PHENIX MuTr GAS OPS. IN THE PEH

procedure name

PHENIX Procedure No. PP-2.5.2.12-09

Revision: A **Date: 11-30-02**

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials
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Approvals

_____ _____

PHENIX S E & I Date Cognizant Scientist/Engineer Date /Activity Manager

_____ _____

PHENIX Safety Date CA-D SAFETY Date

_____ _____

1. Purpose

This procedure describes the following operations for the PHENIX MuTr Gas System:

1. How to start in the non-recirculation mode.
2. How to start the recirculation mode.
3. How to shutdown the system

2. Responsibilities

1. The system operator is responsible for conducting these procedures, logging activities, and responding to values that are out of range.
2. The operators listed in Attachment 2 are qualified to operate the MuTr gas system.

3. Prerequisites

1. Operator shall have knowledge of the MuTr gas system indicated by being listed as an operator in Attachment 2 of this procedure.

4. Precautions

The maximum inlet pressure for station two chambers are 2.5"WC. So the operator must keep the inlet pressure lower than 2.5"wc, and the outlet pressure around atmospheric pressure.

5. Procedure

Key Parameters:

P_tank : Pressure inside the tank . Controlled by CPR02. Indicated at CPG01 ~ 5 psig
P_supply: Initial pressure of supply line at gas house. Controlled by MRR05.
Indicated at MRG06 ~ 1.5"WC
F_supply: Flow rate of the supply gas. Controlled by MRR05. Indicated at MRMFM01 ~ 6.0"WC
F_return: Flow rate of the returned gas. Controlled by CPV02. Indicated at CPMFM > 3.0"WC
Keep these valves closed: MRBV02,03,04,10,MRCV03,04,09,MRDV01-06
DPV102,103,202,203,302,303
Keep these valves open: MRAV01-03,MRBV01,05,06,08,09,11,12, MRCV01,02,05,06,07,08,10,11,12,
MRDV07,08, DPV104,204,304, CPV02,03,10,14

5.A Start non-recirculation mode

@ the Gas Mixing House

1. Close MRR01-05, MRFM01-03, MRAV01-03, MRBV01, MRCV12
2. Power Off MKS 247D
3. Open the supply line at the Gas Panel for Ar-MuTr, CO2-MuTr, CF4
4. Confirm that **MRG01-03 > 20psig**
5. Adjust **MRR01,02 = 20 psig, MRR03 = 15 psig**
6. Close all valves of CP
7. Open CPV02,03,10,14
8. Open MRR01-03 valve, MRBV01
9. (Open the manual flow meters MRFM01-03) or, (Power on MKS 247)
10. Confirm that MRG04 = 15 psig
11. **Adjust CPR02 to be P_tank , open CPR02.**
12. Open CPV01
13. Wait until CPG01=CPR02-> P_tank (filling up the tank) ~ 10min
14. Open CPV12,13
15. Open CPV15,08 (Confirm CPV04 Closing)
16. **Open and tune MRR05, Seeing MRG06=P_supply**
17. (Tune MRFM01-03. 01:02:03=Ar:CO2:CF4 (50%:30%:20%))

@ The Distribution Panel (Once done, no need to do them again.)

1. Close DPV101,201,301 and DPV001
2. Open DPFM1xx,2xx,3xx and DPV106, 206, 306, DPV002
3. Slowly open DPV101,201,301 and DPV001
4. Slowly open DPV001, seeing bubbling at DPB004. Confirm DPG01 <3"wc
5. AGAIN, CONFIRM THAT DPFM101-104, 201-208, 301-308 AND DPV106,206,306 IS FULL OPEN
6. Open DPV103,203,303 if closed

7. Slowly open DPV301, tune DPFM311-318, setting flow rate as 200 sccm (see DPB004 stop bubbling)
8. Slowly open DPV101, tune DPFM111-114, setting the flow rate as 100 sccm
9. Confirm that DPG01<2"WC, no bubbling at DPB004
10. Slowly open DPV201, tune DPFM211-218, setting flow rate as 100 sccm
11. Confirm that DPG05 is around 2"WC, no bubbling at DPB004

5.B Start Recirculation

1. Do 5.A first

@ the Distribution Panel

1. Close DPV103,203,303 if opened

@ Gas Mixing House

1. Close CPV15, CPV04, Open CPV08, CPV14
2. Start Compressor
3. **Open and tune CPV15, while monitoring that CPMFM= F_return**
4. Close CPV08
5. Open CPV04 (Start Mixing)

5.C Stop Flowing

@ the Gas Mixing House

1. Close MRR05 , CPV04
2. Stop Compressor
3. Open CPV08, Full Open CPV15

@ The Distribution Panel

1. Open DPV103,203,303 if closed

6 Documentation

All notes and observations should be recorded in the MuTr gas system logbook. A gas system log sheet (attachment 3) should be completed every 8 hours and placed in the log sheet binder while gas is flowing.

7 References

1. MuTr Gas System Home Page http://spin.riken.bnl.gov/~jiro/mutrgas.html

8 Attachments

1. MuTr Gas System Drawings
   A. Main Rack
   B. Compressor Panel
   C. Distribution Panel
2. Responsible People/Operators
3. Gas system log sheet

9 Gas Control Component Table

Main Rack (MRA,B,C,Dxx)

Panel A :	MRAV01-03	Valve
	MRR01-03	Regulator ~ 15 psig
	MRFC01-03	Mass Flow Controller ~ 1 slpm
	MRFM01-03	Manual Flow meter ~ 1 slpm
	MRG01-03	Pressure Gauge ~ 20 psig
Panel B	MRBV01-12	Valve
	MRR04-05	Regulator ~ 2 psig
	MRG04	Pressure Gauge ~ 15 psig
	MRMFM01	Mass Flow Meter ~ 2 slpm
Panel C	MRCV01-11	Valve
	MRG05-06	Pressure Gauge ~ 10 psig and 2"WC
Panel D	MRDV01-08	Valve
	MRG07	Pressure Gauge ~ 0 "WC

Compressor Panel (CPxx)

CPV01-15	Valve
CPG01-02	Pressure Gauge ~ 10 psi and 15psi
CPMFM	Mass Flow Meter ~ 1slpm
Compressor	

TANK

Distribution Panel (DPxx)

Station 1	DPV101-106	Valve
	DPFM101-104	Flow meter (Return)
	DPFM111-114	Flow meter (Supply)
	DPMFM01	Mass Flow Meter
	DPB001	Bubbler (< 2.5 “wc)
Station 2	DPV201-206	Valve
	DPFM201-208	Flow meter (Return)
	DPFM211-218	Flow meter (Supply)
	DPMFM02	Mass Flow Meter
	DPB002	Bubbler (< 2.5 “wc)
Station 3	DPV301-306	Valve
	DPFM301-308	Flow meter (Return)
	DPFM311-318	Flow meter (Supply)
	DPMFM03	Mass Flow Meter
	DPB003	Bubbler (< 2.5 “wc)
Common	DPV001-002	Valve
	DPMFM4-5	Mass Flow Meter
	DPB004-005	Bubbler (< 2.5 “wc)

10 Electric Component Table

Main Rack

Mass Flow Controller	MKS #1179A12CS1BV	
	15pin Type D control cable (MKS #CB259-5-xx)	
Mass Flow Meter	Matheson #8112-0414,0424	
	12VDC (Circle Jack)	
Pressure Transmitter	Dwyer #7117-6060	
	2-wire readout cable	
H2O Analyzer	KAHN #	
	100VAC (2-wire) power	
	2-wire readout cable	
O2 Analyzer	Teledyne #3010TA-F-K	
	110VAC power (3-wire)	
	4-wire signal cable	

Compressor Panel

Compressor	KNF #UN026STI EX	110VAC wire
Mass Flow Meter	Matheson #8112-0414	
	12VDC (Circle Jack)	

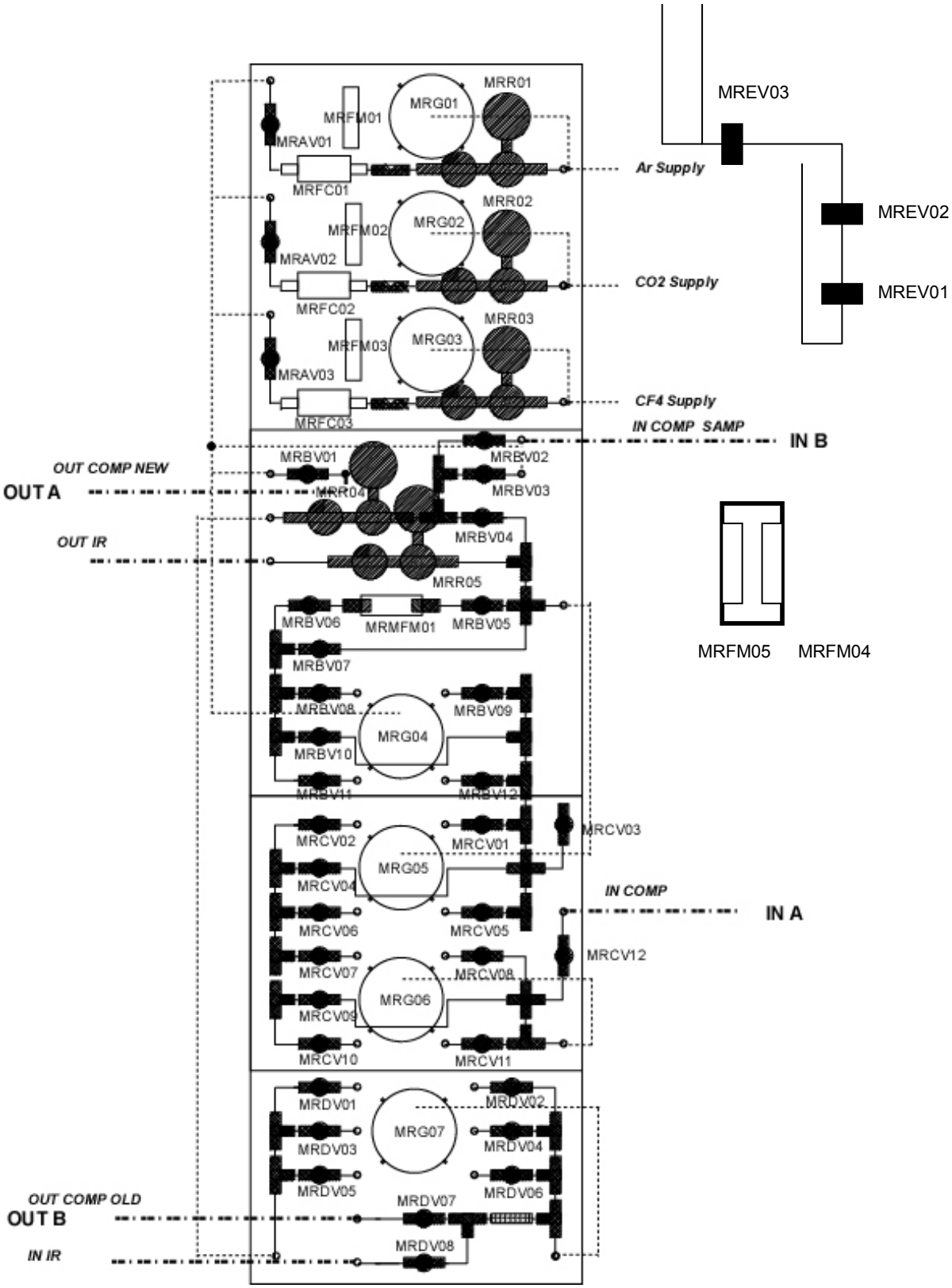
Distribution Panel

Mass Flow Meter	Matheson #8112-0414
	12VDC (Circle Jack)
Differential Pressure Transmitter	Dwyer #3020SGT
	DC Power 12.3-35VDC (2-wire connection)

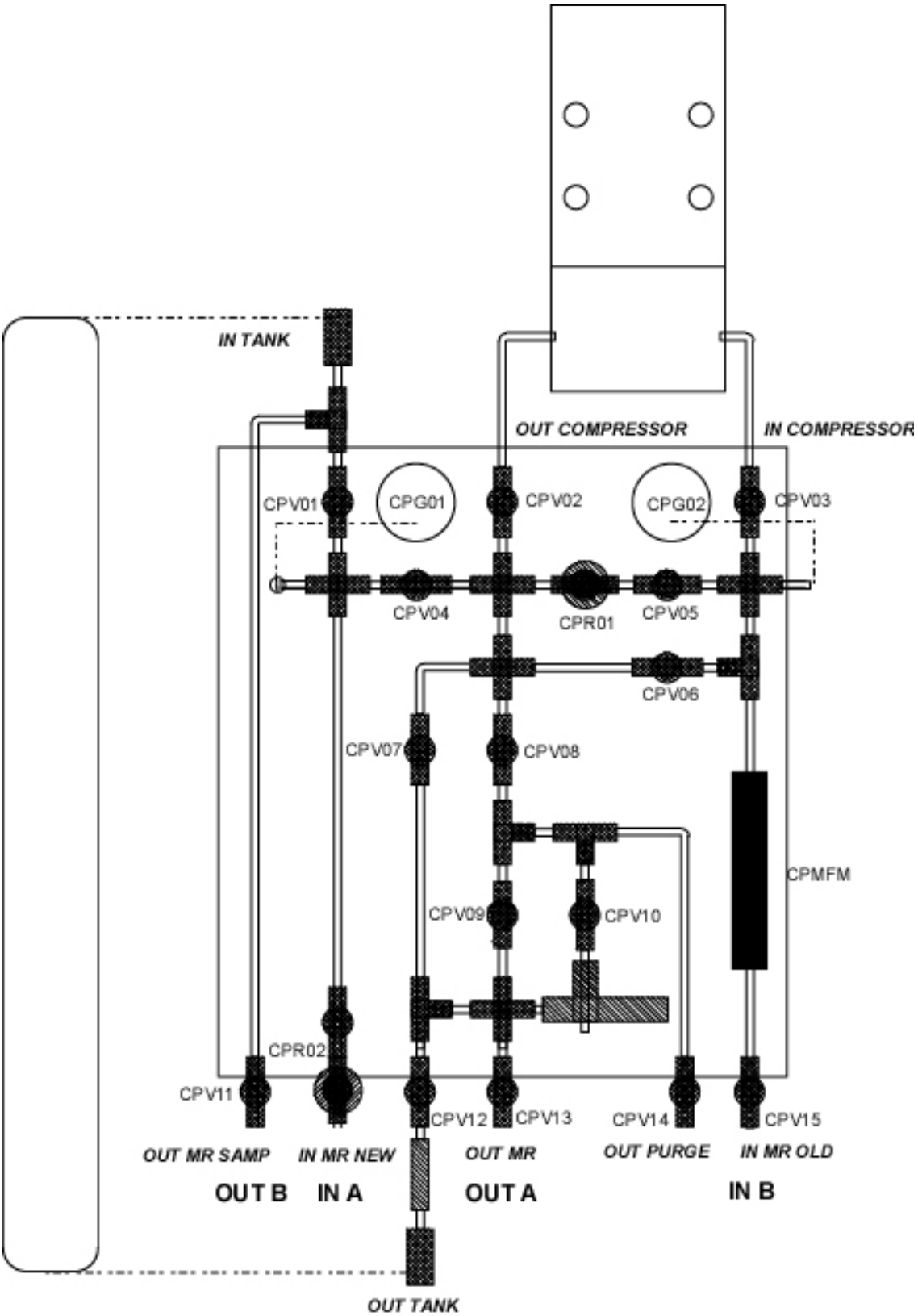
Computer Rack

Mass Flow Readout	MKS #247D
	115VAC power (plug type)
H2O Analyzer Readout	100VAC power (plug or 2-wire)
O2 Analyzer Readout	100VAC (plug)

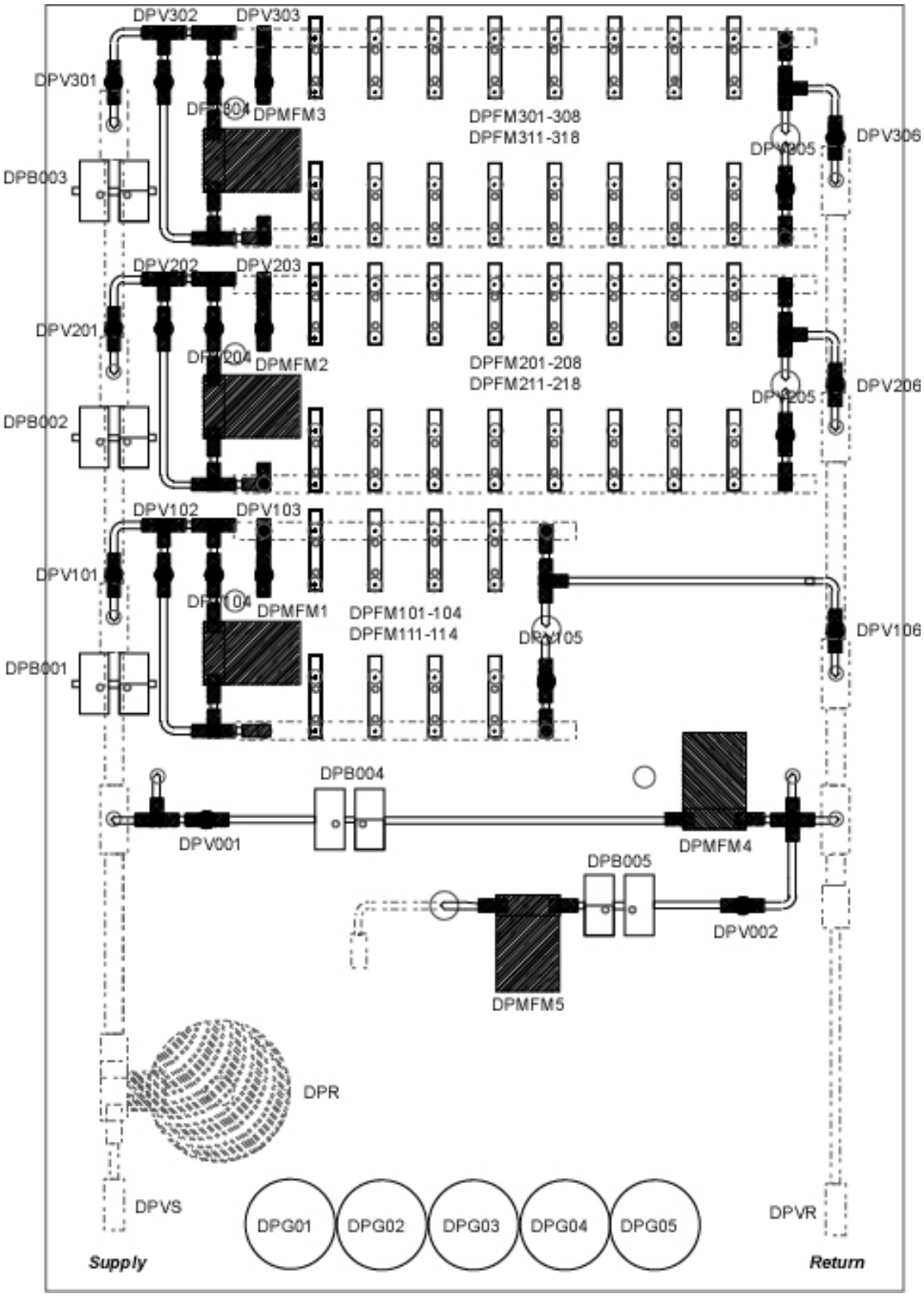
Attachment 1-A: Main Rack



Attachment 1-B: Compressor Panel



Attachment 1-C: Distribution Panel



Attachment 2: Responsible People/Operators

The following people have been trained to operate the PHENIX MuTr gas system. They have completed the prerequisite BNL training courses.

Hideyuki Kobayashi (RIKEN, BNL Local) x2256 (hyuki@bnl.gov) pager 8551
David Brown (NMSU, BNL Local) x7298 (brownds@rcf.rhic.bnl.gov)

Additional qualified users are to be listed below and posted in the MuTr gas system mixing room:

NAME PHONE, LIFE#	APPROVED BY	DATE

MuTr-Gas-CHECKLIST-V1.0

PHENIX MuTr GAS SYSTEM CHECK LIST (Without Slow Control)

(To be filled out once per shift and placed in Gas System Binder)

Main Rack and Compressor Panel in the Mixing House

Sensor	Check Point	Nominal	Minimum	Maximum	Value	Comments
MRR01	Ar Regulator Pressure	20 psig	17 psig	30 psig		
MRR02	CO2 Regulator Pressure	20 psig	17 psig	30 psig		
MRR03	CF4 Regulator Pressure	15 psig	10 psig	20 psig		
MRG04	Mixed New Gas Pressure	15 psig	5 psig	20 psig		
MRG05	Tank Output Pressure	5 psig	1 psig	10 psig		
MRG06	Supply Pressure	3" WC	1" WC	5" WC		
MRG07	Return Pressure	0.1 " WC	-0.5" WC	0.5" WC		
MRMFM	Supply Flow	6 LPM	2 LPM	10 LPM		
CPMFM	Return Flow	3 LPM	0.5 LPM	10 LPM		
Compressor	Compressor Power ON/OFF	ON	--	--		

Mass Flow Controller in the Mixing House

Sensor	Check Point	Nominal	Minimum	Maximum	Value	Comments
LED Indicator	Power ON/OFF	ON	--	--		
Channel 1	CF4 Flow Rate	1.2 LPM	0.1 LPM	3.0 LPM		
Channel 2	CO2 Flow Rate	1.8 LPM	0.15 LPM	4.5 LPM		
Channel 3	Ar Flow Rate	3.0 LPM	0.25 LPM	7.5 LPM		

If any of the above **CHECK** are outside their normal range, immediately contact a MuTr gas expert.

Operator_____ Date & Time_____

Gas Expert:

Hideyuki Kobayashi

ex. 2256 (office), 631-345-9327 (home), pager 8551, hyuki@bnl.gov

David Brown

ex. 7298 (office), brownds@rcf.rhic.bnl.gov