (open the vent line)
___ When PI-4501 reads less than 1.0 psig close MV-4503 (close the vent line)
___ Open MV-4502 (open the supply line)
___ When PI-4501 reads 11 psig, close MV-4502 (close the supply line)
___ Hold the pressure for a minimum of 5 minutes
___ Open MV-4503 (open the vent line)
___ When PI-4501 reads less than 1.0 psig close MV-4503 (close the vent line)
___ Open MV-4502 (open the supply line)
___ When PI-4501 reads 11 psig, close MV-4502 (close the supply line)
___ Hold the pressure for a minimum of 5 minutes
___ Open MV-4503 (open the vent line)
___ When PI-4501 reads less than 1.0 psig close MV-4503 (close the vent line)
___ Open MV-4502 (open the supply line)
___ When PI-4501 reads 11 psig, close MV-4502 (close the supply line)
___ Hold the pressure for a minimum of 5 minutes
___ Open MV-4503 (open the vent line)
___ When PI-4501 reads less than 1.0 psig close MV-4503 (close the vent line)
___ Open MV-4502 (open the supply line)
___ When PI-4501 reads 11 psig, close MV-4502 (close the supply line)
___ Hold the pressure for a minimum of 5 minutes
___ Open MV-4503 (open the vent line)
___ Open MV-4502 (open the supply line)

Check Oxygen Concentration in gas vent line
___ On the return line near the bubblers, open MV-4501 (the line to the oxygen sensor)
___ At the cryo control room, logout of the PUBLIC (or current) account and login to DMACS
___ In the Gas Systems Menu, click on the “O2 Analyzer” button
___ In the O2 Analyzer picture, click in the “MANUAL” box so that it turns green
___ Click on “Zero” so that it turns green
___ When the oxygen level reads less than 5 ppm, click in the “CLCW” box so that it turns green
___ When the time elapsed box reads 20.0 minutes, record the O2 level:
oxygen level was ____________ ppm O_2 (if it reads greater than 1000ppm, repeat 1 nitrogen pressure cycle and one volume flow exchange of nitrogen until the oxygen level is at an acceptable level; make a note of it in the “Exceptions” section)

NOTE: When not analyzing the CLC oxygen level, the system should be set on “SCAN” mode so that the oxygen levels of other detectors are analyzed automatically.

___ Click in the “SCAN” box so that it turns green
___ Click on “Close” to close the O2 Analyzer window
____Logout of your DMACS account; login as PUBLIC

Fill with isobutane at the 730’ platform:
___ Close MV-4502 (close the supply line)

___ When PI-4501 reads 2.5 psig, close MV-4503 (close the vent line)

At the cryo control room:
___ At the computer, logout of PUBLIC (or current account) and login as your DMAC name
___ Click on the CLC_EASTIN (EV-4500) and CLC_EASTOUT (EV-4501) valves so that they turn red
___ Click on the “Gas Menu” button
___ In the picture of the CLC System, click on the “Override” button so that it turns red and reads “Override: False”
___ Logout of your DMACS account; login as PUBLIC

At the 730-ft platform, set up system to control pressure remotely:
___ Open MV-4502
___ Open MV-4503

Obtain permission to turn on HV:
___ Obtain an approval signature from the CDF Gas Engineer to turn on HV

COMMENTS:

CHECK LIST EXCEPTIONS: (List each exception and state reason)

Checklist completed by:_____Date: _____

Permission for Detector
Gas Flow given by:_____Date: _____
(CLC Gas Systems Engineer)

3.2 CLC Flammable Gas System Shutdown

(Refer to 2563.372-MD-382228)

The gas system must be purged of isobutane with nitrogen before the detectors can be opened up for maintenance. The isobutane should be shut off and nitrogen flowed through both detectors until the system has been purged.

1. Shut off the flow of isobutane from the gas shed

___ Close valve on the isobutane cylinder (shut off isobutane source)
___ Close MV-2900 (close line from gas shed)

2. Purging CLC West with Nitrogen Gas

At the cryo control room, open the solenoid valves:
___ In the Intellution Dynamics window (of the iFix software), logout of the PUBLIC (or current) account and login your DMACS account
___ At the CDF Menu, click on the “Flam. Gas Menu” button
___ At the Gas Systems Menu, click on the “730’ Platform” button
___ In the picture of the 730’ Platform, click on either “CLC West” or “CLC East”
___ In the picture of the CLC System, click on the “Override” button so that it turns green and reads “Override: True”
___ Open CLC_WESTIN (EV-4700 - to open supply line from CLC West) by clicking on the valve so that it turns green
___ Open CLC_WESTOUT (EV-4701 - to open vent line from CLC West) by clicking on the valve so that it turns green
___ Open CLC_EASTIN (EV-4500 - to open supply line from CLC East) by clicking on the valve so that it turns green
___ Open CLC_EASTOUT (EV-4501 - to open vent line from CLC East) by clicking on the valve so that it turns green
___ Click on the “Gas Menu” button
___ Logout of your DMACS account; login as PUBLIC

At the 730-ft platform, on Panel 8, flow 2 volume exchanges of nitrogen:
___ Below the panels, on the main nitrogen line, open MV-4604
___ Close MV-4700 (close the isobutane line)
___ Open MV-4703 (open vent line)
___ Open MV-4704 (open nitrogen supply line form CDF main line)
___ Open MV-4702 (open supply line)
___ Adjust PRV-4700 and the manual valve on FI-4700 until PI-4700 reads 15 psig and FI-4700 reads 50 SCFH Air
___ When PI-4701 reads 11 psig, open MV-4703 (to open the vent line)
___ Flow nitrogen for a minimum of 20 minutes

For 1 pressure cycle of nitrogen:
___ Close MV-4702 (close supply line)
___ Allow pressure to drop until PI-4701 reads less than 1 psig
___ Close MV-4703 (close vent line)
___ Open MV-4702 (open supply line)
___ Allow pressure to rise until PI-4701 reads 11 psig
___ Close MV-4702 (close supply line)
___ Hold pressure in detector for a minimum of 5 minutes
___ Open MV-4703 (open vent line)
___ When PI-4701 reads less than 1 psig, open MV-4702 (open the supply line)

For 1 volume exchange of nitrogen:
___ Adjust FI-4700 until it reads 50 SCFH Air
___ Flow nitrogen for a minimum of 10 minutes

3. Empty CLC West

___ Close MV-4704 (close nitrogen main supply line)
___ Allow pressure in CLC West to drop until PI-4701 reads less than 1 psig
___ Close manual valve on FI-4700
___ Close MV-4702 (close supply line)

CLC West is purged.

4. Purging CLC East with Nitrogen Gas

At the 730-ft platform, on Panel 6, flow 2 volume exchanges of nitrogen:
___ Close MV-4500 (close the isobutane line)
___ Open MV-4503 (open vent line)
___ Open MV-4504 (open nitrogen supply line form CDF main line)
___ Open MV-4502 (open supply line)
___ Adjust PRV-4500 and the manual valve on FI-4500 until PI-4500 reads 15 psig and FI-4500 reads 50 SCFH Air
___ When PI-4501 reads 11 psig, open MV-4503 (to open the vent line)
___ Flow nitrogen for a minimum of 20 minutes

For 1 pressure cycle of nitrogen:
___ Close MV-4502 (close supply line)
___ Allow pressure to drop until PI-4501 reads less than 1 psig
___ Close MV-4503 (close vent line)
___ Open MV-4502 (open supply line)
___ Allow pressure to rise until PI-4501 reads 11 psig
___ Close MV-4502 (close supply line)
___ Hold pressure in detector for a minimum of 5 minutes
___ Open MV-4503 (open vent line)
___ When PI-4501 reads less than 1 psig, open MV-4502 (open the supply line)

For 1 volume exchange of nitrogen:
___ Adjust FI-4500 until it reads 50 SCFH Air
___ Flow nitrogen for a minimum of 10 minutes

5. Empty CLC East

___ Close MV-4504 (close nitrogen main supply line)
___ Allow pressure in CLC East to drop until PI-4501 reads less than 1 psig
___ Close manual valve on FI-4500
___ Close MV-4502 (close supply line)

CLC East is purged.

COMMENTS:

CHECK LIST EXCEPTIONS: (List each exception and state reason)

Checklist completed by:_____ Date: _____

Permission for Removal
of End Plate given by:_____ Date: _____
(CLC Gas Systems Engineer)

4.0 Deviations

Deviations are allowed with written approval from the CDF Department Head with prior consultation with the CDF Gas Engineer.

5.0 Required Training and Authorized Training Personnel.

A. Gas Tech training.

Training is required.

Authorized training personnel:
CLC Gas Systems Engineer

The training should be documented on a standard Fermilab Training Form and the Training Expiration date should be tied to the end date of the Collider Run (e.g. "the end of Collider Run II").
The completed forms must be inserted in the CDF Department Office copy of this procedure.

B. CDF Gas Systems Engineer and CDF Operations Manager training.

Read Sections 2 and 3 of this procedure.

The training should be documented on a standard Fermilab Training Form and the Training Expiration date should be tied to the end date of the Collider Run (e.g. "the end of Collider Run II").
The completed forms must be inserted in the CDF Department Office copy of this procedure.

6.0 Training Materials.

This document is used sole document used as training materials. One of the authorized training personnel must give a training lecture using sections 2 and 3 of this procedure.

This lecture must include a tour with stops and instruction at:

1. CDF Gas Systems Monitoring View Node and the oxygen analyzer.
2. CDF 730-ft Gas Platforms.

7.0 List of Trained People for this procedure.

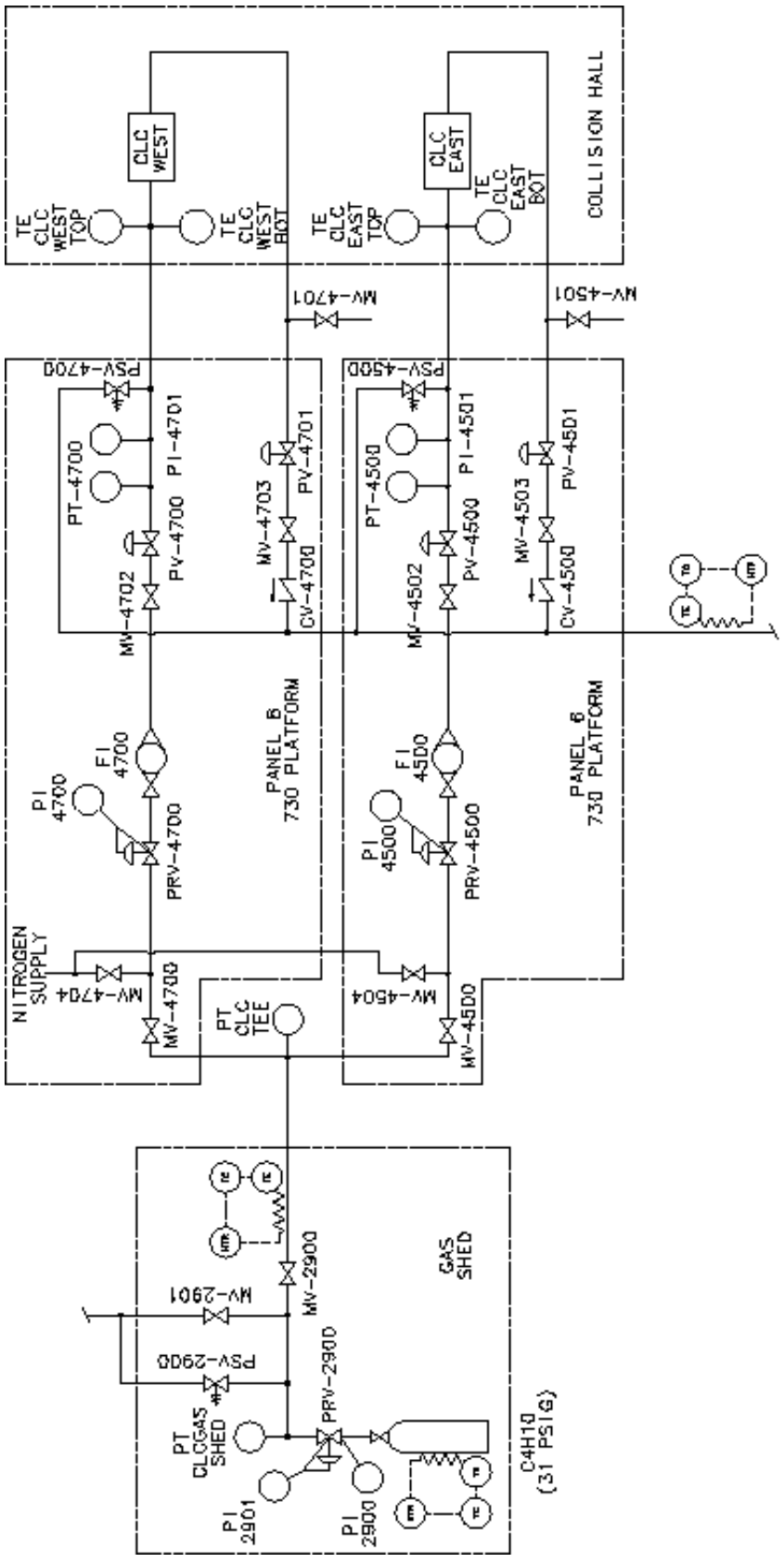
CLC Experts	Title	Phone	Pager
Jacobo Konigsberg	CLC Experimenter	x3623	--
Alexei Safonov	CLC Exerpimenter	x2126	--
S. Ming Wang	CLC Experimenter	x2126	--
Mayling Wong	CLC Engineer	x2532	1134
Del Allspach	CDF Gas System Engineer	x3493	630-612-8117

Gas Technicians	Pager
Dean Beckner	630-218-9762
K.C. Cahill	847-536-5000
Dave Haynie	630-218-9627
Bruce Vollmer	630-218-8885

8.0 References and Supporting Documentation.

CDF-II Procedure 13.

Fermilab Drawing 2563.372-MD-382228 (Piping and Instrumentation Diagram) (see next page)



Drawing 2563.372-MD-382228