MEDICAL AIR TESTING & SERVICES, INC.

1370 Harlan Street
Lakewood, Colorado 80214
Phone: 303-279-2491, 1-800-863-3247
Fax: 303-279-7132
www.medairtesting.com

NFPA 99 MEDICAL GAS SYSTEMS VERIFICATION

VERIFICATION LOCATION: **MEDICAL CENTER OF AURORA SOUTH**
1501 S. POTOMAC ST.
AURORA, CO 80012

JOB DESCRIPTION: **RELOCATE MAINS BY INTERVENTIONAL SUITE**

VERIFICATION DATE: **February 4, 2017**

MECHANICAL CONTRACTOR: **RK MECHANICAL**
3800 XANTHIA STREET
DENVER, CO 80238

JOB CONTACT: **BEN**

THIS VERIFICATION CONSISTS OF THE FOLLOWING MEDICAL GAS EQUIPMENT QUANTITIES:

	ZONE VALVES	ALARM PANELS	OUTLETS / INLETS
O2	0	0	5
VAC	0	0	5
MA	0	0	1
N2O	0	0	0
WAGD	0	0	0
N2	0	0	2
CO2	0	0	0

(PLEASE CONTACT MEDICAL AIR SYSTEMS, INC. REGARDING VACUUM & MEDICAL AIR DEMAND / SIZING)

VERIFICATION IS PER NFPA 99, 2012 EDITION. THE FINDINGS ARE ATTACHED

REMARKS: **ANY MODIFICATIONS OR ALTERATIONS TO THE MEDICAL GAS SYSTEMS SHALL REQUIRE RE-VERIFICATION.**

THIS DOCUMENT CONSISTS OF 11 PAGES.

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NFPA 99, 2012 DEFFICIENCIES:

(PLEASE REVIEW THE NEXT 2 PAGES FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

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THIS REPORT WAS APPROVED BY: _____

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TESTING CRITERIA FOR VERIFICATION OF MEDICAL GAS SYSTEMS

IT IS THE INTENT OF THE MEDICAL GAS VERIFICATION TO TEST THE GENERAL OPERATING CONDITION OF ALL MEDICAL GAS SYSTEM COMPONENTS. THIS REPORT LISTS THEIR CONDITION AND ADDRESSES POTENTIAL HAZARDS. THE VERIFICATIONS ARE DESIGNED TO PROVIDE A "SYSTEM VERIFICATION" AS OUTLINED BY NPFA 99, 5.1.12.3 (2012), WHICH VERIFIES THE INSTALLATION AND PERFORMANCE STANDARDS TO WHICH THE SYSTEM(S) WAS CONSTRUCTED AND IS ONLY REQUIRED WHEN THE SYSTEM IS NEW, OR AN EXISTING SYSTEM HAS BEEN BREACHED AND/OR SYSTEM COMPONENTS HAVE BEEN REPLACED.

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ALL CRITICAL CARE AREAS WILL BE ASSUMED TO INCLUDE THOSE DEFINED BY NFPA 99, 2012 EDITION AND THEREFORE TESTED FOR THE REQUIRED CRITERIA UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY.

WE UNDERSTAND THAT SOME EXISTING SYSTEMS WERE INSTALLED AND TESTED TO PREVIOUS STANDARDS AND MAY NOT MEET PRESENT CODE REQUIREMENTS. NFPA 99, 5.1.1.4 (2012) ADDRESSES THESE SITUATIONS AND REFERS THEIR CONTINUANCE TO THE AUTHORITY HAVING JURISDICTION TO DETERMINE WHETHER THEY CONSTITUTE A DISTINCT HAZARD TO LIFE OR ARE NOT USEABLE.

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****ALL CHAPTER AND PARAGRAPH REFERENCES IN THIS DOCUMENT ARE TAKEN FROM NPFA 99, STANDARD ON GAS AND VACUUM SYSTEMS, 2012 EDITION.****

TESTING QUALITY ASSURANCE

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- ASME IX BRAZER
- ASSE 6010 MEDICAL GAS SYSTEMS INSTALLER
- ASSE 6020 MEDICAL GAS SYSTEMS INSPECTOR
- ASSE 6030 MEDICAL GAS SYSTEMS VERIFIER
- ASSE 6040 MEDICAL GAS SYSTEMS MAINTENANCE PERSONNEL
- ASSE 6050 MEDICAL GAS SYSTEMS INSTRUCTOR
- CMGV - MGPHO CREDENTIALED MEDICAL GAS SYSTEMS VERIFIER

ANY OR ALL OF THE FOLLOWING EQUIPMENT HAVE BEEN USED IN THE TESTING AND ANYLYSIS OF THE MEDICAL GAS SYSTEMS:

- NST MODEL G2000, MEDICAL GAS ANALYZER, S/N: 059
- FOXBORO MODEL MIB, PORTABLE AMBIENT AIR ANALYZER, S/N: 274405
- AINSWORTH MODEL A-200 DS AA, SERIES BALANCE, READABILITY OF .01MG
- 25 MM MEMBRANE PTFE FILTERS
- NYAD MODEL MA-160B, TRACE DEW POINT MONITOR, S/N: 1993
- MINIOX 1, OXYGEN ANALYZER
- MIRAN SAPPHIRE I-R ANALYZER MODEL 205BML1A3N, S/N: 205B-79520-408
- BACHARACH N2O ANALYZER MODEL 19-3314, S/N: 9475
- BACHARACH CO2 ANALYZER MODEL , S/N:
- MERIAM 0-30" HG VACUUM GAUGE MODEL 31111500, S/N: 505562
- MERIAM 0-100 PSI PRESSURE GAUGE MODEL 31110100, S/N: 505561
- MERIAM 0-300 PSI PRESSURE GAUGE MODEL 3111200, S/N: 505560
- DWYER 0-10 SCFM FLOW METER MODEL RMB-57-SSV

THE TESTING EQUIPMENT LISTED ABOVE USED FOR ANNUAL MEDICAL GAS EVALUATIONS AND FOR MEDICAL GAS SYSTEM VERIFICATIONS HAS ITSELF BEEN TESTED AND CALIBRATED TO MEET THE NECESSARY REQUIREMENTS AND THEREFORE ACCURATELY REPRESENTS THE RESULTING DATA INFORMATION IN THE FOLLOWING SECTIONS OF THE DOCUMENT.

VERIFICATION TESTING PROCEDURES PER NFPA 99, 2012 - 5.1.12.3

ZONE VALVE BOX ASSEMBLIES:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY PROPER LABELING

3) VERIFY THAT THERE IS NO LEAKAGE IN ASSEMBLY

4) PERFORM VALVE TEST

AREA ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS MONITORED

7) VERIFY CURRENT HIGH / LOW SET POINTS FOR EACH GAS MONITORED

8) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS WITH CALIBRATED GAUGES

9) CALIBRATE PRESSURE / VACUUM ALARM SENSORS PER MANUFACTURER'S RECOMMENDATIONS

MASTER ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY PROPER OPERATION OF ALL REQUIRED ALARM SIGNALS

7) VERIFY ALL SET POINTS FOR EACH GAS MONITORED

OUTLET / INLET STATIONS:

1) VERIFY PROPER OPERATION AND CONDITION

2) VERIFY PROPER LABELING

3) VERIFY PROPER OPERATION OF VALVES AND THAT THERE IS NO LEAKAGE

4) VERIFY PROPER OPERATION AND CONDITION OF LATCHING MECHANISM

5) VERIFY PROPER OPERATIONAL PRESSURES

6) VERIFY PROPER STATIC PRESSURES

7) PERFORM STANDING PRESSURE TESTS

8) PERFORM CROSS-CONNECTION TESTS

9) PERFORM VALVE TESTS

10) PERFORM PIPING PURGE TESTS

11) PERFORM PIPING PARTICULATE TESTS

12) PERFORM PIPING PURITY TESTS

13) PERFORM MEDICAL GAS CONCENTRATION TESTS ON ALL POSITIVE-PRESSURE GASES

14) PERFORM MEDICAL AIR PURITY TESTS (FOR SYSTEM START-UP ONLY)

15) PERFORM MEDICAL AIR QUALITY TESTS

16) PERFORM FLOW RATE AND TRANSIENT FLOW RATE TESTS

ZONE VALVE BOX FOR: INTERVENTIONAL RADIOLOGY

ASSEMBLY LOCATION:

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1							
2							
3							
4							
5							
6							
7							

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: NOT TESTED AT THIS TIME

AREA ALARM PANEL LOCATION:

MANUFACTURER: **MODEL:**

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

OUTLET/INLET ZONE: INTERVENTIONAL

MANUFACTURER: AMICO **MODEL:** OHIO

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	INTERVENTIONAL	O2	O2	54 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
2	1-16	INTERVENTIONAL	MA	MA	53 PSIG	3.5/6.0 SCFM	51 PSIG	YES	YES	NO
3	1-16	INTERVENTIONAL	VAC	VAC	21 " HG	3.0 SCFM	19 " HG	YES	YES	NO
4	1-16	INTERVENTIONAL	N2	N2	175 PSIG	5.0 SCFM	172 PSIG	YES	YES	NO
5	1-16	RECOVERY	O2	O2	54 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
6	1-16	RECOVERY	VAC	VAC	21 " HG	4.0 SCFM	19 " HG	YES	YES	NO
7	1-16	RECOVERY	O2	O2	54 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
8	1-16	RECOVERY	VAC	VAC	21 " HG	4.0 SCFM	19 " HG	YES	YES	NO
9	1-16	RECOVERY	O2	O2	54 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
10	1-16	RECOVERY	VAC	VAC	21 " HG	4.0 SCFM	19 " HG	YES	YES	NO
11	1-16	RECOVERY	O2	O2	54 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
12	1-16	RECOVERY	VAC	VAC	21 " HG	4.0 SCFM	19 " HG	YES	YES	NO
13	1-16	DECON	N2	N2	175 PSIG	5.0 SCFM	172 PSIG	YES	YES	NO
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: ALL OUTLETS EXISTING AND RE-VERIFIED GOOD AFTER MAINS WERE RELOCATED.

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NFPA 99 MEDICAL GAS SYSTEMS VERIFICATION

VERIFICATION LOCATION:	**MEDICAL CENTER OF AURORA - SOUTH** **1501 S. POTOMAC ST.** **AURORA, CO 80011**
JOB DESCRIPTION:	**START UP SPD AIR COMPRESSOR**
VERIFICATION DATE:	**June 16, 2017**
MECHANICAL CONTRACTOR:	**RK MECHANICAL** **3800 XANTHIA ST.** **DENVER, CO 80238**
JOB CONTACT:	**BEN**

THIS VERIFICATION CONSISTS OF THE FOLLOWING MEDICAL GAS EQUIPMENT QUANTITIES:

	ZONE VALVES	ALARM PANELS	OUTLETS / INLETS
O2	0	0	0
VAC	0	0	0
MA	0	0	0
N2O	0	0	0
WAGD	0	0	0
N2	0	0	0
CO2	0	0	0

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SPD AIR COMPRESSOR STARTED UP GOOD AND READY FOR USE.

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MEDICAL GAS SOURCE EQUIPMENT: MEDICAL AIR COMPRESSOR / DRYER SYSTEMS

EQUIPMENT LOCATION #1: WEST MECHANICAL

MEDICAL AIR COMPRESSOR / DRYER SYSTEMS

COMP.	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	SERIAL NUMBER	HP / KW	RATED VOLTAGE	RATED AMPERAGE
UNIT #1	POWEREX	SEH3007S4806306	H06/29/15-	5806306-125	30 HP	460	6.49
UNIT #2							
UNIT #3							
UNIT #4							
UNIT #5							
UNIT #6							

UNIT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER
CO MONITOR	N/A		
DP MONITOR	N/A		
DRYER SYSTEM			

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

SWITCH LOCATION: N/A

NOTES:

MEDICAL GAS SOURCE EQUIPMENT: MEDICAL AIR COMPRESSOR / DRYER SYSTEMS

EQUIPMENT LOCATION #2:

MEDICAL AIR COMPRESSOR / DRYER SYSTEMS

COMP.	MANUFACTURER	SYSTEM NUMBER	MODEL NUMBER	SERIAL NUMBER	HP / KW	RATED VOLTAGE	RATED AMPERAGE
UNIT #1							
UNIT #2							
UNIT #3							
UNIT #4							
UNIT #5							
UNIT #6							

UNIT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER
CO MONITOR			
DP MONITOR			
DRYER SYSTEM			

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

SWITCH LOCATION:

NOTES:

MEDICAL AIR COMPRESSOR / DRYER SYSTEMS NFPA 99 VERIFICATION CHECKLIST

TEST #	MEDICAL AIR COMPRESSOR / DRYER SYSTEMS AND LOCATION REQUIREMENTS	LOCATION #1	LOCATION #2
	EQUIPMENT LOCATION REQUIREMENTS:		
1	LOCATION IS USED ONLY FOR THE PURPOSE OF MECHANICAL EQUIPMENT STORAGE	YES	
2	LOCATION IS PROPERLY LABELED ACCORDING TO THE ROOM'S CONTENTS	YES	
3	LOCATION IS LOCKABLE AND/OR SECURED FROM THE PUBLIC	YES	
4	LOCATOIN IS ACCESSIBLE BY VENDORS AND/OR MAINTENANCE FOR SERVICE	YES	
5	LOCATION IS CONSTRUCTED OF NONCOMBUSTIBLE OR LIMITED COMBUSTIBLE MATERIALS	YES	
6	LOCATION'S WALLS, FLOORS, CEILINGS & DOORS HAVE MIN. 1-HR FIRE RATING (IF INDOORS)	YES	
7	LOCATION'S CONTENTS INCLUDE NO COMBUSTIBLE OR FLAMMABLE MATERIALS	YES	
8	LOCATION'S ELECTRICAL DEVICES ARE INSTALLED 5 FEET ABOVE FLOOR LEVEL	N/A	
9	LOCATION IS PROPERLY HEATED	YES	
10	LOCATION IS PROPERLY VENTILATED	YES	
11	LOCATION INCLUDES ONLY CENTRAL SUPPLY SYSTEMS PERMITTED TO BE IN THE SAME AREA	YES	
	SYSTEM REQUIREMENTS (* = MAY NOT APPLY TO ALL COMPRESSOR / DRYER SYSTEMS):**		
12	SYSTEM INCLUDES AN EMERGENCY ELECTRICAL POWER SUPPLY	N/A	
13	SYSTEM INCLUDES MIN. DUPLEX PUMP CONFIGURATION	YES	
14	SYSTEM INCLUDES AUTOMATIC OR MANUAL MEANS OF ALTERNATION	YES	
15	SYSTEM INCLUDES AUTOMATIC MEANS FOR LAG PUMP TO ACTIVATE WHEN DEMAND > SUPPLY	YES	
16	SYSTEM INCLUDES A LOCAL ALARM SIGNAL FOR LAG PUMP OPERATING	N/A	
17	SYSTEM INCLUDES VALVE ARRANGEMENT FOR MEANS OF ISOLATING EACH UNIT FOR SERVICE	N/A	
18	SYSTEM INCLUDES ANTI-VIBRATION MOUNTINGS INSTALLED PER MANUFACTURER'S SPECS	YES	
19	SYSTEM INCLUDES FLEXIBLE CONNECTORS TO BOTH INTAKE AND EXHAUST PIPING	YES	
20	SYSTEM INCLUDES PROPERLY LOCATED AND LABELED SOURCE VALVE	YES	
21	SYSTEM INCLUDES PROPERLY LOCATED PRESSURE SWITCHE & GAUGE	N/A	
22	SYSTEM INCLUDES MAIN VALVE WHERE SOURCE IS REMOTE ***	N/A	
23	SYSTEM PIPING IS PROPERLY LABELED	YES	
24	SYSTEM INCLUDES MEANS OF SEPARATING LIQUIDS FROM PIPELINE W/ VISUAL CONFIRMATION	N/A	
25	SYSTEM INCLUDES PRESSURE RELIEF VALVE SET AT 50% ABOVE LINE PRESSURE	YES	
26	SYSTEM INCLUDES HIGH WATER LEVEL SWITCH & ALARM (IF LIQUID RING) ***	N/A	
27	SYSTEM INCLUDES HIGH AIR TEMP SWITCH AND ALARM (W/ EXCEPTION OF LIQUID RING) ***	YES	
28	SYSTEM INCLUDES INTAKE MUFFLER / FILTER OF THE DRY TYPE	YES	
29	SYSTEM INCLUDES A 1/4" NPT SAMPLE PORT UPSTRAM OF SOURCE VALVE	N/A	
30	SYSTEM INCLUDES COALESCING FILTERS W/ MONITORING DEVICES (OIL-FILLED) ***	N/A	
31	SYSTEM INCLUDES CHARCOAL ABSORBERS W/ COLORMETRIC HYDROCARBON INDICATORS (OIL-FILLED) ***	N/A	
32	SYSTEM INCLUDES DEW POINT MONITOR & ALARM SET AT 39 DEGREES (F)	N/A	
33	SYSTEM INCLUDES CARBON MONOXIDE MONITOR & ALARM SET AT 10 PPM	N/A	
34	AFTER COOLERS ARE PROVIDED FOR EACH COMPRESSOR ***	YES	

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

MEDICAL AIR COMPRESSOR / DRYER SYSTEMS NFPA 99 VERIFICATION CHECKLIST

TEST #	MEDICAL AIR COMPRESSOR / DRYER SYSTEMS AND LOCATION REQUIREMENTS (...CONTINUED)	LOCATION #1	LOCATION #2
35	AFTER COOLERS INCLUDE VALVE ARRANGEMENT FOR MEANS OF ISOLATING EACH UNIT FOR SERVICE	N/A	
36	AFTER COOLERS INCLUDE INDIVIDUAL CONDENSATE TRAPS	N/A	
37	AFTER COOLERS INCLUDE ANTI-VIBRATION MOUNTINGS	YES	
38	RECEIVER INCLUDES VALVE ARRANGEMENT FOR MEANS OF ISOLATION FROM PUMPS	YES	
39	RECEIVER INCLUDES MANUAL DRAIN	YES	
40	RECEIVER INCLUDES A PRESSURE INDICATOR	YES	
41	RECEIVER INCLUDES A SIGHT GLASS	N/A	
42	RECEIVER INCLUDES A PRESSURE RELIEF VALVE	YES	
43	MOTORS INCLUDE DEDICATED DISCONNECT SWITCH PRIOR TO EACH STARTER	YES	
44	MOTORS INCLUDE MOTOR STARTING DEVICES	YES	
45	MOTORS INCLUDE OVERLOAD PROTECTION DEVICES	YES	
46	MOTORS INCLUDE AUTOMATIC RESTART FUNCTION	YES	
47	INTAKE IS PIPED OUTDOORS, TURNED DOWN & SCREENED	N/A	
48	INTAKE IS 10 FT FROM ANY DOOR, WINDOW, AIR INTAKE OR OTHER BUILDING OPENING	N/A	
49	INTAKE IS 20 FT ABOVE GROUND LEVEL	N/A	
50	INTAKE PIPING IS LARGE ENOUGH TO PREVENT BACKFLOW TO PUMPS	N/A	
51	INTAKE SOURCE MUST BE EQUAL TO OR BETTER THAN OUTDOOR AIR QUALITY ON A 24/7 BASIS ***	N/A	
52	DRYER SYSTEM INCLUDES ANTI-VIBRATION MOUNTINGS	YES	
53	DRYERS, FILTERS & REGS INCLUDE VALVES LOCATED UPSTREAM AND DOWNSTREAM FOR SERVICE	YES	
54	FILTERS ARE DUPLEXED & LOCATED UPSTREAM OF REGS W/ CONTINUOUS VISUAL ELEMENT LIFE INDICATOR	N/A	
55	REGULATORS ARE DUPLEXED & INCLUDE A PRESSURE INDICATOR PER MANUFACTURER'S RECOMMENDATION	N/A	

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

MEDICAL GAS SOURCE EQUIPMENT: BULK OXYGEN SUPPLY SYSTEM

EQUIPMENT LOCATION #1:

BULK OXYGEN SUPPLY SYSTEM

TANK SUPPLY	SUPPLIER / MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	TANK SIZE	LINE PRESSURE
PRIMARY					
SECONDARY					
EMER. RESERVE					

UNIT	COMMENTS	DATE REPAIRED	REPAIRED BY

SWITCH LOCATION:

NOTES:

MEDICAL GAS SOURCE EQUIPMENT: BULK OXYGEN SUPPLY SYSTEM

EQUIPMENT LOCATION #2:

BULK OXYGEN SUPPLY SYSTEM

TANK SUPPLY	SUPPLIER / MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	TANK SIZE	LINE PRESSURE
PRIMARY					
SECONDARY					
EMER. RESERVE					

UNIT	COMMENTS	DATE REPAIRED	REPAIRED BY

SWITCH LOCATION:

NOTES:

BULK OXYGEN SUPPLY SYSTEMS NFPA 99 VERIFICATION CHECKLIST

TEST #	BULK OXYGEN SUPPLY SYSTEMS AND LOCATION REQUIREMENTS	LOCATION #1	LOCATION #2
	EQUIPMENT LOCATION REQUIREMENTS:		
1	LOCATION IS USED ONLY FOR THE PURPOSE OF BULK GAS STORAGE		
2	LOCATION IS PROPERLY LABELED ACCORDING TO ITS CONTENTS		
3	LOCATION IS LOCKABLE AND/OR SECURED FROM THE PUBLIC		
4	LOCATOIN IS ACCESSIBLE BY VENDORS AND/OR MAINTENANCE FOR SERVICE		
5	LOCATION'S CONTENTS INCLUDE NO CUMBUSTIBLE OR FLAMMABLE MATERIALS		
6	LOCATION'S ELECTRICAL DEVICES ARE INSTALLED 5 FEET ABOVE GROUND LEVEL		
7	LOCATION'S CONTENTS ARE SECURED W/ PERMANENT ANCHORS		
8	LOCATION IS PROPERLY VENTILATED		
9	LOCATION COMPLIES WITH MINIMUM DISTANCE REQUIREMENTS FROM OTHER STRUCTURES		
10	LOCATION INCLUDES EQUIPMENT & DELIVERY VEHICLE PAD SLOPED AWAY FROM ENCLOSURE TO SAFE AREA		
11	LOCATION IS CONSTRUCTED OF NONCOMBUSTIBLE MATERIALS (GROUND IS CONCRETE OR CRUSHED STONE)		
	SYSTEM REQUIREMENTS (* = MAY NOT APPLY TO ALL BULK STORAGE SYSTEMS):**		
12	SYSTEM INCLUDES 1 OR MORE MAIN VESSELS W/ APPROPRIATELY SIZED SECONDARY/RESERVE		
13	SYSTEM'S PRIMARY TANK SUPPLIES GAS WHILE SECONDARY/RESERVE SUPPLY IS PREVENTED FROM USE		
14	SYSTEM'S SECONDARY/RESERVE AUTOMATICALLY ACTIVATES WHEN PRIMARY IS DEPLETED		
15	SYSTEM'S SECONDARY SUPPLY IS PIPED UPSTREAM OF FINAL LINE REG		
16	SYSTEM'S SECONDARY SUPPLY INCLUDES ECONOMIZER W/ DISCHARGE PIPED UPSTREAM OF FINAL LINE REG		
17	SYSTEM INCLUDES APPROPRIATE & ACCESSIBLE FILL CONNECTIONS, VALVES & GAUGES		
18	SYSTEM INCLUDES APPROPRIATE CAPS, STRAINERS & SUPPORTS		
19	SYSTEM INCLUDES APPROPRIATELY LOCATED RUPTURE DISCS TO PREVENT OVERPRESSURIZATION		
20	RESERVE SUPPLY INCLUDES MIN. 3 CONNECTIONS AND/OR AN AVG. DAY'S SUPPLY		
21	RESERVE SUPPLY INCLUDES APPROPRIATE VALVES & GAUGES		
22	RESERVE SUPPLY INCLUDES AUTOMATIC MEANS OF ACTIVATING WHEN NECESSARY		
23	RESERVE SUPPLY IS CONNECTED TO THE MAIN LINE UPSTREAM OF THE FINAL LINE REG		
24	SYSTEM INCLUDES A PROPERLY LOCATED AND LABELED SOURCE VALVE		
25	SYSTEM INCLUDES MAIN VALVES WHERE SOURCES ARE REMOTE ***		
26	SYSTEM INCLUDES A PROPELY LOCATED PRESSURE SWITCH & GAUGE		
27	SYSTEMS PIPING IS PROPERLY LABELED		
28	SYSTEM INCLUDES SENSORS & ALARMS INDICATING CHANGEOVER FROM PRIMARY TO SECONDARY SUPPLY		
29	SYSTEM INCLUDES SENSORS & ALARMS INDICATING SECONDARY SUPPLY IS BELOW AVG. DAY'S SUPPLY		
30	SYSTEM INCLUDES SENSORS & ALARMS INDICATING WHEN RESERVE SUPPLY IS IN USE ***		
31	SYSTEM INCLUDES SENSORS & ALARMS INDICATING RESERVE SUPPLY IS BELOW AVG. DAY'S SUPPLY ***		
32	VAPORIZERS INCLUDE APPROPRIATE VALVE ARRANGEMENT AND MEANS OF COVERTING LIQUID TO GAS ***		
33	EMERGENCY OXYGEN CONNECTION IS LOCATED PROPERLY & PROTECTED ***		
34	EMERGENCY OXYGEN CONNECTION INCLUDES APPROPRIATE VALVE ARRANGEMENT ***		

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

NFPA 99 MEDICAL GAS VERIFICATION TESTS: PIPING PURITY & PARTICULATE TESTS

SAMPLE LOCATIONS: SOURCE SAMPLE & MOST REMOTE OUTLETS

PIPING PURITY TESTS

TEST #	PIPELINE SYSTEM	TOTAL HYDROCARBONS (PPM)	HALOGENATED HYDROCARBONS (PPM)	DEW POINT (DEGREES - F)	PARTICULATE TESTS (QTY / GAS)	PARTICULATE TESTS (PASS / FAIL)
1	SOURCE			N/A	N/A	N/A
2				- 20 ^{0}F		
3				- 20 ^{0}F		
4				- 20 ^{0}F		
5				- 20 ^{0}F		
6				- 20 ^{0}F		
7						
8						
9						
10						

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

MEDICAL
AIR TESTING & SERVICES, INC.

1370 Harlan Street
Lakewood, Colorado 80214
Phone: 303-279-2491, 1-800-863-3247
Fax: 303-279-7132
www.medairtesting.com

NFPA 99 MEDICAL GAS SYSTEMS VERIFICATION

VERIFICATION LOCATION: **MEDICAL CENTER OF AURORA - SOUTH**
1501 SOUTH POTOMAC ST
AURORA, CO 80011

JOB DESCRIPTION: **NEW O.R.'S 1 & 2**

VERIFICATION DATE: **October 23, 2017**

MECHANICAL CONTRACTOR: **RK MECHANICAL**
3800 XANTHIA ST
DENVER, CO 80238

THIS VERIFICATION CONSISTS OF THE FOLLOWING MEDICAL GAS EQUIPMENT QUANTITIES:

	ZONE VALVES	ALARM PANELS	OUTLETS / INLETS
O2	2	0	4
VAC	2	0	4
MA	2	0	4
N2O	2	0	4
WAGD	2	0	4
N2	2	0	2
CO2	2	0	2

(PLEASE CONTACT MEDICAL AIR SYSTEMS, INC. REGARDING VACUUM & MEDICAL AIR DEMAND / SIZING)

VERIFICATION IS PER NFPA 99, 2012 EDITION. THE FINDINGS ARE ATTACHED

REMARKS: **ANY MODIFICATIONS OR ALTERATIONS TO THE MEDICAL GAS SYSTEMS SHALL REQUIRE RE-VERIFICATION.**

THIS DOCUMENT CONSISTS OF 13 PAGES.

MEDICAL AIR TESTING & SERVICES, INC. HAS INSPECTED THIS SYSTEM FOR ADHERENCE TO THE NFPA 99, MEDICAL GAS AND VACUUM SYSTEMS, 2012 EDITION.

THE FOLLOWING IS A LIST OF DEFICIENCIES, AREAS OF CONCERN AND/OR NOTABLE ISSUES THAT YOUR FACILITY NEEDS TO AT LEAST BE MADE AWARE OF WHICH MAY HAVE BEEN FORMALLY PERMITTABLE AT THE TIME OF DESIGN, HOWEVER DO NOT MEET THE STANDARDS REQUIRED BY THE NFPA 99. IF THESE CIRCUMSTANCES EXIST, PLEASE NOTE THAT PER NFPA 99, 2012 EDITION (5.1.1.4) "AN EXISTING SYSTEM THAT IS NOT IN STRICT COMPLIANCE WITH THE PROVISIONS OF THIS STANDARD SHALL BE PERMITTED TO BE CONTINUED IN USE AS LONG AS THE AUTHORITY HAVING JURISDICTION HAS DETERMINED THAT SUCH USE DOES NOT CONSTITUTE A DISTINCT HAZARD TO LIFE." ALSO NOTE THAT ALL NON-TESTED ITEMS WERE INACCESSIBLE AT THE TIME OF THIS EVALUATION. ALL NOTATIONS ARE MADE IN REFERENCE TO THE NFPA 99.

NFPA 99, 2012 DEFFICIENCIES:

(PLEASE REVIEW THE NEXT 2 PAGES FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

(PLEASE REVIEW THE NEXT PAGE FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

O.R.'S 1 & 2 VERIFIED GOOD PER NFPA 99. 3 VACUUM INLETS IN EACH O.R. WILL NEED TO BE TESTED ONCE INLETS ARE INSTALLED IN THE BOOMS.

THIS REPORT WAS APPROVED BY: _____

THANK YOU FOR YOUR SUPPORT OF OUR SERVICES. IN CASE OF EMERGENCY OR FOR FURTHER ASSISTANCE, CONTACT MEDICAL AIR TESTING & SERVICES, INC. VIA PHONE AT (800) 863-3247 OR (303) 279-2491. YOU MAY ALSO REACH US VIA E-MAIL AT info@medicalairsystems.com.

TESTING CRITERIA FOR VERIFICATION OF MEDICAL GAS SYSTEMS

IT IS THE INTENT OF THE MEDICAL GAS VERIFICATION TO TEST THE GENERAL OPERATING CONDITION OF ALL MEDICAL GAS SYSTEM COMPONENTS. THIS REPORT LISTS THEIR CONDITION AND ADDRESSES POTENTIAL HAZARDS. THE VERIFICATIONS ARE DESIGNED TO PROVIDE A "SYSTEM VERIFICATION" AS OUTLINED BY NPFA 99, 5.1.12.3 (2012), WHICH VERIFIES THE INSTALLATION AND PERFORMANCE STANDARDS TO WHICH THE SYSTEM(S) WAS CONSTRUCTED AND IS ONLY REQUIRED WHEN THE SYSTEM IS NEW, OR AN EXISTING SYSTEM HAS BEEN BREACHED AND/OR SYSTEM COMPONENTS HAVE BEEN REPLACED.

PLEASE BE ADVISED THAT THIS DOCUMENT IS ONLY A REPORT OF OUR FINDINGS AND THAT WE ARE NOT CONSIDERED TO BE THE AUTHORITY HAVING JURISDICTION. THE COMMENTS NOTED IN THE PREVIOUS PAGES OF OUR DOCUMENT REFER TO ANY NOTABLE CONCERNS AND/OR DEFICIENCIES THAT WERE DISCOVERED AT THE TIME OF OUR VERIFICATION.

ALL MEDICAL GAS SYSTEMS WILL BE TESTED TO THE MINIMUM STANDARDS SET FORTH BY NFPA 99, 2012 EDITION UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY. IF THERE IS ANY QUESTION AS TO WHICH CATEGORY THE FACILITY IS CATEGORIZED AS, THE AUTHORITY HAVING JURISDICTION IS RESPONSIBLE FOR DETERMINING THE FACILITY'S STATUS. THE MEDICAL GAS SYSTEMS WILL THEREFORE BE TESTED TO THOSE REQUIREMENTS.

ALL CRITICAL CARE AREAS WILL BE ASSUMED TO INCLUDE THOSE DEFINED BY NFPA 99, 2012 EDITION AND THEREFORE TESTED FOR THE REQUIRED CRITERIA UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY.

WE UNDERSTAND THAT SOME EXISTING SYSTEMS WERE INSTALLED AND TESTED TO PREVIOUS STANDARDS AND MAY NOT MEET PRESENT CODE REQUIREMENTS. NFPA 99, 5.1.1.4 (2012) ADDRESSES THESE SITUATIONS AND REFERS THEIR CONTINUANCE TO THE AUTHORITY HAVING JURISDICTION TO DETERMINE WHETHER THEY CONSTITUTE A DISTINCT HAZARD TO LIFE OR ARE NOT USEABLE.

MEDICAL GAS ZONES (E.R., P.A.C.U., PATIENT ROOMS, ETC.) ARE LISTED IN ORDER BY FLOOR AND IN SOME CASES BY BUILDING. UPON ENTERING A ROOM, OUTLETS/INLETS ARE LISTED STARTING WITH THE FIRST TO THE LEFT, PROCEEDING CLOCKWISE AROUND THE ROOM. IT IS ALWAYS OUR INTENT TO TEST ALL OUTLETS IN THE SYSTEM, HOWEVER IT IS RECOGNIZED THAT IT MAY NOT BE POSSIBLE TO TEST EVERY SINGLE ONE. SOME OUTLETS/INLETS MAY BE INACCESSIBLE OR IN USE. OUTLETS/INLETS THAT WERE NOT TESTED ARE LISTED BUT HAVE NO PERFORMANCE DATA. POTENTIAL PROBLEMS ARE NOTED ON THE COMMENT SECTION AND ARE DESCRIBED IN MORE DETAIL ON THE SUMMARY PAGES.

IT IS NOT PRACTICAL TO LIST EACH SPECIFIC PROBLEM FOUND (UNDECTABLE LEAKAGE, BENT FACE PLATE, DEFECTIVE OUTLET/INLET, ETC.). THE INTENT IS TO PROVIDE GUIDANCE FOR HOSPITAL PERSONNEL TO BE ABLE TO QUICKLY LOCATE SPECIFIC PROBLEM AREAS IN ORDER TO REPAIR AND RETEST THE SPECIFIC PROBLEM'S) NOTED.

****ALL CHAPTER AND PARAGRAPH REFERENCES IN THIS DOCUMENT ARE TAKEN FROM NPFA 99, STANDARD ON GAS AND VACUUM SYSTEMS, 2012 EDITION.****

TESTING QUALITY ASSURANCE

MEDICAL AIR TESTING & SERVICES' TECHNICAL SERVICE STAFF IS EXPERIENCED AND CONSISTS OF FACTORY TRAINED PERSONNEL WHO HAVE ALSO OBTAINED THE FOLLOWING INDUSTRY REQUIRED CREDENTIALS:

- ASME IX BRAZER
- ASSE 6010 MEDICAL GAS SYSTEMS INSTALLER
- ASSE 6020 MEDICAL GAS SYSTEMS INSPECTOR
- ASSE 6030 MEDICAL GAS SYSTEMS VERIFIER
- ASSE 6040 MEDICAL GAS SYSTEMS MAINTENANCE PERSONNEL
- ASSE 6050 MEDICAL GAS SYSTEMS INSTRUCTOR
- CMGV - MGPHO CREDENTIALED MEDICAL GAS SYSTEMS VERIFIER

ANY OR ALL OF THE FOLLOWING EQUIPMENT HAVE BEEN USED IN THE TESTING AND ANYLYSIS OF THE MEDICAL GAS SYSTEMS:

- NST MODEL G2000, MEDICAL GAS ANALYZER, S/N: 059
- FOXBORO MODEL MIB, PORTABLE AMBIENT AIR ANALYZER, S/N: 274405
- AINSWORTH MODEL A-200 DS AA, SERIES BALANCE, READABILITY OF .01MG
- 25 MM MEMBRANE PTFE FILTERS
- NYAD MODEL MA-160B, TRACE DEW POINT MONITOR, S/N: 1993
- MINIOX 1, OXYGEN ANALYZER
- MIRAN SAPPHIRE I-R ANALYZER MODEL 205BML1A3N, S/N: 205B-79520-408
- BACHARACH N2O ANALYZER MODEL 19-3314, S/N: 9475
- BACHARACH CO2 ANALYZER MODEL , S/N:
- MERIAM 0-30" HG VACUUM GAUGE MODEL 31111500, S/N: 505562
- MERIAM 0-100 PSI PRESSURE GAUGE MODEL 31110100, S/N: 505561
- MERIAM 0-300 PSI PRESSURE GAUGE MODEL 3111200, S/N: 505560
- DWYER 0-10 SCFM FLOW METER MODEL RMB-57-SSV

THE TESTING EQUIPMENT LISTED ABOVE USED FOR ANNUAL MEDICAL GAS EVALUATIONS AND FOR MEDICAL GAS SYSTEM VERIFICATIONS HAS ITSELF BEEN TESTED AND CALIBRATED TO MEET THE NECESSARY REQUIREMENTS AND THEREFORE ACCURATELY REPRESENTS THE RESULTING DATA INFORMATION IN THE FOLLOWING SECTIONS OF THE DOCUMENT.

VERIFICATION TESTING PROCEDURES PER NFPA 99, 2012 - 5.1.12.3

ZONE VALVE BOX ASSEMBLIES:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY PROPER LABELING

3) VERIFY THAT THERE IS NO LEAKAGE IN ASSEMBLY

4) PERFORM VALVE TEST

AREA ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS MONITORED

7) VERIFY CURRENT HIGH / LOW SET POINTS FOR EACH GAS MONITORED

8) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS WITH CALIBRATED GAUGES

9) CALIBRATE PRESSURE / VACUUM ALARM SENSORS PER MANUFACTURER'S RECOMMENDATIONS

MASTER ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY PROPER OPERATION OF ALL REQUIRED ALARM SIGNALS

7) VERIFY ALL SET POINTS FOR EACH GAS MONITORED

OUTLET / INLET STATIONS:

1) VERIFY PROPER OPERATION AND CONDITION

2) VERIFY PROPER LABELING

3) VERIFY PROPER OPERATION OF VALVES AND THAT THERE IS NO LEAKAGE

4) VERIFY PROPER OPERATION AND CONDITION OF LATCHING MECHANISM

5) VERIFY PROPER OPERATIONAL PRESSURES

6) VERIFY PROPER STATIC PRESSURES

7) PERFORM STANDING PRESSURE TESTS

8) PERFORM CROSS-CONNECTION TESTS

9) PERFORM VALVE TESTS

10) PERFORM PIPING PURGE TESTS

11) PERFORM PIPING PARTICULATE TESTS

12) PERFORM PIPING PURITY TESTS

13) PERFORM MEDICAL GAS CONCENTRATION TESTS ON ALL POSITIVE-PRESSURE GASES

14) PERFORM MEDICAL AIR PURITY TESTS (FOR SYSTEM START-UP ONLY)

15) PERFORM MEDICAL AIR QUALITY TESTS

16) PERFORM FLOW RATE AND TRANSIENT FLOW RATE TESTS

ZONE VALVE BOX FOR: O.R. 1

ASSEMBLY LOCATION: OUTSIDE O.R. 1

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1	1-4	CO2	O.R. 1	YES	YES	YES	YES
2	1-4	N2O	O.R. 1	YES	YES	YES	YES
3	1-4	N2	O.R. 1	YES	YES	YES	YES
4	1-4	MA	O.R. 1	YES	YES	YES	YES
5	1-4	O2	O.R. 1	YES	YES	YES	YES
6	1-4	WAGD	O.R. 1	YES	YES	YES	YES
7	1-4	VAC	O.R. 1	YES	YES	YES	YES

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

AREA ALARM PANEL LOCATION: NURSES STATION

MANUFACTURER: CHEMETRON **MODEL:** IMPACT

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: EXISTING AREA ALARM PANEL - RE-LABELED

OUTLET/INLET ZONE: O.R. 1

MANUFACTURER: AMICO **MODEL:** OHIO

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	O.R. 1	VAC	VAC	21 " HG	3.7 SCFM	20 " HG	YES	YES	NO
2	1-16	O.R. 1	WAGD	WAGD	21 " HG	3.7 SCFM	20 " HG	YES	YES	NO
3	1-16	O.R. 1	O2	O2	53 PSIG	3.5/6.0 SCFM	51 PSIG	YES	YES	NO
4	1-16	O.R. 1	MA	MA	51 PSIG	3.5/6.0 SCFM	50 PSIG	YES	YES	NO
5	1-16	O.R. 1	N2O	N2O	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
6	1-16	O.R. 1	N2	N2	175 PSIG	5.0 SCFM	172 PSIG	YES	YES	NO
7	1-16	O.R. 1	CO2	CO2	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
8	1-16	O.R. 1	N2O	N2O	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
9	1-16	O.R. 1	MA	MA	51 PSIG	3.5/6.0 SCFM	50 PSIG	YES	YES	NO
10	1-16	O.R. 1	O2	O2	53 PSIG	3.5/6.0 SCFM	51 PSIG	YES	YES	NO
11	1-16	O.R. 1	WAGD	WAGD	21 " HG	3.7 SCFM	20 " HG	YES	YES	NO
12	1-16	O.R. 1	VAC	VAC	21 " HG	3.7 SCFM	20 " HG	YES	YES	NO
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: 3 VACUUM INLETS NOT TESTED - NO OUTLETS IN BOOM

ZONE VALVE BOX FOR: O.R. 2

ASSEMBLY LOCATION: OUTSIDE O.R. 2

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1	1-4	N2O	O.R. 2	YES	YES	YES	YES
2	1-4	CO2	O.R. 2	YES	YES	YES	YES
3	1-4	MA	O.R. 2	YES	YES	YES	YES
4	1-4	N2	O.R. 2	YES	YES	YES	YES
5	1-4	O2	O.R. 2	YES	YES	YES	YES
6	1-4	WAGD	O.R. 2	YES	YES	YES	YES
7	1-4	VAC	O.R. 2	YES	YES	YES	YES

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

AREA ALARM PANEL LOCATION: NURSES STATION

MANUFACTURER: **MODEL:**

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: EXISTING AREA ALARM PANEL

OUTLET/INLET ZONE: O.R. 2

MANUFACTURER: AMICO **MODEL:** OHIO

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	O.R. 2	VAC	VAC	21 " HG	4.0 SCFM	20 " HG	YES	YES	NO
2	1-16	O.R. 2	WAGD	WAGD	21 " HG	3.7 SCFM	20 " HG	YES	YES	NO
3	1-16	O.R. 2	O2	O2	53 PSIG	3.5/6.0 SCFM	51 PSIG	YES	YES	NO
4	1-16	O.R. 2	MA	MA	51 PSIG	3.5/6.0 SCFM	50 PSIG	YES	YES	NO
5	1-16	O.R. 2	N2O	N2O	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
6	1-16	O.R. 2	N2	N2	175 PSIG	5.0 SCFM	172 PSIG	YES	YES	NO
7	1-16	O.R. 2	CO2	CO2	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
8	1-16	O.R. 2	N2O	N2O	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
9	1-16	O.R. 2	MA	MA	51 PSIG	3.5/6.0 SCFM	50 PSIG	YES	YES	NO
10	1-16	O.R. 2	O2	O2	53 PSIG	3.5/6.0 SCFM	51 PSIG	YES	YES	NO
11	1-16	O.R. 2	WAGD	WAGD	21 " HG	3.7 SCFM	20 " HG	YES	YES	NO
12	1-16	O.R. 2	VAC	VAC	21 " HG	4.0 SCFM	20 " HG	YES	YES	NO
13										
14										
15										
16										
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TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: 3 VACUUM INLETS NOT TESTED - NO OUTLETS IN BOOM

MEDICAL AIR TESTING & SERVICES, INC.

1370 Harlan Street
Lakewood, Colorado 80214
Phone: 303-279-2491, 1-800-863-3247
Fax: 303-279-7132
www.medairtesting.com

NFPA 99 MEDICAL GAS SYSTEMS VERIFICATION

VERIFICATION LOCATION: MEDICAL CENTER OF AURORA - SOUTH CAMPUS
1501 SOUTH POTOMAC ST.
AURORA, CO 80011

JOB DESCRIPTION: NEW O.R.'S 1 & 2 (2ND TRIP TO TEST VACUUM IN BOOMS)

VERIFICATION DATE: October 27, 2017

MECHANICAL CONTRACTOR: RK MECHANICAL
3800 XANTHIA ST
DENVER, CO 80238

THIS VERIFICATION CONSISTS OF THE FOLLOWING MEDICAL GAS EQUIPMENT QUANTITIES:

	ZONE VALVES	ALARM PANELS	OUTLETS / INLETS
O2	0	0	0
VAC	0	0	6
MA	0	0	0
N2O	0	0	0
WAGD	0	0	0
N2	0	0	0
CO2	0	0	0

(PLEASE CONTACT MEDICAL AIR SYSTEMS, INC. REGARDING VACUUM & MEDICAL AIR DEMAND / SIZING)

VERIFICATION IS PER NFPA 99, 2012 EDITION. THE FINDINGS ARE ATTACHED

REMARKS: **ANY MODIFICATIONS OR ALTERATIONS TO THE MEDICAL GAS SYSTEMS SHALL REQUIRE RE-VERIFICATION.**

THIS DOCUMENT CONSISTS OF 13 PAGES.

MEDICAL AIR TESTING & SERVICES, INC. HAS INSPECTED THIS SYSTEM FOR ADHERENCE TO THE NFPA 99, MEDICAL GAS AND VACUUM SYSTEMS, 2012 EDITION.

THE FOLLOWING IS A LIST OF DEFICIENCIES, AREAS OF CONCERN AND/OR NOTABLE ISSUES THAT YOUR FACILITY NEEDS TO AT LEAST BE MADE AWARE OF WHICH MAY HAVE BEEN FORMALLY PERMITTABLE AT THE TIME OF DESIGN, HOWEVER DO NOT MEET THE STANDARDS REQUIRED BY THE NFPA 99. IF THESE CIRCUMSTANCES EXIST, PLEASE NOTE THAT PER NFPA 99, 2012 EDITION (5.1.1.4) "AN EXISTING SYSTEM THAT IS NOT IN STRICT COMPLIANCE WITH THE PROVISIONS OF THIS STANDARD SHALL BE PERMITTED TO BE CONTINUED IN USE AS LONG AS THE AUTHORITY HAVING JURISDICTION HAS DETERMINED THAT SUCH USE DOES NOT CONSTITUTE A DISTINCT HAZARD TO LIFE." ALSO NOTE THAT ALL NON-TESTED ITEMS WERE INACCESSIBLE AT THE TIME OF THIS EVALUATION. ALL NOTATIONS ARE MADE IN REFERENCE TO THE NFPA 99.

NFPA 99, 2012 DEFFICIENCIES:

(PLEASE REVIEW THE NEXT 2 PAGES FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

(PLEASE REVIEW THE NEXT PAGE FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

VACUUM INLETS IN THE BOOMS FOR O.R.'S 1 & 2 VERIFIED GOOD PER NFPA 999 AND READY FOR PATIENT USE.

THIS REPORT WAS APPROVED BY: _____

THANK YOU FOR YOUR SUPPORT OF OUR SERVICES. IN CASE OF EMERGENCY OR FOR FURTHER ASSISTANCE, CONTACT MEDICAL AIR TESTING & SERVICES, INC. VIA PHONE AT (800) 863-3247 OR (303) 279-2491. YOU MAY ALSO REACH US VIA E-MAIL AT info@medicalairsystems.com.

TESTING CRITERIA FOR VERIFICATION OF MEDICAL GAS SYSTEMS

IT IS THE INTENT OF THE MEDICAL GAS VERIFICATION TO TEST THE GENERAL OPERATING CONDITION OF ALL MEDICAL GAS SYSTEM COMPONENTS. THIS REPORT LISTS THEIR CONDITION AND ADDRESSES POTENTIAL HAZARDS. THE VERIFICATIONS ARE DESIGNED TO PROVIDE A "SYSTEM VERIFICATION" AS OUTLINED BY NPFA 99, 5.1.12.3 (2012), WHICH VERIFIES THE INSTALLATION AND PERFORMANCE STANDARDS TO WHICH THE SYSTEM(S) WAS CONSTRUCTED AND IS ONLY REQUIRED WHEN THE SYSTEM IS NEW, OR AN EXISTING SYSTEM HAS BEEN BREACHED AND/OR SYSTEM COMPONENTS HAVE BEEN REPLACED.

PLEASE BE ADVISED THAT THIS DOCUMENT IS ONLY A REPORT OF OUR FINDINGS AND THAT WE ARE NOT CONSIDERED TO BE THE AUTHORITY HAVING JURISDICTION. THE COMMENTS NOTED IN THE PREVIOUS PAGES OF OUR DOCUMENT REFER TO ANY NOTABLE CONCERNS AND/OR DEFICIENCIES THAT WERE DISCOVERED AT THE TIME OF OUR VERIFICATION.

ALL MEDICAL GAS SYSTEMS WILL BE TESTED TO THE MINIMUM STANDARDS SET FORTH BY NFPA 99, 2012 EDITION UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY. IF THERE IS ANY QUESTION AS TO WHICH CATEGORY THE FACILITY IS CATEGORIZED AS, THE AUTHORITY HAVING JURISDICTION IS RESPONSIBLE FOR DETERMINING THE FACILITY'S STATUS. THE MEDICAL GAS SYSTEMS WILL THEREFORE BE TESTED TO THOSE REQUIREMENTS.

ALL CRITICAL CARE AREAS WILL BE ASSUMED TO INCLUDE THOSE DEFINED BY NFPA 99, 2012 EDITION AND THEREFORE TESTED FOR THE REQUIRED CRITERIA UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY.

WE UNDERSTAND THAT SOME EXISTING SYSTEMS WERE INSTALLED AND TESTED TO PREVIOUS STANDARDS AND MAY NOT MEET PRESENT CODE REQUIREMENTS. NFPA 99, 5.1.1.4 (2012) ADDRESSES THESE SITUATIONS AND REFERS THEIR CONTINUANCE TO THE AUTHORITY HAVING JURISDICTION TO DETERMINE WHETHER THEY CONSTITUTE A DISTINCT HAZARD TO LIFE OR ARE NOT USEABLE.

MEDICAL GAS ZONES (E.R., P.A.C.U., PATIENT ROOMS, ETC.) ARE LISTED IN ORDER BY FLOOR AND IN SOME CASES BY BUILDING. UPON ENTERING A ROOM, OUTLETS/INLETS ARE LISTED STARTING WITH THE FIRST TO THE LEFT, PROCEEDING CLOCKWISE AROUND THE ROOM. IT IS ALWAYS OUR INTENT TO TEST ALL OUTLETS IN THE SYSTEM, HOWEVER IT IS RECOGNIZED THAT IT MAY NOT BE POSSIBLE TO TEST EVERY SINGLE ONE. SOME OUTLETS/INLETS MAY BE INACCESSIBLE OR IN USE. OUTLETS/INLETS THAT WERE NOT TESTED ARE LISTED BUT HAVE NO PERFORMANCE DATA. POTENTIAL PROBLEMS ARE NOTED ON THE COMMENT SECTION AND ARE DESCRIBED IN MORE DETAIL ON THE SUMMARY PAGES.

IT IS NOT PRACTICAL TO LIST EACH SPECIFIC PROBLEM FOUND (UNDECTABLE LEAKAGE, BENT FACE PLATE, DEFECTIVE OUTLET/INLET, ETC.). THE INTENT IS TO PROVIDE GUIDANCE FOR HOSPITAL PERSONNEL TO BE ABLE TO QUICKLY LOCATE SPECIFIC PROBLEM AREAS IN ORDER TO REPAIR AND RETEST THE SPECIFIC PROBLEM'S) NOTED.

****ALL CHAPTER AND PARAGRAPH REFERENCES IN THIS DOCUMENT ARE TAKEN FROM NPFA 99, STANDARD ON GAS AND VACUUM SYSTEMS, 2012 EDITION.****

TESTING QUALITY ASSURANCE

MEDICAL AIR TESTING & SERVICES' TECHNICAL SERVICE STAFF IS EXPERIENCED AND CONSISTS OF FACTORY TRAINED PERSONNEL WHO HAVE ALSO OBTAINED THE FOLLOWING INDUSTRY REQUIRED CREDENTIALS:

- ASME IX BRAZER
- ASSE 6010 MEDICAL GAS SYSTEMS INSTALLER
- ASSE 6020 MEDICAL GAS SYSTEMS INSPECTOR
- ASSE 6030 MEDICAL GAS SYSTEMS VERIFIER
- ASSE 6040 MEDICAL GAS SYSTEMS MAINTENANCE PERSONNEL
- ASSE 6050 MEDICAL GAS SYSTEMS INSTRUCTOR
- CMGV - MGPHO CREDENTIALED MEDICAL GAS SYSTEMS VERIFIER

ANY OR ALL OF THE FOLLOWING EQUIPMENT HAVE BEEN USED IN THE TESTING AND ANYLYSIS OF THE MEDICAL GAS SYSTEMS:

- NST MODEL G2000, MEDICAL GAS ANALYZER, S/N: 059
- FOXBORO MODEL MIB, PORTABLE AMBIENT AIR ANALYZER, S/N: 274405
- AINSWORTH MODEL A-200 DS AA, SERIES BALANCE, READABILITY OF .01MG
- 25 MM MEMBRANE PTFE FILTERS
- NYAD MODEL MA-160B, TRACE DEW POINT MONITOR, S/N: 1993
- MINIOX 1, OXYGEN ANALYZER
- MIRAN SAPPHIRE I-R ANALYZER MODEL 205BML1A3N, S/N: 205B-79520-408
- BACHARACH N2O ANALYZER MODEL 19-3314, S/N: 9475
- BACHARACH CO2 ANALYZER MODEL , S/N:
- MERIAM 0-30" HG VACUUM GAUGE MODEL 31111500, S/N: 505562
- MERIAM 0-100 PSI PRESSURE GAUGE MODEL 31110100, S/N: 505561
- MERIAM 0-300 PSI PRESSURE GAUGE MODEL 3111200, S/N: 505560
- DWYER 0-10 SCFM FLOW METER MODEL RMB-57-SSV

THE TESTING EQUIPMENT LISTED ABOVE USED FOR ANNUAL MEDICAL GAS EVALUATIONS AND FOR MEDICAL GAS SYSTEM VERIFICATIONS HAS ITSELF BEEN TESTED AND CALIBRATED TO MEET THE NECESSARY REQUIREMENTS AND THEREFORE ACCURATELY REPRESENTS THE RESULTING DATA INFORMATION IN THE FOLLOWING SECTIONS OF THE DOCUMENT.

VERIFICATION TESTING PROCEDURES PER NFPA 99, 2012 - 5.1.12.3

ZONE VALVE BOX ASSEMBLIES:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY PROPER LABELING

3) VERIFY THAT THERE IS NO LEAKAGE IN ASSEMBLY

4) PERFORM VALVE TEST

AREA ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS MONITORED

7) VERIFY CURRENT HIGH / LOW SET POINTS FOR EACH GAS MONITORED

8) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS WITH CALIBRATED GAUGES

9) CALIBRATE PRESSURE / VACUUM ALARM SENSORS PER MANUFACTURER'S RECOMMENDATIONS

MASTER ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY PROPER OPERATION OF ALL REQUIRED ALARM SIGNALS

7) VERIFY ALL SET POINTS FOR EACH GAS MONITORED

OUTLET / INLET STATIONS:

1) VERIFY PROPER OPERATION AND CONDITION

2) VERIFY PROPER LABELING

3) VERIFY PROPER OPERATION OF VALVES AND THAT THERE IS NO LEAKAGE

4) VERIFY PROPER OPERATION AND CONDITION OF LATCHING MECHANISM

5) VERIFY PROPER OPERATIONAL PRESSURES

6) VERIFY PROPER STATIC PRESSURES

7) PERFORM STANDING PRESSURE TESTS

8) PERFORM CROSS-CONNECTION TESTS

9) PERFORM VALVE TESTS

10) PERFORM PIPING PURGE TESTS

11) PERFORM PIPING PARTICULATE TESTS

12) PERFORM PIPING PURITY TESTS

13) PERFORM MEDICAL GAS CONCENTRATION TESTS ON ALL POSITIVE-PRESSURE GASES

14) PERFORM MEDICAL AIR PURITY TESTS (FOR SYSTEM START-UP ONLY)

15) PERFORM MEDICAL AIR QUALITY TESTS

16) PERFORM FLOW RATE AND TRANSIENT FLOW RATE TESTS

ZONE VALVE BOX FOR: O.R. 1

ASSEMBLY LOCATION: OUTSIDE O.R. 1

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1							
2							
3							
4							
5							
6							
7							

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: EXISTING ZONE VALVE BOX TESTED GOOD

AREA ALARM PANEL LOCATION:

MANUFACTURER: **MODEL:**

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

OUTLET/INLET ZONE: O.R. 1

MANUFACTURER: TRI-TECH **MODEL:** OHIO

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	O.R. 1	VAC	VAC	21 " HG	3.7 SCFM	19 " HG	YES	YES	NO
2	1-16	O.R. 1	VAC	VAC	21 " HG	3.7 SCFM	19 " HG	YES	YES	NO
3	1-16	O.R. 1	VAC	VAC	21 " HG	3.7 SCFM	19 " HG	YES	YES	NO
4										
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TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: 1 - 3 VAC IN BOOMS

ZONE VALVE BOX FOR: O.R. 2

ASSEMBLY LOCATION: OUTSIDE O.R. 2

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1							
2							
3							
4							
5							
6							
7							

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: EXISTING ZONE VALVE BOX TESTED GOOD

AREA ALARM PANEL LOCATION:

MANUFACTURER: **MODEL:**

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

OUTLET/INLET ZONE: O.R. 2

MANUFACTURER: TRI-TECH **MODEL:** OHIO

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	O.R. 2	VAC	VAC	21 " HG	3.7 SCFM	19 " HG	YES	YES	NO
2	1-16	O.R. 2	VAC	VAC	21 " HG	3.7 SCFM	19 " HG	YES	YES	NO
3	1-16	O.R. 2	VAC	VAC	21 " HG	3.7 SCFM	19 " HG	YES	YES	NO
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29										
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TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: 1 - 3 VAC IN BOOMS

MEDICAL AIR TESTING & SERVICES, INC.

1370 Harlan Street
Lakewood, Colorado 80214
Phone: 303-279-2491, 1-800-863-3247
Fax: 303-279-7132
www.medairtesting.com

NFPA 99 MEDICAL GAS SYSTEMS VERIFICATION

VERIFICATION LOCATION: MEDICAL CENTER OF AURORA - SOUTH
1501 SOUTH POTOMAC STREET
AURORA, CO 80011

JOB DESCRIPTION: NEW O.R. 3

VERIFICATION DATE: June 16, 2017

MECHANICAL CONTRACTOR: RK MECHANCIAL
3800 XANTHIA STREET
DENVER, CO 80238

JOB CONTACT: BEN

THIS VERIFICATION CONSISTS OF THE FOLLOWING MEDICAL GAS EQUIPMENT QUANTITIES:

	ZONE VALVES	ALARM PANELS	OUTLETS / INLETS
O2	1	0	2
VAC	1	0	5
MA	1	0	2
N2O	1	0	2
WAGD	1	0	2
N2	1	0	2
CO2	1	0	1

(PLEASE CONTACT MEDICAL AIR SYSTEMS, INC. REGARDING VACUUM & MEDICAL AIR DEMAND / SIZING)

VERIFICATION IS PER NFPA 99, 2012 EDITION. THE FINDINGS ARE ATTACHED

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THIS DOCUMENT CONSISTS OF 11 PAGES.

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NFPA 99, 2012 DEFFICIENCIES:

(PLEASE REVIEW THE NEXT 2 PAGES FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

(PLEASE REVIEW THE NEXT PAGE FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

O.R. 3 VERIFIED GOOD PER NFPA 99 AND IS READY FOR PATIENT USE.

THIS REPORT WAS APPROVED BY: _____

THANK YOU FOR YOUR SUPPORT OF OUR SERVICES. IN CASE OF EMERGENCY OR FOR FURTHER ASSISTANCE, CONTACT MEDICAL AIR TESTING & SERVICES, INC. VIA PHONE AT (800) 863-3247 OR (303) 279-2491. YOU MAY ALSO REACH US VIA E-MAIL AT info@medicalairsystems.com.

TESTING CRITERIA FOR VERIFICATION OF MEDICAL GAS SYSTEMS

IT IS THE INTENT OF THE MEDICAL GAS VERIFICATION TO TEST THE GENERAL OPERATING CONDITION OF ALL MEDICAL GAS SYSTEM COMPONENTS. THIS REPORT LISTS THEIR CONDITION AND ADDRESSES POTENTIAL HAZARDS. THE VERIFICATIONS ARE DESIGNED TO PROVIDE A "SYSTEM VERIFICATION" AS OUTLINED BY NPFA 99, 5.1.12.3 (2012), WHICH VERIFIES THE INSTALLATION AND PERFORMANCE STANDARDS TO WHICH THE SYSTEM(S) WAS CONSTRUCTED AND IS ONLY REQUIRED WHEN THE SYSTEM IS NEW, OR AN EXISTING SYSTEM HAS BEEN BREACHED AND/OR SYSTEM COMPONENTS HAVE BEEN REPLACED.

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WE UNDERSTAND THAT SOME EXISTING SYSTEMS WERE INSTALLED AND TESTED TO PREVIOUS STANDARDS AND MAY NOT MEET PRESENT CODE REQUIREMENTS. NFPA 99, 5.1.1.4 (2012) ADDRESSES THESE SITUATIONS AND REFERS THEIR CONTINUANCE TO THE AUTHORITY HAVING JURISDICTION TO DETERMINE WHETHER THEY CONSTITUTE A DISTINCT HAZARD TO LIFE OR ARE NOT USEABLE.

MEDICAL GAS ZONES (E.R., P.A.C.U., PATIENT ROOMS, ETC.) ARE LISTED IN ORDER BY FLOOR AND IN SOME CASES BY BUILDING. UPON ENTERING A ROOM, OUTLETS/INLETS ARE LISTED STARTING WITH THE FIRST TO THE LEFT, PROCEEDING CLOCKWISE AROUND THE ROOM. IT IS ALWAYS OUR INTENT TO TEST ALL OUTLETS IN THE SYSTEM, HOWEVER IT IS RECOGNIZED THAT IT MAY NOT BE POSSIBLE TO TEST EVERY SINGLE ONE. SOME OUTLETS/INLETS MAY BE INACCESSIBLE OR IN USE. OUTLETS/INLETS THAT WERE NOT TESTED ARE LISTED BUT HAVE NO PERFORMANCE DATA. POTENTIAL PROBLEMS ARE NOTED ON THE COMMENT SECTION AND ARE DESCRIBED IN MORE DETAIL ON THE SUMMARY PAGES.

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****ALL CHAPTER AND PARAGRAPH REFERENCES IN THIS DOCUMENT ARE TAKEN FROM NPFA 99, STANDARD ON GAS AND VACUUM SYSTEMS, 2012 EDITION.****

TESTING QUALITY ASSURANCE

MEDICAL AIR TESTING & SERVICES' TECHNICAL SERVICE STAFF IS EXPERIENCED AND CONSISTS OF FACTORY TRAINED PERSONNEL WHO HAVE ALSO OBTAINED THE FOLLOWING INDUSTRY REQUIRED CREDENTIALS:

- ASME IX BRAZER
- ASSE 6010 MEDICAL GAS SYSTEMS INSTALLER
- ASSE 6020 MEDICAL GAS SYSTEMS INSPECTOR
- ASSE 6030 MEDICAL GAS SYSTEMS VERIFIER
- ASSE 6040 MEDICAL GAS SYSTEMS MAINTENANCE PERSONNEL
- ASSE 6050 MEDICAL GAS SYSTEMS INSTRUCTOR
- CMGV - MGPHO CREDENTIALED MEDICAL GAS SYSTEMS VERIFIER

ANY OR ALL OF THE FOLLOWING EQUIPMENT HAVE BEEN USED IN THE TESTING AND ANYLYSIS OF THE MEDICAL GAS SYSTEMS:

- NST MODEL G2000, MEDICAL GAS ANALYZER, S/N: 059
- FOXBORO MODEL MIB, PORTABLE AMBIENT AIR ANALYZER, S/N: 274405
- AINSWORTH MODEL A-200 DS AA, SERIES BALANCE, READABILITY OF .01MG
- 25 MM MEMBRANE PTFE FILTERS
- NYAD MODEL MA-160B, TRACE DEW POINT MONITOR, S/N: 1993
- MINIOX 1, OXYGEN ANALYZER
- MIRAN SAPPHIRE I-R ANALYZER MODEL 205BML1A3N, S/N: 205B-79520-408
- BACHARACH N2O ANALYZER MODEL 19-3314, S/N: 9475
- BACHARACH CO2 ANALYZER MODEL , S/N:
- MERIAM 0-30" HG VACUUM GAUGE MODEL 31111500, S/N: 505562
- MERIAM 0-100 PSI PRESSURE GAUGE MODEL 31110100, S/N: 505561
- MERIAM 0-300 PSI PRESSURE GAUGE MODEL 3111200, S/N: 505560
- DWYER 0-10 SCFM FLOW METER MODEL RMB-57-SSV

THE TESTING EQUIPMENT LISTED ABOVE USED FOR ANNUAL MEDICAL GAS EVALUATIONS AND FOR MEDICAL GAS SYSTEM VERIFICATIONS HAS ITSELF BEEN TESTED AND CALIBRATED TO MEET THE NECESSARY REQUIREMENTS AND THEREFORE ACCURATELY REPRESENTS THE RESULTING DATA INFORMATION IN THE FOLLOWING SECTIONS OF THE DOCUMENT.

VERIFICATION TESTING PROCEDURES PER NFPA 99, 2012 - 5.1.12.3

ZONE VALVE BOX ASSEMBLIES:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY PROPER LABELING

3) VERIFY THAT THERE IS NO LEAKAGE IN ASSEMBLY

4) PERFORM VALVE TEST

AREA ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS MONITORED

7) VERIFY CURRENT HIGH / LOW SET POINTS FOR EACH GAS MONITORED

8) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS WITH CALIBRATED GAUGES

9) CALIBRATE PRESSURE / VACUUM ALARM SENSORS PER MANUFACTURER'S RECOMMENDATIONS

MASTER ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY PROPER OPERATION OF ALL REQUIRED ALARM SIGNALS

7) VERIFY ALL SET POINTS FOR EACH GAS MONITORED

OUTLET / INLET STATIONS:

1) VERIFY PROPER OPERATION AND CONDITION

2) VERIFY PROPER LABELING

3) VERIFY PROPER OPERATION OF VALVES AND THAT THERE IS NO LEAKAGE

4) VERIFY PROPER OPERATION AND CONDITION OF LATCHING MECHANISM

5) VERIFY PROPER OPERATIONAL PRESSURES

6) VERIFY PROPER STATIC PRESSURES

7) PERFORM STANDING PRESSURE TESTS

8) PERFORM CROSS-CONNECTION TESTS

9) PERFORM VALVE TESTS

10) PERFORM PIPING PURGE TESTS

11) PERFORM PIPING PARTICULATE TESTS

12) PERFORM PIPING PURITY TESTS

13) PERFORM MEDICAL GAS CONCENTRATION TESTS ON ALL POSITIVE-PRESSURE GASES

14) PERFORM MEDICAL AIR PURITY TESTS (FOR SYSTEM START-UP ONLY)

15) PERFORM MEDICAL AIR QUALITY TESTS

16) PERFORM FLOW RATE AND TRANSIENT FLOW RATE TESTS

ZONE VALVE BOX FOR: O.R. 3

ASSEMBLY LOCATION: AMICO

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1	1-4	CO2	O.R. 3	YES	YES	YES	YES
2	1-4	N2O	O.R. 3	YES	YES	YES	YES
3	1-4	N2	O.R. 3	YES	YES	YES	YES
4	1-4	MA	O.R. 3	YES	YES	YES	YES
5	1-4	O2	O.R. 3	YES	YES	YES	YES
6	1-4	WAGD	O.R. 3	YES	YES	YES	YES
7	1-4	VAC	O.R. 3	YES	YES	YES	YES

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

AREA ALARM PANEL LOCATION: NURSES STATION - SAME AREA ALARM PANEL FOR ALL O.R.'S

MANUFACTURER: **MODEL:**

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

OUTLET/INLET ZONE: O.R. 3

MANUFACTURER: AMICO **MODEL:** OHIO

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	O.R. 3	VAC	VAC	21 " HG	4.5 SCFM	19 " HG	YES	YES	NO
2	1-16	O.R. 3	WAGD	WAGD	21 " HG	4.5 SCFM	19 " HG	YES	YES	NO
3	1-16	O.R. 3	O2	O2	54 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
4	1-16	O.R. 3	MA	MA	53 PSIG	3.5/6.0 SCFM	51 PSIG	YES	YES	NO
5	1-16	O.R. 3	N2O	N2O	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
6	1-16	O.R. 3	VAC	VAC	21 " HG	4.5 SCFM	19 " HG	YES	YES	NO
7	1-16	O.R. 3	N2	N2	175 PSIG	5.0 SCFM	170 PSIG	YES	YES	NO
8	1-16	O.R. 3	VAC	VAC	21 " HG	4.0 SCFM	19 " HG	YES	YES	NO
9	1-16	O.R. 3	VAC	VAC	21 " HG	4.0 SCFM	19 " HG	YES	YES	NO
10	1-16	O.R. 3	CO2	CO2	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
11	1-16	O.R. 3	N2O	N2O	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
12	1-16	O.R. 3	MA	MA	53 PSIG	3.5/6.0 SCFM	51 PSIG	YES	YES	NO
13	1-16	O.R. 3	O2	O2	54 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
14	1-16	O.R. 3	WAGD	WAGD	21 " HG	4.0 SCFM	19 " HG	YES	YES	NO
15	1-16	O.R. 3	VAC	VAC	21 " HG	4.5 SCFM	19 " HG	YES	YES	NO
16	1-16	O.R. 3	N2	N2	175 PSIG	5.0 SCFM	170 PSIG	YES	YES	NO
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

MEDICAL AIR TESTING & SERVICES, INC.

1370 Harlan Street
Lakewood, Colorado 80214
Phone: 303-279-2491, 1-800-863-3247
Fax: 303-279-7132
www.medairtesting.com

NFPA 99 MEDICAL GAS SYSTEMS VERIFICATION

VERIFICATION LOCATION: **MEDICAL CENTER OF AURORA - SOUTH**
1501 SOUTH POTOMAC ST.
AURORA, CO 80011

JOB DESCRIPTION: **O.R. 3 & MINOR PROCEDURE**

VERIFICATION DATE: **August 8, 2017**

MECHANICAL CONTRACTOR: **MC MECHANICAL**
PO BOX 617
STRAUSBURG, CO 80136

JOB CONTACT: **MIKE**

THIS VERIFICATION CONSISTS OF THE FOLLOWING MEDICAL GAS EQUIPMENT QUANTITIES:

	ZONE VALVES	ALARM PANELS	OUTLETS / INLETS
O2	0	0	3
VAC	0	0	4
MA	0	0	1
N2O	0	0	1
WAGD	0	0	2
N2	0	0	0
CO2	0	0	0

(PLEASE CONTACT MEDICAL AIR SYSTEMS, INC. REGARDING VACUUM & MEDICAL AIR DEMAND / SIZING)

VERIFICATION IS PER NFPA 99, 2012 EDITION. THE FINDINGS ARE ATTACHED

REMARKS: **ANY MODIFICATIONS OR ALTERATIONS TO THE MEDICAL GAS SYSTEMS SHALL REQUIRE RE-VERIFICATION.**

THIS DOCUMENT CONSISTS OF 13 PAGES.

MEDICAL AIR TESTING & SERVICES, INC. HAS INSPECTED THIS SYSTEM FOR ADHERENCE TO THE NFPA 99, MEDICAL GAS AND VACUUM SYSTEMS, 2012 EDITION.

THE FOLLOWING IS A LIST OF DEFICIENCIES, AREAS OF CONCERN AND/OR NOTABLE ISSUES THAT YOUR FACILITY NEEDS TO AT LEAST BE MADE AWARE OF WHICH MAY HAVE BEEN FORMALLY PERMITTABLE AT THE TIME OF DESIGN, HOWEVER DO NOT MEET THE STANDARDS REQUIRED BY THE NFPA 99. IF THESE CIRCUMSTANCES EXIST, PLEASE NOTE THAT PER NFPA 99, 2012 EDITION (5.1.1.4) "AN EXISTING SYSTEM THAT IS NOT IN STRICT COMPLIANCE WITH THE PROVISIONS OF THIS STANDARD SHALL BE PERMITTED TO BE CONTINUED IN USE AS LONG AS THE AUTHORITY HAVING JURISDICTION HAS DETERMINED THAT SUCH USE DOES NOT CONSTITUTE A DISTINCT HAZARD TO LIFE." ALSO NOTE THAT ALL NON-TESTED ITEMS WERE INACCESSIBLE AT THE TIME OF THIS EVALUATION. ALL NOTATIONS ARE MADE IN REFERENCE TO THE NFPA 99.

NFPA 99, 2012 DEFFICIENCIES:

(PLEASE REVIEW THE NEXT 2 PAGES FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

NEW OUTLETS IN O.R. 3 AND MINOR PROCEDURE VERIFIED GOOD AND READY FOR PATIENT USE.

(PLEASE REVIEW THE NEXT PAGE FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

THIS REPORT WAS APPROVED BY: _____

THANK YOU FOR YOUR SUPPORT OF OUR SERVICES. IN CASE OF EMERGENCY OR FOR FURTHER ASSISTANCE, CONTACT MEDICAL AIR TESTING & SERVICES, INC. VIA PHONE AT (800) 863-3247 OR (303) 279-2491. YOU MAY ALSO REACH US VIA E-MAIL AT info@medicalairsystems.com.

TESTING CRITERIA FOR VERIFICATION OF MEDICAL GAS SYSTEMS

IT IS THE INTENT OF THE MEDICAL GAS VERIFICATION TO TEST THE GENERAL OPERATING CONDITION OF ALL MEDICAL GAS SYSTEM COMPONENTS. THIS REPORT LISTS THEIR CONDITION AND ADDRESSES POTENTIAL HAZARDS. THE VERIFICATIONS ARE DESIGNED TO PROVIDE A "SYSTEM VERIFICATION" AS OUTLINED BY NPFA 99, 5.1.12.3 (2012), WHICH VERIFIES THE INSTALLATION AND PERFORMANCE STANDARDS TO WHICH THE SYSTEM(S) WAS CONSTRUCTED AND IS ONLY REQUIRED WHEN THE SYSTEM IS NEW, OR AN EXISTING SYSTEM HAS BEEN BREACHED AND/OR SYSTEM COMPONENTS HAVE BEEN REPLACED.

PLEASE BE ADVISED THAT THIS DOCUMENT IS ONLY A REPORT OF OUR FINDINGS AND THAT WE ARE NOT CONSIDERED TO BE THE AUTHORITY HAVING JURISDICTION. THE COMMENTS NOTED IN THE PREVIOUS PAGES OF OUR DOCUMENT REFER TO ANY NOTABLE CONCERNS AND/OR DEFICIENCIES THAT WERE DISCOVERED AT THE TIME OF OUR VERIFICATION.

ALL MEDICAL GAS SYSTEMS WILL BE TESTED TO THE MINIMUM STANDARDS SET FORTH BY NFPA 99, 2012 EDITION UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY. IF THERE IS ANY QUESTION AS TO WHICH CATEGORY THE FACILITY IS CATEGORIZED AS, THE AUTHORITY HAVING JURISDICTION IS RESPONSIBLE FOR DETERMINING THE FACILITY'S STATUS. THE MEDICAL GAS SYSTEMS WILL THEREFORE BE TESTED TO THOSE REQUIREMENTS.

ALL CRITICAL CARE AREAS WILL BE ASSUMED TO INCLUDE THOSE DEFINED BY NFPA 99, 2012 EDITION AND THEREFORE TESTED FOR THE REQUIRED CRITERIA UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY.

WE UNDERSTAND THAT SOME EXISTING SYSTEMS WERE INSTALLED AND TESTED TO PREVIOUS STANDARDS AND MAY NOT MEET PRESENT CODE REQUIREMENTS. NFPA 99, 5.1.1.4 (2012) ADDRESSES THESE SITUATIONS AND REFERS THEIR CONTINUANCE TO THE AUTHORITY HAVING JURISDICTION TO DETERMINE WHETHER THEY CONSTITUTE A DISTINCT HAZARD TO LIFE OR ARE NOT USEABLE.

MEDICAL GAS ZONES (E.R., P.A.C.U., PATIENT ROOMS, ETC.) ARE LISTED IN ORDER BY FLOOR AND IN SOME CASES BY BUILDING. UPON ENTERING A ROOM, OUTLETS/INLETS ARE LISTED STARTING WITH THE FIRST TO THE LEFT, PROCEEDING CLOCKWISE AROUND THE ROOM. IT IS ALWAYS OUR INTENT TO TEST ALL OUTLETS IN THE SYSTEM, HOWEVER IT IS RECOGNIZED THAT IT MAY NOT BE POSSIBLE TO TEST EVERY SINGLE ONE. SOME OUTLETS/INLETS MAY BE INACCESSIBLE OR IN USE. OUTLETS/INLETS THAT WERE NOT TESTED ARE LISTED BUT HAVE NO PERFORMANCE DATA. POTENTIAL PROBLEMS ARE NOTED ON THE COMMENT SECTION AND ARE DESCRIBED IN MORE DETAIL ON THE SUMMARY PAGES.

IT IS NOT PRACTICAL TO LIST EACH SPECIFIC PROBLEM FOUND (UNDECTABLE LEAKAGE, BENT FACE PLATE, DEFECTIVE OUTLET/INLET, ETC.). THE INTENT IS TO PROVIDE GUIDANCE FOR HOSPITAL PERSONNEL TO BE ABLE TO QUICKLY LOCATE SPECIFIC PROBLEM AREAS IN ORDER TO REPAIR AND RETEST THE SPECIFIC PROBLEM'S) NOTED.

****ALL CHAPTER AND PARAGRAPH REFERENCES IN THIS DOCUMENT ARE TAKEN FROM NPFA 99, STANDARD ON GAS AND VACUUM SYSTEMS, 2012 EDITION.****

TESTING QUALITY ASSURANCE

MEDICAL AIR TESTING & SERVICES' TECHNICAL SERVICE STAFF IS EXPERIENCED AND CONSISTS OF FACTORY TRAINED PERSONNEL WHO HAVE ALSO OBTAINED THE FOLLOWING INDUSTRY REQUIRED CREDENTIALS:

- ASME IX BRAZER
- ASSE 6010 MEDICAL GAS SYSTEMS INSTALLER
- ASSE 6020 MEDICAL GAS SYSTEMS INSPECTOR
- ASSE 6030 MEDICAL GAS SYSTEMS VERIFIER
- ASSE 6040 MEDICAL GAS SYSTEMS MAINTENANCE PERSONNEL
- ASSE 6050 MEDICAL GAS SYSTEMS INSTRUCTOR
- CMGV - MGPHO CREDENTIALED MEDICAL GAS SYSTEMS VERIFIER

ANY OR ALL OF THE FOLLOWING EQUIPMENT HAVE BEEN USED IN THE TESTING AND ANYLYSIS OF THE MEDICAL GAS SYSTEMS:

- NST MODEL G2000, MEDICAL GAS ANALYZER, S/N: 059
- FOXBORO MODEL MIB, PORTABLE AMBIENT AIR ANALYZER, S/N: 274405
- AINSWORTH MODEL A-200 DS AA, SERIES BALANCE, READABILITY OF .01MG
- 25 MM MEMBRANE PTFE FILTERS
- NYAD MODEL MA-160B, TRACE DEW POINT MONITOR, S/N: 1993
- MINIOX 1, OXYGEN ANALYZER
- MIRAN SAPPHIRE I-R ANALYZER MODEL 205BML1A3N, S/N: 205B-79520-408
- BACHARACH N2O ANALYZER MODEL 19-3314, S/N: 9475
- BACHARACH CO2 ANALYZER MODEL , S/N:
- MERIAM 0-30" HG VACUUM GAUGE MODEL 31111500, S/N: 505562
- MERIAM 0-100 PSI PRESSURE GAUGE MODEL 31110100, S/N: 505561
- MERIAM 0-300 PSI PRESSURE GAUGE MODEL 3111200, S/N: 505560
- DWYER 0-10 SCFM FLOW METER MODEL RMB-57-SSV

THE TESTING EQUIPMENT LISTED ABOVE USED FOR ANNUAL MEDICAL GAS EVALUATIONS AND FOR MEDICAL GAS SYSTEM VERIFICATIONS HAS ITSELF BEEN TESTED AND CALIBRATED TO MEET THE NECESSARY REQUIREMENTS AND THEREFORE ACCURATELY REPRESENTS THE RESULTING DATA INFORMATION IN THE FOLLOWING SECTIONS OF THE DOCUMENT.

VERIFICATION TESTING PROCEDURES PER NFPA 99, 2012 - 5.1.12.3

ZONE VALVE BOX ASSEMBLIES:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY PROPER LABELING

3) VERIFY THAT THERE IS NO LEAKAGE IN ASSEMBLY

4) PERFORM VALVE TEST

AREA ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS MONITORED

7) VERIFY CURRENT HIGH / LOW SET POINTS FOR EACH GAS MONITORED

8) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS WITH CALIBRATED GAUGES

9) CALIBRATE PRESSURE / VACUUM ALARM SENSORS PER MANUFACTURER'S RECOMMENDATIONS

MASTER ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY PROPER OPERATION OF ALL REQUIRED ALARM SIGNALS

7) VERIFY ALL SET POINTS FOR EACH GAS MONITORED

OUTLET / INLET STATIONS:

1) VERIFY PROPER OPERATION AND CONDITION

2) VERIFY PROPER LABELING

3) VERIFY PROPER OPERATION OF VALVES AND THAT THERE IS NO LEAKAGE

4) VERIFY PROPER OPERATION AND CONDITION OF LATCHING MECHANISM

5) VERIFY PROPER OPERATIONAL PRESSURES

6) VERIFY PROPER STATIC PRESSURES

7) PERFORM STANDING PRESSURE TESTS

8) PERFORM CROSS-CONNECTION TESTS

9) PERFORM VALVE TESTS

10) PERFORM PIPING PURGE TESTS

11) PERFORM PIPING PARTICULATE TESTS

12) PERFORM PIPING PURITY TESTS

13) PERFORM MEDICAL GAS CONCENTRATION TESTS ON ALL POSITIVE-PRESSURE GASES

14) PERFORM MEDICAL AIR PURITY TESTS (FOR SYSTEM START-UP ONLY)

15) PERFORM MEDICAL AIR QUALITY TESTS

16) PERFORM FLOW RATE AND TRANSIENT FLOW RATE TESTS

ZONE VALVE BOX FOR: O.R. 3

ASSEMBLY LOCATION:

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1							
2							
3							
4							
5							
6							
7							

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: EXISTING ZONE VALVE BOX - NOT TESTED AT THIS TIME.

AREA ALARM PANEL LOCATION:

MANUFACTURER: **MODEL:**

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

OUTLET/INLET ZONE: O.R. 3

MANUFACTURER: AMICO **MODEL:** OHIO

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	O.R. 3	VAC	VAC	21 " HG	4.0 SCFM	20 " HG	YES	YES	NO
2	1-16	O.R. 3	WAGD	WAGD	21 " HG	4.0 SCFM	20 " HG	YES	YES	NO
3	1-16	O.R. 3	O2	O2	55 PSIG	3.5/6.0 SCFM	53 PSIG	YES	YES	NO
4	1-16	O.R. 3	MA	MA	54 PSIG	3.5/6.0 SCFM	53 PSIG	YES	YES	NO
5	1-16	O.R. 3	N2O	N2O	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
6										
7										
8										
9										
10										
11										
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29										
30										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: ADDED CEILING OUTLETS .

ZONE VALVE BOX IS EXISTING

ZONE VALVE BOX FOR: MINOR PROCEDURE

ASSEMBLY LOCATION:

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1							
2							
3							
4							
5							
6							
7							

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: EXISTING ZONE VALVE BOX - NOT TESTED AT THIS TIME.

AREA ALARM PANEL LOCATION:

MANUFACTURER: **MODEL:**

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

OUTLET/INLET ZONE: MINOR PROCEDURE

MANUFACTURER: AMICO **MODEL:** OHIO

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	MINOR PROCEDURE	VAC	VAC	20 " HG	4.5 SCFM	19 " HG	YES	YES	NO
2	1-16	MINOR PROCEDURE	VAC	VAC	21 " HG	4.8 SCFM	19 " HG	YES	YES	NO
3	1-16	MINOR PROCEDURE	VAC	VAC	21 " HG	4.5 SCFM	19 " HG	YES	YES	NO
4	1-16	MINOR PROCEDURE	O2	O2	55 PSIG	3.5/6.0 SCFM	53 PSIG	YES	YES	NO
5	1-16	MINOR PROCEDURE	O2	O2	55 PSIG	3.5/6.0 SCFM	53 PSIG	YES	YES	NO
6	1-16	MINOR PROCEDURE	WAGD	WAGD	21 " HG	4.0 SCFM	20 " HG	YES	YES	NO
7										
8										
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12										
13										
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TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

MEDICAL AIR TESTING & SERVICES, INC.

1370 Harlan Street
Lakewood, Colorado 80214
Phone: 303-279-2491, 1-800-863-3247
Fax: 303-279-7132
www.medairtesting.com

NFPA 99 MEDICAL GAS SYSTEMS VERIFICATION

VERIFICATION LOCATION: **MEDICAL CENTER OF AURORA - SOUTH**
1501 SOUTH POTOMAC ST.
AURORA, CO 80011

JOB DESCRIPTION: **REPAIR MEDICAL AIR LINE FEEDING O.R. 3 & OLD O.R. 11**

VERIFICATION DATE: **April 2, 2017**

MECHANICAL CONTRACTOR: **MC MECHANICAL**
PO BOX 617
STRAUSBURG, CO 80136

THIS VERIFICATION CONSISTS OF THE FOLLOWING MEDICAL GAS EQUIPMENT QUANTITIES:

	ZONE VALVES	ALARM PANELS	OUTLETS / INLETS
O2	0	0	0
VAC	0	0	0
MA	0	0	5
N2O	0	0	0
WAGD	0	0	0
N2	0	0	0
CO2	0	0	0

(PLEASE CONTACT MEDICAL AIR SYSTEMS, INC. REGARDING VACUUM & MEDICAL AIR DEMAND / SIZING)

VERIFICATION IS PER NFPA 99, 2012 EDITION. THE FINDINGS ARE ATTACHED

REMARKS: **ANY MODIFICATIONS OR ALTERATIONS TO THE MEDICAL GAS SYSTEMS SHALL REQUIRE RE-VERIFICATION.**

THIS DOCUMENT CONSISTS OF 11 PAGES.

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THE FOLLOWING IS A LIST OF DEFICIENCIES, AREAS OF CONCERN AND/OR NOTABLE ISSUES THAT YOUR FACILITY NEEDS TO AT LEAST BE MADE AWARE OF WHICH MAY HAVE BEEN FORMALLY PERMITTABLE AT THE TIME OF DESIGN, HOWEVER DO NOT MEET THE STANDARDS REQUIRED BY THE NFPA 99. IF THESE CIRCUMSTANCES EXIST, PLEASE NOTE THAT PER NFPA 99, 2012 EDITION (5.1.1.4) "AN EXISTING SYSTEM THAT IS NOT IN STRICT COMPLIANCE WITH THE PROVISIONS OF THIS STANDARD SHALL BE PERMITTED TO BE CONTINUED IN USE AS LONG AS THE AUTHORITY HAVING JURISDICTION HAS DETERMINED THAT SUCH USE DOES NOT CONSTITUTE A DISTINCT HAZARD TO LIFE." ALSO NOTE THAT ALL NON-TESTED ITEMS WERE INACCESSIBLE AT THE TIME OF THIS EVALUATION. ALL NOTATIONS ARE MADE IN REFERENCE TO THE NFPA 99.

NFPA 99, 2012 DEFFICIENCIES:

(PLEASE REVIEW THE NEXT 2 PAGES FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

(PLEASE REVIEW THE NEXT PAGE FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

THIS REPORT WAS APPROVED BY: _____

THANK YOU FOR YOUR SUPPORT OF OUR SERVICES. IN CASE OF EMERGENCY OR FOR FURTHER ASSISTANCE, CONTACT MEDICAL AIR TESTING & SERVICES, INC. VIA PHONE AT (800) 863-3247 OR (303) 279-2491. YOU MAY ALSO REACH US VIA E-MAIL AT info@medicalairsystems.com.

TESTING CRITERIA FOR VERIFICATION OF MEDICAL GAS SYSTEMS

IT IS THE INTENT OF THE MEDICAL GAS VERIFICATION TO TEST THE GENERAL OPERATING CONDITION OF ALL MEDICAL GAS SYSTEM COMPONENTS. THIS REPORT LISTS THEIR CONDITION AND ADDRESSES POTENTIAL HAZARDS. THE VERIFICATIONS ARE DESIGNED TO PROVIDE A "SYSTEM VERIFICATION" AS OUTLINED BY NPFA 99, 5.1.12.3 (2012), WHICH VERIFIES THE INSTALLATION AND PERFORMANCE STANDARDS TO WHICH THE SYSTEM(S) WAS CONSTRUCTED AND IS ONLY REQUIRED WHEN THE SYSTEM IS NEW, OR AN EXISTING SYSTEM HAS BEEN BREACHED AND/OR SYSTEM COMPONENTS HAVE BEEN REPLACED.

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WE UNDERSTAND THAT SOME EXISTING SYSTEMS WERE INSTALLED AND TESTED TO PREVIOUS STANDARDS AND MAY NOT MEET PRESENT CODE REQUIREMENTS. NFPA 99, 5.1.1.4 (2012) ADDRESSES THESE SITUATIONS AND REFERS THEIR CONTINUANCE TO THE AUTHORITY HAVING JURISDICTION TO DETERMINE WHETHER THEY CONSTITUTE A DISTINCT HAZARD TO LIFE OR ARE NOT USEABLE.

MEDICAL GAS ZONES (E.R., P.A.C.U., PATIENT ROOMS, ETC.) ARE LISTED IN ORDER BY FLOOR AND IN SOME CASES BY BUILDING. UPON ENTERING A ROOM, OUTLETS/INLETS ARE LISTED STARTING WITH THE FIRST TO THE LEFT, PROCEEDING CLOCKWISE AROUND THE ROOM. IT IS ALWAYS OUR INTENT TO TEST ALL OUTLETS IN THE SYSTEM, HOWEVER IT IS RECOGNIZED THAT IT MAY NOT BE POSSIBLE TO TEST EVERY SINGLE ONE. SOME OUTLETS/INLETS MAY BE INACCESSIBLE OR IN USE. OUTLETS/INLETS THAT WERE NOT TESTED ARE LISTED BUT HAVE NO PERFORMANCE DATA. POTENTIAL PROBLEMS ARE NOTED ON THE COMMENT SECTION AND ARE DESCRIBED IN MORE DETAIL ON THE SUMMARY PAGES.

IT IS NOT PRACTICAL TO LIST EACH SPECIFIC PROBLEM FOUND (UNDECTABLE LEAKAGE, BENT FACE PLATE, DEFECTIVE OUTLET/INLET, ETC.). THE INTENT IS TO PROVIDE GUIDANCE FOR HOSPITAL PERSONNEL TO BE ABLE TO QUICKLY LOCATE SPECIFIC PROBLEM AREAS IN ORDER TO REPAIR AND RETEST THE SPECIFIC PROBLEM'S) NOTED.

****ALL CHAPTER AND PARAGRAPH REFERENCES IN THIS DOCUMENT ARE TAKEN FROM NPFA 99, STANDARD ON GAS AND VACUUM SYSTEMS, 2012 EDITION.****

TESTING QUALITY ASSURANCE

MEDICAL AIR TESTING & SERVICES' TECHNICAL SERVICE STAFF IS EXPERIENCED AND CONSISTS OF FACTORY TRAINED PERSONNEL WHO HAVE ALSO OBTAINED THE FOLLOWING INDUSTRY REQUIRED CREDENTIALS:

- ASME IX BRAZER
- ASSE 6010 MEDICAL GAS SYSTEMS INSTALLER
- ASSE 6020 MEDICAL GAS SYSTEMS INSPECTOR
- ASSE 6030 MEDICAL GAS SYSTEMS VERIFIER
- ASSE 6040 MEDICAL GAS SYSTEMS MAINTENANCE PERSONNEL
- ASSE 6050 MEDICAL GAS SYSTEMS INSTRUCTOR
- CMGV - MGPHO CREDENTIALED MEDICAL GAS SYSTEMS VERIFIER

ANY OR ALL OF THE FOLLOWING EQUIPMENT HAVE BEEN USED IN THE TESTING AND ANYLYSIS OF THE MEDICAL GAS SYSTEMS:

- NST MODEL G2000, MEDICAL GAS ANALYZER, S/N: 059
- FOXBORO MODEL MIB, PORTABLE AMBIENT AIR ANALYZER, S/N: 274405
- AINSWORTH MODEL A-200 DS AA, SERIES BALANCE, READABILITY OF .01MG
- 25 MM MEMBRANE PTFE FILTERS
- NYAD MODEL MA-160B, TRACE DEW POINT MONITOR, S/N: 1993
- MINIOX 1, OXYGEN ANALYZER
- MIRAN SAPPHIRE I-R ANALYZER MODEL 205BML1A3N, S/N: 205B-79520-408
- BACHARACH N2O ANALYZER MODEL 19-3314, S/N: 9475
- BACHARACH CO2 ANALYZER MODEL , S/N:
- MERIAM 0-30" HG VACUUM GAUGE MODEL 31111500, S/N: 505562
- MERIAM 0-100 PSI PRESSURE GAUGE MODEL 31110100, S/N: 505561
- MERIAM 0-300 PSI PRESSURE GAUGE MODEL 3111200, S/N: 505560
- DWYER 0-10 SCFM FLOW METER MODEL RMB-57-SSV

THE TESTING EQUIPMENT LISTED ABOVE USED FOR ANNUAL MEDICAL GAS EVALUATIONS AND FOR MEDICAL GAS SYSTEM VERIFICATIONS HAS ITSELF BEEN TESTED AND CALIBRATED TO MEET THE NECESSARY REQUIREMENTS AND THEREFORE ACCURATELY REPRESENTS THE RESULTING DATA INFORMATION IN THE FOLLOWING SECTIONS OF THE DOCUMENT.

VERIFICATION TESTING PROCEDURES PER NFPA 99, 2012 - 5.1.12.3

ZONE VALVE BOX ASSEMBLIES:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY PROPER LABELING

3) VERIFY THAT THERE IS NO LEAKAGE IN ASSEMBLY

4) PERFORM VALVE TEST

AREA ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS MONITORED

7) VERIFY CURRENT HIGH / LOW SET POINTS FOR EACH GAS MONITORED

8) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS WITH CALIBRATED GAUGES

9) CALIBRATE PRESSURE / VACUUM ALARM SENSORS PER MANUFACTURER'S RECOMMENDATIONS

MASTER ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY PROPER OPERATION OF ALL REQUIRED ALARM SIGNALS

7) VERIFY ALL SET POINTS FOR EACH GAS MONITORED

OUTLET / INLET STATIONS:

1) VERIFY PROPER OPERATION AND CONDITION

2) VERIFY PROPER LABELING

3) VERIFY PROPER OPERATION OF VALVES AND THAT THERE IS NO LEAKAGE

4) VERIFY PROPER OPERATION AND CONDITION OF LATCHING MECHANISM

5) VERIFY PROPER OPERATIONAL PRESSURES

6) VERIFY PROPER STATIC PRESSURES

7) PERFORM STANDING PRESSURE TESTS

8) PERFORM CROSS-CONNECTION TESTS

9) PERFORM VALVE TESTS

10) PERFORM PIPING PURGE TESTS

11) PERFORM PIPING PARTICULATE TESTS

12) PERFORM PIPING PURITY TESTS

13) PERFORM MEDICAL GAS CONCENTRATION TESTS ON ALL POSITIVE-PRESSURE GASES

14) PERFORM MEDICAL AIR PURITY TESTS (FOR SYSTEM START-UP ONLY)

15) PERFORM MEDICAL AIR QUALITY TESTS

16) PERFORM FLOW RATE AND TRANSIENT FLOW RATE TESTS

ZONE VALVE BOX FOR: NOT TESTED AT THIS TIME.

ASSEMBLY LOCATION:

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1							
2							
3							
4							
5							
6							
7							

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

AREA ALARM PANEL LOCATION:

MANUFACTURER: **MODEL:**

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

OUTLET/INLET ZONE: SURGERY

MANUFACTURER: OHMEDA **MODEL:** OHIO

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	O.R. 3	MA	MA	51 PSIG	3.5/6.0 SCFM	47 PSIG	YES	YES	NO
2	1-16	O.R. 3	MA	MA	51 PSIG	3.5/6.0 SCFM	47 PSIG	YES	YES	NO
3	1-16	OLD O.R. 11	MA	MA	51 PSIG	3.5/6.0 SCFM	47 PSIG	YES	YES	NO
4	1-16	OLD O.R. 11	MA	MA	51 PSIG	3.5/6.0 SCFM	47 PSIG	YES	YES	NO
5	1-16	OLD O.R. 11	MA	MA	51 PSIG	3.5/6.0 SCFM	47 PSIG	YES	YES	NO
6										
7										
8										
9										
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11										
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TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

MEDICAL AIR TESTING & SERVICES, INC.

1370 Harlan Street
Lakewood, Colorado 80214
Phone: 303-279-2491, 1-800-863-3247
Fax: 303-279-7132
www.medairtesting.com

NFPA 99 MEDICAL GAS SYSTEMS VERIFICATION

VERIFICATION LOCATION: **MEDICAL CENTER OF AURORA SOUTH**
1501 POTOMAC ST.
AURORA, CO 80011

JOB DESCRIPTION: **O.R. 4**

VERIFICATION DATE: **January 5, 2018**

MECHANICAL CONTRACTOR: **RK MECHANICAL**
3800 XANTHIA STREET
DENVER, CO 80238

JOB CONTACT: **JASON HERSHEY**
303-419-6191

THIS VERIFICATION CONSISTS OF THE FOLLOWING MEDICAL GAS EQUIPMENT QUANTITIES:

	ZONE VALVES	ALARM PANELS	OUTLETS / INLETS
O2	1	0	2
VAC	1	0	3
MA	1	0	2
N2O	1	0	2
WAGD	0	0	2
N2	1	0	0
CO2	1	0	1

(PLEASE CONTACT MEDICAL AIR SYSTEMS, INC. REGARDING VACUUM & MEDICAL AIR DEMAND / SIZING)

VERIFICATION IS PER NFPA 99, 2012 EDITION. THE FINDINGS ARE ATTACHED

REMARKS: **ANY MODIFICATIONS OR ALTERATIONS TO THE MEDICAL GAS SYSTEMS SHALL REQUIRE RE-VERIFICATION.**

THIS DOCUMENT CONSISTS OF 11 PAGES.

MEDICAL AIR TESTING & SERVICES, INC. HAS INSPECTED THIS SYSTEM FOR ADHERENCE TO THE NFPA 99, MEDICAL GAS AND VACUUM SYSTEMS, 2012 EDITION.

THE FOLLOWING IS A LIST OF DEFICIENCIES, AREAS OF CONCERN AND/OR NOTABLE ISSUES THAT YOUR FACILITY NEEDS TO AT LEAST BE MADE AWARE OF WHICH MAY HAVE BEEN FORMALLY PERMITTABLE AT THE TIME OF DESIGN, HOWEVER DO NOT MEET THE STANDARDS REQUIRED BY THE NFPA 99. IF THESE CIRCUMSTANCES EXIST, PLEASE NOTE THAT PER NFPA 99, 2012 EDITION (5.1.1.4) "AN EXISTING SYSTEM THAT IS NOT IN STRICT COMPLIANCE WITH THE PROVISIONS OF THIS STANDARD SHALL BE PERMITTED TO BE CONTINUED IN USE AS LONG AS THE AUTHORITY HAVING JURISDICTION HAS DETERMINED THAT SUCH USE DOES NOT CONSTITUTE A DISTINCT HAZARD TO LIFE." ALSO NOTE THAT ALL NON-TESTED ITEMS WERE INACCESSIBLE AT THE TIME OF THIS EVALUATION. ALL NOTATIONS ARE MADE IN REFERENCE TO THE NFPA 99.

NFPA 99, 2012 DEFFICIENCIES:

(PLEASE REVIEW THE NEXT 2 PAGES FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

(PLEASE REVIEW THE NEXT PAGE FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

NO OPERATING AREA ALARM PANEL FOR O.R. 4.

THIS REPORT WAS APPROVED BY: _____

THANK YOU FOR YOUR SUPPORT OF OUR SERVICES. IN CASE OF EMERGENCY OR FOR FURTHER ASSISTANCE, CONTACT MEDICAL AIR TESTING & SERVICES, INC. VIA PHONE AT (800) 863-3247 OR (303) 279-2491. YOU MAY ALSO REACH US VIA E-MAIL AT info@medicalairsystems.com.

TESTING CRITERIA FOR VERIFICATION OF MEDICAL GAS SYSTEMS

IT IS THE INTENT OF THE MEDICAL GAS VERIFICATION TO TEST THE GENERAL OPERATING CONDITION OF ALL MEDICAL GAS SYSTEM COMPONENTS. THIS REPORT LISTS THEIR CONDITION AND ADDRESSES POTENTIAL HAZARDS. THE VERIFICATIONS ARE DESIGNED TO PROVIDE A "SYSTEM VERIFICATION" AS OUTLINED BY NPFA 99, 5.1.12.3 (2012), WHICH VERIFIES THE INSTALLATION AND PERFORMANCE STANDARDS TO WHICH THE SYSTEM(S) WAS CONSTRUCTED AND IS ONLY REQUIRED WHEN THE SYSTEM IS NEW, OR AN EXISTING SYSTEM HAS BEEN BREACHED AND/OR SYSTEM COMPONENTS HAVE BEEN REPLACED.

PLEASE BE ADVISED THAT THIS DOCUMENT IS ONLY A REPORT OF OUR FINDINGS AND THAT WE ARE NOT CONSIDERED TO BE THE AUTHORITY HAVING JURISDICTION. THE COMMENTS NOTED IN THE PREVIOUS PAGES OF OUR DOCUMENT REFER TO ANY NOTABLE CONCERNS AND/OR DEFICIENCIES THAT WERE DISCOVERED AT THE TIME OF OUR VERIFICATION.

ALL MEDICAL GAS SYSTEMS WILL BE TESTED TO THE MINIMUM STANDARDS SET FORTH BY NFPA 99, 2012 EDITION UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY. IF THERE IS ANY QUESTION AS TO WHICH CATEGORY THE FACILITY IS CATEGORIZED AS, THE AUTHORITY HAVING JURISDICTION IS RESPONSIBLE FOR DETERMINING THE FACILITY'S STATUS. THE MEDICAL GAS SYSTEMS WILL THEREFORE BE TESTED TO THOSE REQUIREMENTS.

ALL CRITICAL CARE AREAS WILL BE ASSUMED TO INCLUDE THOSE DEFINED BY NFPA 99, 2012 EDITION AND THEREFORE TESTED FOR THE REQUIRED CRITERIA UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY.

WE UNDERSTAND THAT SOME EXISTING SYSTEMS WERE INSTALLED AND TESTED TO PREVIOUS STANDARDS AND MAY NOT MEET PRESENT CODE REQUIREMENTS. NFPA 99, 5.1.1.4 (2012) ADDRESSES THESE SITUATIONS AND REFERS THEIR CONTINUANCE TO THE AUTHORITY HAVING JURISDICTION TO DETERMINE WHETHER THEY CONSTITUTE A DISTINCT HAZARD TO LIFE OR ARE NOT USEABLE.

MEDICAL GAS ZONES (E.R., P.A.C.U., PATIENT ROOMS, ETC.) ARE LISTED IN ORDER BY FLOOR AND IN SOME CASES BY BUILDING. UPON ENTERING A ROOM, OUTLETS/INLETS ARE LISTED STARTING WITH THE FIRST TO THE LEFT, PROCEEDING CLOCKWISE AROUND THE ROOM. IT IS ALWAYS OUR INTENT TO TEST ALL OUTLETS IN THE SYSTEM, HOWEVER IT IS RECOGNIZED THAT IT MAY NOT BE POSSIBLE TO TEST EVERY SINGLE ONE. SOME OUTLETS/INLETS MAY BE INACCESSIBLE OR IN USE. OUTLETS/INLETS THAT WERE NOT TESTED ARE LISTED BUT HAVE NO PERFORMANCE DATA. POTENTIAL PROBLEMS ARE NOTED ON THE COMMENT SECTION AND ARE DESCRIBED IN MORE DETAIL ON THE SUMMARY PAGES.

IT IS NOT PRACTICAL TO LIST EACH SPECIFIC PROBLEM FOUND (UNDECTABLE LEAKAGE, BENT FACE PLATE, DEFECTIVE OUTLET/INLET, ETC.). THE INTENT IS TO PROVIDE GUIDANCE FOR HOSPITAL PERSONNEL TO BE ABLE TO QUICKLY LOCATE SPECIFIC PROBLEM AREAS IN ORDER TO REPAIR AND RETEST THE SPECIFIC PROBLEM'S) NOTED.

****ALL CHAPTER AND PARAGRAPH REFERENCES IN THIS DOCUMENT ARE TAKEN FROM NPFA 99, STANDARD ON GAS AND VACUUM SYSTEMS, 2012 EDITION.****

TESTING QUALITY ASSURANCE

MEDICAL AIR TESTING & SERVICES' TECHNICAL SERVICE STAFF IS EXPERIENCED AND CONSISTS OF FACTORY TRAINED PERSONNEL WHO HAVE ALSO OBTAINED THE FOLLOWING INDUSTRY REQUIRED CREDENTIALS:

- ASME IX BRAZER
- ASSE 6010 MEDICAL GAS SYSTEMS INSTALLER
- ASSE 6020 MEDICAL GAS SYSTEMS INSPECTOR
- ASSE 6030 MEDICAL GAS SYSTEMS VERIFIER
- ASSE 6040 MEDICAL GAS SYSTEMS MAINTENANCE PERSONNEL
- ASSE 6050 MEDICAL GAS SYSTEMS INSTRUCTOR
- CMGV - MGPHO CREDENTIALED MEDICAL GAS SYSTEMS VERIFIER

ANY OR ALL OF THE FOLLOWING EQUIPMENT HAVE BEEN USED IN THE TESTING AND ANYLYSIS OF THE MEDICAL GAS SYSTEMS:

- NST MODEL G2000, MEDICAL GAS ANALYZER, S/N: 059
- FOXBORO MODEL MIB, PORTABLE AMBIENT AIR ANALYZER, S/N: 274405
- AINSWORTH MODEL A-200 DS AA, SERIES BALANCE, READABILITY OF .01MG
- 25 MM MEMBRANE PTFE FILTERS
- NYAD MODEL MA-160B, TRACE DEW POINT MONITOR, S/N: 1993
- MINIOX 1, OXYGEN ANALYZER
- MIRAN SAPPHIRE I-R ANALYZER MODEL 205BML1A3N, S/N: 205B-79520-408
- BACHARACH N2O ANALYZER MODEL 19-3314, S/N: 9475
- BACHARACH CO2 ANALYZER MODEL , S/N:
- MERIAM 0-30" HG VACUUM GAUGE MODEL 31111500, S/N: 505562
- MERIAM 0-100 PSI PRESSURE GAUGE MODEL 31110100, S/N: 505561
- MERIAM 0-300 PSI PRESSURE GAUGE MODEL 3111200, S/N: 505560
- DWYER 0-10 SCFM FLOW METER MODEL RMB-57-SSV

THE TESTING EQUIPMENT LISTED ABOVE USED FOR ANNUAL MEDICAL GAS EVALUATIONS AND FOR MEDICAL GAS SYSTEM VERIFICATIONS HAS ITSELF BEEN TESTED AND CALIBRATED TO MEET THE NECESSARY REQUIREMENTS AND THEREFORE ACCURATELY REPRESENTS THE RESULTING DATA INFORMATION IN THE FOLLOWING SECTIONS OF THE DOCUMENT.

VERIFICATION TESTING PROCEDURES PER NFPA 99, 2012 - 5.1.12.3

ZONE VALVE BOX ASSEMBLIES:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY PROPER LABELING

3) VERIFY THAT THERE IS NO LEAKAGE IN ASSEMBLY

4) PERFORM VALVE TEST

AREA ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS MONITORED

7) VERIFY CURRENT HIGH / LOW SET POINTS FOR EACH GAS MONITORED

8) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS WITH CALIBRATED GAUGES

9) CALIBRATE PRESSURE / VACUUM ALARM SENSORS PER MANUFACTURER'S RECOMMENDATIONS

MASTER ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY PROPER OPERATION OF ALL REQUIRED ALARM SIGNALS

7) VERIFY ALL SET POINTS FOR EACH GAS MONITORED

OUTLET / INLET STATIONS:

1) VERIFY PROPER OPERATION AND CONDITION

2) VERIFY PROPER LABELING

3) VERIFY PROPER OPERATION OF VALVES AND THAT THERE IS NO LEAKAGE

4) VERIFY PROPER OPERATION AND CONDITION OF LATCHING MECHANISM

5) VERIFY PROPER OPERATIONAL PRESSURES

6) VERIFY PROPER STATIC PRESSURES

7) PERFORM STANDING PRESSURE TESTS

8) PERFORM CROSS-CONNECTION TESTS

9) PERFORM VALVE TESTS

10) PERFORM PIPING PURGE TESTS

11) PERFORM PIPING PARTICULATE TESTS

12) PERFORM PIPING PURITY TESTS

13) PERFORM MEDICAL GAS CONCENTRATION TESTS ON ALL POSITIVE-PRESSURE GASES

14) PERFORM MEDICAL AIR PURITY TESTS (FOR SYSTEM START-UP ONLY)

15) PERFORM MEDICAL AIR QUALITY TESTS

16) PERFORM FLOW RATE AND TRANSIENT FLOW RATE TESTS

ZONE VALVE BOX FOR: O.R. 4

ASSEMBLY LOCATION: OUTSIDE O.R. 4

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1	1-4	CO2	O.R. 4	YES	YES	YES	YES
2	1-4	O2	O.R. 4	YES	YES	YES	YES
3	1-4	N2O	O.R. 4	YES	YES	YES	YES
4	1-4	MA	O.R. 4	YES	YES	YES	YES
5	1-4	N2	O.R. 4	YES	YES	YES	YES
6	1-4	VAC	O.R. 4	YES	YES	YES	YES
7							

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

AREA ALARM PANEL LOCATION: NURSES STATION

MANUFACTURER: **MODEL:**

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: NO OPERATING AREA ALARM.

OUTLET/INLET ZONE: O.R. 4

MANUFACTURER: AMICO **MODEL:** DISS

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	O.R. 4	VAC	VAC	19 " HG	3.5 SCFM	18 " HG	YES	YES	NO
2	1-16	O.R. 4	WAGD	WAGD	19 " HG	3.5 SCFM	18 " HG	YES	YES	NO
3	1-16	O.R. 4	O2	O2	50 PSIG	3.5/6.0 SCFM	48 PSIG	YES	YES	NO
4	1-16	O.R. 4	MA	MA	50 PSIG	3.5/6.0 SCFM	48 PSIG	YES	YES	NO
5	1-16	O.R. 4	N2O	N2O	50 PSIG	3.5 SCFM	45 PSIG	YES	YES	NO
6	1-16	O.R. 4	N2O	N2O	50 PSIG	3.5 SCFM	45 PSIG	YES	YES	NO
7	1-16	O.R. 4	MA	MA	50 PSIG	3.5/6.0 SCFM	48 PSIG	YES	YES	NO
8	1-16	O.R. 4	O2	O2	50 PSIG	3.5/6.0 SCFM	48 PSIG	YES	YES	NO
9	1-16	O.R. 4	WAGD	WAGD	19 " HG	3.5 SCFM	18 " HG	YES	YES	NO
10	1-16	O.R. 4 (BOOM)	CO2	CO2	50 PSIG	3.5 SCFM	48 PSIG	YES	YES	NO
11	1-16	O.R. 4 (BOOM)	VAC	VAC	19 " HG	3.3 SCFM	18 " HG	YES	YES	NO
12	1-16	O.R. 4 (BOOM)	VAC	VAC	19 " HG	3.3 SCFM	18 " HG	YES	YES	NO
13										
14										
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25										
26										
27										
28										
29										
30										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

MEDICAL AIR TESTING & SERVICES, INC.

1370 Harlan Street
Lakewood, Colorado 80214
Phone: 303-279-2491, 1-800-863-3247
Fax: 303-279-7132
www.medairtesting.com

NFPA 99 MEDICAL GAS SYSTEMS VERIFICATION

VERIFICATION LOCATION: **MEDICAL CENTER OF AURORA SOUTH**
1501 S. POTOMAC ST.
AURORA, CO 80012

JOB DESCRIPTION: **O.R.'S 5 & 6**

VERIFICATION DATE: **February 4, 2017**

MECHANICAL CONTRACTOR: **RK MECHANICAL**
3800 XANTHIA STREET
DENVER, CO 80238

JOB CONTACT: **BEN**

THIS VERIFICATION CONSISTS OF THE FOLLOWING MEDICAL GAS EQUIPMENT QUANTITIES:

	ZONE VALVES	ALARM PANELS	OUTLETS / INLETS
O2	2	0	4
VAC	2	0	10
MA	2	0	4
N2O	2	0	4
WAGD	2	0	4
N2	2	0	4
CO2	2	0	2

(PLEASE CONTACT MEDICAL AIR SYSTEMS, INC. REGARDING VACUUM & MEDICAL AIR DEMAND / SIZING)

VERIFICATION IS PER NFPA 99, 2012 EDITION. THE FINDINGS ARE ATTACHED

REMARKS: **ANY MODIFICATIONS OR ALTERATIONS TO THE MEDICAL GAS SYSTEMS SHALL REQUIRE RE-VERIFICATION.**

THIS DOCUMENT CONSISTS OF 13 PAGES.

MEDICAL AIR TESTING & SERVICES, INC. HAS INSPECTED THIS SYSTEM FOR ADHERENCE TO THE NFPA 99, MEDICAL GAS AND VACUUM SYSTEMS, 2012 EDITION.

THE FOLLOWING IS A LIST OF DEFICIENCIES, AREAS OF CONCERN AND/OR NOTABLE ISSUES THAT YOUR FACILITY NEEDS TO AT LEAST BE MADE AWARE OF WHICH MAY HAVE BEEN FORMALLY PERMITTABLE AT THE TIME OF DESIGN, HOWEVER DO NOT MEET THE STANDARDS REQUIRED BY THE NFPA 99. IF THESE CIRCUMSTANCES EXIST, PLEASE NOTE THAT PER NFPA 99, 2012 EDITION (5.1.1.4) "AN EXISTING SYSTEM THAT IS NOT IN STRICT COMPLIANCE WITH THE PROVISIONS OF THIS STANDARD SHALL BE PERMITTED TO BE CONTINUED IN USE AS LONG AS THE AUTHORITY HAVING JURISDICTION HAS DETERMINED THAT SUCH USE DOES NOT CONSTITUTE A DISTINCT HAZARD TO LIFE." ALSO NOTE THAT ALL NON-TESTED ITEMS WERE INACCESSIBLE AT THE TIME OF THIS EVALUATION. ALL NOTATIONS ARE MADE IN REFERENCE TO THE NFPA 99.

NFPA 99, 2012 DEFFICIENCIES:

(PLEASE REVIEW THE NEXT 2 PAGES FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

(PLEASE REVIEW THE NEXT PAGE FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

O.R.'S 5 & 6 VERIFIED GOOD PER NFPA 99, 2012. INTERVENTIONAL SUITE, RECOVERY AND DECON ALL RE-VERIFIED GOOD ON O2, MA, N2 AND VAC. ALL PIPING CLEAN AND EXCEDED NFPA.

THIS REPORT WAS APPROVED BY: _____

THANK YOU FOR YOUR SUPPORT OF OUR SERVICES. IN CASE OF EMERGENCY OR FOR FURTHER ASSISTANCE, CONTACT MEDICAL AIR TESTING & SERVICES, INC. VIA PHONE AT (800) 863-3247 OR (303) 279-2491. YOU MAY ALSO REACH US VIA E-MAIL AT info@medicalairsystems.com.

TESTING CRITERIA FOR VERIFICATION OF MEDICAL GAS SYSTEMS

IT IS THE INTENT OF THE MEDICAL GAS VERIFICATION TO TEST THE GENERAL OPERATING CONDITION OF ALL MEDICAL GAS SYSTEM COMPONENTS. THIS REPORT LISTS THEIR CONDITION AND ADDRESSES POTENTIAL HAZARDS. THE VERIFICATIONS ARE DESIGNED TO PROVIDE A "SYSTEM VERIFICATION" AS OUTLINED BY NPFA 99, 5.1.12.3 (2012), WHICH VERIFIES THE INSTALLATION AND PERFORMANCE STANDARDS TO WHICH THE SYSTEM(S) WAS CONSTRUCTED AND IS ONLY REQUIRED WHEN THE SYSTEM IS NEW, OR AN EXISTING SYSTEM HAS BEEN BREACHED AND/OR SYSTEM COMPONENTS HAVE BEEN REPLACED.

PLEASE BE ADVISED THAT THIS DOCUMENT IS ONLY A REPORT OF OUR FINDINGS AND THAT WE ARE NOT CONSIDERED TO BE THE AUTHORITY HAVING JURISDICTION. THE COMMENTS NOTED IN THE PREVIOUS PAGES OF OUR DOCUMENT REFER TO ANY NOTABLE CONCERNS AND/OR DEFICIENCIES THAT WERE DISCOVERED AT THE TIME OF OUR VERIFICATION.

ALL MEDICAL GAS SYSTEMS WILL BE TESTED TO THE MINIMUM STANDARDS SET FORTH BY NFPA 99, 2012 EDITION UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY. IF THERE IS ANY QUESTION AS TO WHICH CATEGORY THE FACILITY IS CATEGORIZED AS, THE AUTHORITY HAVING JURISDICTION IS RESPONSIBLE FOR DETERMINING THE FACILITY'S STATUS. THE MEDICAL GAS SYSTEMS WILL THEREFORE BE TESTED TO THOSE REQUIREMENTS.

ALL CRITICAL CARE AREAS WILL BE ASSUMED TO INCLUDE THOSE DEFINED BY NFPA 99, 2012 EDITION AND THEREFORE TESTED FOR THE REQUIRED CRITERIA UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY.

WE UNDERSTAND THAT SOME EXISTING SYSTEMS WERE INSTALLED AND TESTED TO PREVIOUS STANDARDS AND MAY NOT MEET PRESENT CODE REQUIREMENTS. NFPA 99, 5.1.1.4 (2012) ADDRESSES THESE SITUATIONS AND REFERS THEIR CONTINUANCE TO THE AUTHORITY HAVING JURISDICTION TO DETERMINE WHETHER THEY CONSTITUTE A DISTINCT HAZARD TO LIFE OR ARE NOT USEABLE.

MEDICAL GAS ZONES (E.R., P.A.C.U., PATIENT ROOMS, ETC.) ARE LISTED IN ORDER BY FLOOR AND IN SOME CASES BY BUILDING. UPON ENTERING A ROOM, OUTLETS/INLETS ARE LISTED STARTING WITH THE FIRST TO THE LEFT, PROCEEDING CLOCKWISE AROUND THE ROOM. IT IS ALWAYS OUR INTENT TO TEST ALL OUTLETS IN THE SYSTEM, HOWEVER IT IS RECOGNIZED THAT IT MAY NOT BE POSSIBLE TO TEST EVERY SINGLE ONE. SOME OUTLETS/INLETS MAY BE INACCESSIBLE OR IN USE. OUTLETS/INLETS THAT WERE NOT TESTED ARE LISTED BUT HAVE NO PERFORMANCE DATA. POTENTIAL PROBLEMS ARE NOTED ON THE COMMENT SECTION AND ARE DESCRIBED IN MORE DETAIL ON THE SUMMARY PAGES.

IT IS NOT PRACTICAL TO LIST EACH SPECIFIC PROBLEM FOUND (UNDECTABLE LEAKAGE, BENT FACE PLATE, DEFECTIVE OUTLET/INLET, ETC.). THE INTENT IS TO PROVIDE GUIDANCE FOR HOSPITAL PERSONNEL TO BE ABLE TO QUICKLY LOCATE SPECIFIC PROBLEM AREAS IN ORDER TO REPAIR AND RETEST THE SPECIFIC PROBLEM'S) NOTED.

****ALL CHAPTER AND PARAGRAPH REFERENCES IN THIS DOCUMENT ARE TAKEN FROM NPFA 99, STANDARD ON GAS AND VACUUM SYSTEMS, 2012 EDITION.****

TESTING QUALITY ASSURANCE

MEDICAL AIR TESTING & SERVICES' TECHNICAL SERVICE STAFF IS EXPERIENCED AND CONSISTS OF FACTORY TRAINED PERSONNEL WHO HAVE ALSO OBTAINED THE FOLLOWING INDUSTRY REQUIRED CREDENTIALS:

- ASME IX BRAZER
- ASSE 6010 MEDICAL GAS SYSTEMS INSTALLER
- ASSE 6020 MEDICAL GAS SYSTEMS INSPECTOR
- ASSE 6030 MEDICAL GAS SYSTEMS VERIFIER
- ASSE 6040 MEDICAL GAS SYSTEMS MAINTENANCE PERSONNEL
- ASSE 6050 MEDICAL GAS SYSTEMS INSTRUCTOR
- CMGV - MGPHO CREDENTIALED MEDICAL GAS SYSTEMS VERIFIER

ANY OR ALL OF THE FOLLOWING EQUIPMENT HAVE BEEN USED IN THE TESTING AND ANYLYSIS OF THE MEDICAL GAS SYSTEMS:

- NST MODEL G2000, MEDICAL GAS ANALYZER, S/N: 059
- FOXBORO MODEL MIB, PORTABLE AMBIENT AIR ANALYZER, S/N: 274405
- AINSWORTH MODEL A-200 DS AA, SERIES BALANCE, READABILITY OF .01MG
- 25 MM MEMBRANE PTFE FILTERS
- NYAD MODEL MA-160B, TRACE DEW POINT MONITOR, S/N: 1993
- MINIOX 1, OXYGEN ANALYZER
- MIRAN SAPPHIRE I-R ANALYZER MODEL 205BML1A3N, S/N: 205B-79520-408
- BACHARACH N2O ANALYZER MODEL 19-3314, S/N: 9475
- BACHARACH CO2 ANALYZER MODEL , S/N:
- MERIAM 0-30" HG VACUUM GAUGE MODEL 31111500, S/N: 505562
- MERIAM 0-100 PSI PRESSURE GAUGE MODEL 31110100, S/N: 505561
- MERIAM 0-300 PSI PRESSURE GAUGE MODEL 3111200, S/N: 505560
- DWYER 0-10 SCFM FLOW METER MODEL RMB-57-SSV

THE TESTING EQUIPMENT LISTED ABOVE USED FOR ANNUAL MEDICAL GAS EVALUATIONS AND FOR MEDICAL GAS SYSTEM VERIFICATIONS HAS ITSELF BEEN TESTED AND CALIBRATED TO MEET THE NECESSARY REQUIREMENTS AND THEREFORE ACCURATELY REPRESENTS THE RESULTING DATA INFORMATION IN THE FOLLOWING SECTIONS OF THE DOCUMENT.

VERIFICATION TESTING PROCEDURES PER NFPA 99, 2012 - 5.1.12.3

ZONE VALVE BOX ASSEMBLIES:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY PROPER LABELING

3) VERIFY THAT THERE IS NO LEAKAGE IN ASSEMBLY

4) PERFORM VALVE TEST

AREA ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS MONITORED

7) VERIFY CURRENT HIGH / LOW SET POINTS FOR EACH GAS MONITORED

8) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS WITH CALIBRATED GAUGES

9) CALIBRATE PRESSURE / VACUUM ALARM SENSORS PER MANUFACTURER'S RECOMMENDATIONS

MASTER ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY PROPER OPERATION OF ALL REQUIRED ALARM SIGNALS

7) VERIFY ALL SET POINTS FOR EACH GAS MONITORED

OUTLET / INLET STATIONS:

1) VERIFY PROPER OPERATION AND CONDITION

2) VERIFY PROPER LABELING

3) VERIFY PROPER OPERATION OF VALVES AND THAT THERE IS NO LEAKAGE

4) VERIFY PROPER OPERATION AND CONDITION OF LATCHING MECHANISM

5) VERIFY PROPER OPERATIONAL PRESSURES

6) VERIFY PROPER STATIC PRESSURES

7) PERFORM STANDING PRESSURE TESTS

8) PERFORM CROSS-CONNECTION TESTS

9) PERFORM VALVE TESTS

10) PERFORM PIPING PURGE TESTS

11) PERFORM PIPING PARTICULATE TESTS

12) PERFORM PIPING PURITY TESTS

13) PERFORM MEDICAL GAS CONCENTRATION TESTS ON ALL POSITIVE-PRESSURE GASES

14) PERFORM MEDICAL AIR PURITY TESTS (FOR SYSTEM START-UP ONLY)

15) PERFORM MEDICAL AIR QUALITY TESTS

16) PERFORM FLOW RATE AND TRANSIENT FLOW RATE TESTS

ZONE VALVE BOX FOR: O.R. 5

ASSEMBLY LOCATION: OUTSIDE O.R. 5

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1	1-4	CO2	O.R. 5	YES	YES	YES	YES
2	1-4	N2O	O.R. 5	YES	YES	YES	YES
3	1-4	N2	O.R. 5	YES	YES	YES	YES
4	1-4	MA	O.R. 5	YES	YES	YES	YES
5	1-4	O2	O.R. 5	YES	YES	YES	YES
6	1-4	WAGD	O.R. 5	YES	YES	YES	YES
7	1-4	VAC	O.R. 5	YES	YES	YES	YES

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: NEW ZONE VALVE BOX

AREA ALARM PANEL LOCATION:

MANUFACTURER: **MODEL:**

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: EXISTING ALARM PANEL

OUTLET/INLET ZONE: O.R. 5

MANUFACTURER: AMICO **MODEL:** OHIO

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	O.R. 5	VAC	VAC	21 " HG	3.4 SCFM	19 " HG	YES	YES	NO
2	1-16	O.R. 5	VAC	VAC	21 " HG	3.2 SCFM	19 " HG	YES	YES	NO
3	1-16	O.R. 5	VAC	VAC	21 " HG	3.2 SCFM	19 " HG	YES	YES	NO
4	1-16	O.R. 5	VAC	VAC	21 " HG	3.2 SCFM	19 " HG	YES	YES	NO
5	1-16	O.R. 5	VAC	VAC	21 " HG	3.4 SCFM	19 " HG	YES	YES	NO
6	1-16	O.R. 5	WAGD	WAGD	21 " HG	3.4 SCFM	19 " HG	YES	YES	NO
7	1-16	O.R. 5	WAGD	WAGD	21 " HG	3.4 SCFM	19 " HG	YES	YES	NO
8	1-16	O.R. 5	O2	O2	53 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
9	1-16	O.R. 5	O2	O2	53 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
10	1-16	O.R. 5	MA	MA	54 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
11	1-16	O.R. 5	MA	MA	54 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
12	1-16	O.R. 5	N2O	N2O	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
13	1-16	O.R. 5	N2O	N2O	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
14	1-16	O.R. 5	N2	N2	175 PSIG	5.0 SCFM	173 PSIG	YES	YES	NO
15	1-16	O.R. 5	N2	N2	175 PSIG	5.0 SCFM	173 PSIG	YES	YES	NO
16	1-16	O.R. 5	CO2	CO2	51 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: ALL NEW OUTLETS AND BOOM

ZONE VALVE BOX FOR: O.R. 6

ASSEMBLY LOCATION: OUTSIDE O.R. 6

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1	1-4	CO2	O.R. 6	YES	YES	YES	YES
2	1-4	N2O	O.R. 6	YES	YES	YES	YES
3	1-4	N2	O.R. 6	YES	YES	YES	YES
4	1-4	MA	O.R. 6	YES	YES	YES	YES
5	1-4	O2	O.R. 6	YES	YES	YES	YES
6	1-4	WAGD	O.R. 6	YES	YES	YES	YES
7	1-4	VAC	O.R. 6	YES	YES	YES	YES

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: NEW ZONE BOX

AREA ALARM PANEL LOCATION:

MANUFACTURER: **MODEL:**

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: EXISITING ZONE VALVE BOX

OUTLET/INLET ZONE: O.R. 6

MANUFACTURER: AMICO **MODEL:** OHIO

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	O.R. 6	VAC	VAC	21 " HG	3.2 SCFM	19 " HG	YES	YES	NO
2	1-16	O.R. 6	VAC	VAC	21 " HG	3.2 SCFM	19 " HG	YES	YES	NO
3	1-16	O.R. 6	VAC	VAC	21 " HG	3.2 SCFM	19 " HG	YES	YES	NO
4	1-16	O.R. 6	VAC	VAC	21 " HG	3.2 SCFM	19 " HG	YES	YES	NO
5	1-16	O.R. 6	VAC	VAC	21 " HG	3.2 SCFM	19 " HG	YES	YES	NO
6	1-16	O.R. 6	WAGD	WAGD	21 " HG	3.4 SCFM	19 " HG	YES	YES	NO
7	1-16	O.R. 6	WAGD	WAGD	21 " HG	3.4 SCFM	19 " HG	YES	YES	NO
8	1-16	O.R. 6	O2	O2	53 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
9	1-16	O.R. 6	O2	O2	53 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
10	1-16	O.R. 6	MA	MA	54 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
11	1-16	O.R. 6	MA	MA	54 PSIG	3.5/6.0 SCFM	52 PSIG	YES	YES	NO
12	1-16	O.R. 6	N2O	N2O	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
13	1-16	O.R. 6	N2O	N2O	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
14	1-16	O.R. 6	N2	N2	175 PSIG	5.0 SCFM	173 PSIG	YES	YES	NO
15	1-16	O.R. 6	N2	N2	175 PSIG	5.0 SCFM	173 PSIG	YES	YES	NO
16	1-16	O.R. 6	CO2	CO2	51 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: NEW OUTLETS AND BOOM

MEDICAL AIR TESTING & SERVICES, INC.

1370 Harlan Street
Lakewood, Colorado 80214
Phone: 303-279-2491, 1-800-863-3247
Fax: 303-279-7132
www.medairtesting.com

NFPA 99 MEDICAL GAS SYSTEMS VERIFICATION

VERIFICATION LOCATION: **MEDICAL CENTER OF AURORA - SOUTH**
1501 SOUTH POTOMAC ST.
AURORA, CO 80011

JOB DESCRIPTION: **O.R. 7 & 9 REMODEL**

VERIFICATION DATE: **April 1, 2017**

MECHANICAL CONTRACTOR: **MC MECHANICAL**
PO BOX 617
STRAUSBURG, CO 80136

THIS VERIFICATION CONSISTS OF THE FOLLOWING MEDICAL GAS EQUIPMENT QUANTITIES:

	ZONE VALVES	ALARM PANELS	OUTLETS / INLETS
O2	0	0	0
VAC	0	0	0
MA	0	0	5
N2O	0	0	0
WAGD	0	0	0
N2	0	0	0
CO2	0	0	0

(PLEASE CONTACT MEDICAL AIR SYSTEMS, INC. REGARDING VACUUM & MEDICAL AIR DEMAND / SIZING)

VERIFICATION IS PER NFPA 99, 2012 EDITION. THE FINDINGS ARE ATTACHED

REMARKS: **ANY MODIFICATIONS OR ALTERATIONS TO THE MEDICAL GAS SYSTEMS SHALL REQUIRE RE-VERIFICATION.**

THIS DOCUMENT CONSISTS OF 11 PAGES.

MEDICAL AIR TESTING & SERVICES, INC. HAS INSPECTED THIS SYSTEM FOR ADHERENCE TO THE NFPA 99, MEDICAL GAS AND VACUUM SYSTEMS, 2012 EDITION.

THE FOLLOWING IS A LIST OF DEFICIENCIES, AREAS OF CONCERN AND/OR NOTABLE ISSUES THAT YOUR FACILITY NEEDS TO AT LEAST BE MADE AWARE OF WHICH MAY HAVE BEEN FORMALLY PERMITTABLE AT THE TIME OF DESIGN, HOWEVER DO NOT MEET THE STANDARDS REQUIRED BY THE NFPA 99. IF THESE CIRCUMSTANCES EXIST, PLEASE NOTE THAT PER NFPA 99, 2012 EDITION (5.1.1.4) "AN EXISTING SYSTEM THAT IS NOT IN STRICT COMPLIANCE WITH THE PROVISIONS OF THIS STANDARD SHALL BE PERMITTED TO BE CONTINUED IN USE AS LONG AS THE AUTHORITY HAVING JURISDICTION HAS DETERMINED THAT SUCH USE DOES NOT CONSTITUTE A DISTINCT HAZARD TO LIFE." ALSO NOTE THAT ALL NON-TESTED ITEMS WERE INACCESSIBLE AT THE TIME OF THIS EVALUATION. ALL NOTATIONS ARE MADE IN REFERENCE TO THE NFPA 99.

NFPA 99, 2012 DEFFICIENCIES:

(PLEASE REVIEW THE NEXT 2 PAGES FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

(PLEASE REVIEW THE NEXT PAGE FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

THIS REPORT WAS APPROVED BY: _____

THANK YOU FOR YOUR SUPPORT OF OUR SERVICES. IN CASE OF EMERGENCY OR FOR FURTHER ASSISTANCE, CONTACT MEDICAL AIR TESTING & SERVICES, INC. VIA PHONE AT (800) 863-3247 OR (303) 279-2491. YOU MAY ALSO REACH US VIA E-MAIL AT info@medicalairsystems.com.

TESTING CRITERIA FOR VERIFICATION OF MEDICAL GAS SYSTEMS

IT IS THE INTENT OF THE MEDICAL GAS VERIFICATION TO TEST THE GENERAL OPERATING CONDITION OF ALL MEDICAL GAS SYSTEM COMPONENTS. THIS REPORT LISTS THEIR CONDITION AND ADDRESSES POTENTIAL HAZARDS. THE VERIFICATIONS ARE DESIGNED TO PROVIDE A "SYSTEM VERIFICATION" AS OUTLINED BY NPFA 99, 5.1.12.3 (2012), WHICH VERIFIES THE INSTALLATION AND PERFORMANCE STANDARDS TO WHICH THE SYSTEM(S) WAS CONSTRUCTED AND IS ONLY REQUIRED WHEN THE SYSTEM IS NEW, OR AN EXISTING SYSTEM HAS BEEN BREACHED AND/OR SYSTEM COMPONENTS HAVE BEEN REPLACED.

PLEASE BE ADVISED THAT THIS DOCUMENT IS ONLY A REPORT OF OUR FINDINGS AND THAT WE ARE NOT CONSIDERED TO BE THE AUTHORITY HAVING JURISDICTION. THE COMMENTS NOTED IN THE PREVIOUS PAGES OF OUR DOCUMENT REFER TO ANY NOTABLE CONCERNS AND/OR DEFICIENCIES THAT WERE DISCOVERED AT THE TIME OF OUR VERIFICATION.

ALL MEDICAL GAS SYSTEMS WILL BE TESTED TO THE MINIMUM STANDARDS SET FORTH BY NFPA 99, 2012 EDITION UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY. IF THERE IS ANY QUESTION AS TO WHICH CATEGORY THE FACILITY IS CATEGORIZED AS, THE AUTHORITY HAVING JURISDICTION IS RESPONSIBLE FOR DETERMINING THE FACILITY'S STATUS. THE MEDICAL GAS SYSTEMS WILL THEREFORE BE TESTED TO THOSE REQUIREMENTS.

ALL CRITICAL CARE AREAS WILL BE ASSUMED TO INCLUDE THOSE DEFINED BY NFPA 99, 2012 EDITION AND THEREFORE TESTED FOR THE REQUIRED CRITERIA UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY.

WE UNDERSTAND THAT SOME EXISTING SYSTEMS WERE INSTALLED AND TESTED TO PREVIOUS STANDARDS AND MAY NOT MEET PRESENT CODE REQUIREMENTS. NFPA 99, 5.1.1.4 (2012) ADDRESSES THESE SITUATIONS AND REFERS THEIR CONTINUANCE TO THE AUTHORITY HAVING JURISDICTION TO DETERMINE WHETHER THEY CONSTITUTE A DISTINCT HAZARD TO LIFE OR ARE NOT USEABLE.

MEDICAL GAS ZONES (E.R., P.A.C.U., PATIENT ROOMS, ETC.) ARE LISTED IN ORDER BY FLOOR AND IN SOME CASES BY BUILDING. UPON ENTERING A ROOM, OUTLETS/INLETS ARE LISTED STARTING WITH THE FIRST TO THE LEFT, PROCEEDING CLOCKWISE AROUND THE ROOM. IT IS ALWAYS OUR INTENT TO TEST ALL OUTLETS IN THE SYSTEM, HOWEVER IT IS RECOGNIZED THAT IT MAY NOT BE POSSIBLE TO TEST EVERY SINGLE ONE. SOME OUTLETS/INLETS MAY BE INACCESSIBLE OR IN USE. OUTLETS/INLETS THAT WERE NOT TESTED ARE LISTED BUT HAVE NO PERFORMANCE DATA. POTENTIAL PROBLEMS ARE NOTED ON THE COMMENT SECTION AND ARE DESCRIBED IN MORE DETAIL ON THE SUMMARY PAGES.

IT IS NOT PRACTICAL TO LIST EACH SPECIFIC PROBLEM FOUND (UNDECTABLE LEAKAGE, BENT FACE PLATE, DEFECTIVE OUTLET/INLET, ETC.). THE INTENT IS TO PROVIDE GUIDANCE FOR HOSPITAL PERSONNEL TO BE ABLE TO QUICKLY LOCATE SPECIFIC PROBLEM AREAS IN ORDER TO REPAIR AND RETEST THE SPECIFIC PROBLEM'S) NOTED.

****ALL CHAPTER AND PARAGRAPH REFERENCES IN THIS DOCUMENT ARE TAKEN FROM NPFA 99, STANDARD ON GAS AND VACUUM SYSTEMS, 2012 EDITION.****

TESTING QUALITY ASSURANCE

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- ASSE 6010 MEDICAL GAS SYSTEMS INSTALLER
- ASSE 6020 MEDICAL GAS SYSTEMS INSPECTOR
- ASSE 6030 MEDICAL GAS SYSTEMS VERIFIER
- ASSE 6040 MEDICAL GAS SYSTEMS MAINTENANCE PERSONNEL
- ASSE 6050 MEDICAL GAS SYSTEMS INSTRUCTOR
- CMGV - MGPHO CREDENTIALED MEDICAL GAS SYSTEMS VERIFIER

ANY OR ALL OF THE FOLLOWING EQUIPMENT HAVE BEEN USED IN THE TESTING AND ANYLYSIS OF THE MEDICAL GAS SYSTEMS:

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- FOXBORO MODEL MIB, PORTABLE AMBIENT AIR ANALYZER, S/N: 274405
- AINSWORTH MODEL A-200 DS AA, SERIES BALANCE, READABILITY OF .01MG
- 25 MM MEMBRANE PTFE FILTERS
- NYAD MODEL MA-160B, TRACE DEW POINT MONITOR, S/N: 1993
- MINIOX 1, OXYGEN ANALYZER
- MIRAN SAPPHIRE I-R ANALYZER MODEL 205BML1A3N, S/N: 205B-79520-408
- BACHARACH N2O ANALYZER MODEL 19-3314, S/N: 9475
- BACHARACH CO2 ANALYZER MODEL , S/N:
- MERIAM 0-30" HG VACUUM GAUGE MODEL 31111500, S/N: 505562
- MERIAM 0-100 PSI PRESSURE GAUGE MODEL 31110100, S/N: 505561
- MERIAM 0-300 PSI PRESSURE GAUGE MODEL 3111200, S/N: 505560
- DWYER 0-10 SCFM FLOW METER MODEL RMB-57-SSV

THE TESTING EQUIPMENT LISTED ABOVE USED FOR ANNUAL MEDICAL GAS EVALUATIONS AND FOR MEDICAL GAS SYSTEM VERIFICATIONS HAS ITSELF BEEN TESTED AND CALIBRATED TO MEET THE NECESSARY REQUIREMENTS AND THEREFORE ACCURATELY REPRESENTS THE RESULTING DATA INFORMATION IN THE FOLLOWING SECTIONS OF THE DOCUMENT.

VERIFICATION TESTING PROCEDURES PER NFPA 99, 2012 - 5.1.12.3

ZONE VALVE BOX ASSEMBLIES:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY PROPER LABELING

3) VERIFY THAT THERE IS NO LEAKAGE IN ASSEMBLY

4) PERFORM VALVE TEST

AREA ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS MONITORED

7) VERIFY CURRENT HIGH / LOW SET POINTS FOR EACH GAS MONITORED

8) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS WITH CALIBRATED GAUGES

9) CALIBRATE PRESSURE / VACUUM ALARM SENSORS PER MANUFACTURER'S RECOMMENDATIONS

MASTER ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY PROPER OPERATION OF ALL REQUIRED ALARM SIGNALS

7) VERIFY ALL SET POINTS FOR EACH GAS MONITORED

OUTLET / INLET STATIONS:

1) VERIFY PROPER OPERATION AND CONDITION

2) VERIFY PROPER LABELING

3) VERIFY PROPER OPERATION OF VALVES AND THAT THERE IS NO LEAKAGE

4) VERIFY PROPER OPERATION AND CONDITION OF LATCHING MECHANISM

5) VERIFY PROPER OPERATIONAL PRESSURES

6) VERIFY PROPER STATIC PRESSURES

7) PERFORM STANDING PRESSURE TESTS

8) PERFORM CROSS-CONNECTION TESTS

9) PERFORM VALVE TESTS

10) PERFORM PIPING PURGE TESTS

11) PERFORM PIPING PARTICULATE TESTS

12) PERFORM PIPING PURITY TESTS

13) PERFORM MEDICAL GAS CONCENTRATION TESTS ON ALL POSITIVE-PRESSURE GASES

14) PERFORM MEDICAL AIR PURITY TESTS (FOR SYSTEM START-UP ONLY)

15) PERFORM MEDICAL AIR QUALITY TESTS

16) PERFORM FLOW RATE AND TRANSIENT FLOW RATE TESTS

ZONE VALVE BOX FOR: NOT TESTED AT THIS TIME.

ASSEMBLY LOCATION:

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1							
2							
3							
4							
5							
6							
7							

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

AREA ALARM PANEL LOCATION:

MANUFACTURER: **MODEL:**

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

OUTLET/INLET ZONE: SURGERY

MANUFACTURER: OHMEDA **MODEL:** OHIO

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	O.R. 3	MA	MA	51 PSIG	3.5/6.0 SCFM	47 PSIG	YES	YES	NO
2	1-16	O.R. 3	MA	MA	51 PSIG	3.5/6.0 SCFM	47 PSIG	YES	YES	NO
3	1-16	OLD O.R. 11	MA	MA	51 PSIG	3.5/6.0 SCFM	47 PSIG	YES	YES	NO
4	1-16	OLD O.R. 11	MA	MA	51 PSIG	3.5/6.0 SCFM	47 PSIG	YES	YES	NO
5	1-16	OLD O.R. 11	MA	MA	51 PSIG	3.5/6.0 SCFM	47 PSIG	YES	YES	NO
6										
7										
8										
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TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

MEDICAL AIR TESTING & SERVICES, INC.

1370 Harlan Street
Lakewood, Colorado 80214
Phone: 303-279-2491, 1-800-863-3247
Fax: 303-279-7132
www.medairtesting.com

NFPA 99 MEDICAL GAS SYSTEMS VERIFICATION

VERIFICATION LOCATION: **MEDICAL CENTER OF AURORA - SOUTH CAMPUS**
1501 S. POTOMAC ST.
AURORA, CO 80012

JOB DESCRIPTION: **NEW O.R. 11**

VERIFICATION DATE: **April 24, 2017**

MECHANICAL CONTRACTOR: **RK MECHANICAL**
3800 XANTHIA ST.
DENVER, CO 80238

THIS VERIFICATION CONSISTS OF THE FOLLOWING MEDICAL GAS EQUIPMENT QUANTITIES:

	ZONE VALVES	ALARM PANELS	OUTLETS / INLETS
O2	1	0	2
VAC	1	0	5
MA	1	0	2
N2O	1	0	2
WAGD	1	0	2
N2	1	0	2
CO2	1	0	1

(PLEASE CONTACT MEDICAL AIR SYSTEMS, INC. REGARDING VACUUM & MEDICAL AIR DEMAND / SIZING)

VERIFICATION IS PER NFPA 99, 2012 EDITION. THE FINDINGS ARE ATTACHED

REMARKS: **ANY MODIFICATIONS OR ALTERATIONS TO THE MEDICAL GAS SYSTEMS SHALL REQUIRE RE-VERIFICATION.**

THIS DOCUMENT CONSISTS OF 11 PAGES.

MEDICAL AIR TESTING & SERVICES, INC. HAS INSPECTED THIS SYSTEM FOR ADHERENCE TO THE NFPA 99, MEDICAL GAS AND VACUUM SYSTEMS, 2012 EDITION.

THE FOLLOWING IS A LIST OF DEFICIENCIES, AREAS OF CONCERN AND/OR NOTABLE ISSUES THAT YOUR FACILITY NEEDS TO AT LEAST BE MADE AWARE OF WHICH MAY HAVE BEEN FORMALLY PERMITTABLE AT THE TIME OF DESIGN, HOWEVER DO NOT MEET THE STANDARDS REQUIRED BY THE NFPA 99. IF THESE CIRCUMSTANCES EXIST, PLEASE NOTE THAT PER NFPA 99, 2012 EDITION (5.1.1.4) "AN EXISTING SYSTEM THAT IS NOT IN STRICT COMPLIANCE WITH THE PROVISIONS OF THIS STANDARD SHALL BE PERMITTED TO BE CONTINUED IN USE AS LONG AS THE AUTHORITY HAVING JURISDICTION HAS DETERMINED THAT SUCH USE DOES NOT CONSTITUTE A DISTINCT HAZARD TO LIFE." ALSO NOTE THAT ALL NON-TESTED ITEMS WERE INACCESSIBLE AT THE TIME OF THIS EVALUATION. ALL NOTATIONS ARE MADE IN REFERENCE TO THE NFPA 99.

NFPA 99, 2012 DEFFICIENCIES:

(PLEASE REVIEW THE NEXT 2 PAGES FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

(PLEASE REVIEW THE NEXT PAGE FOR REMAINDER OF POTENTIAL NFPA 99 DEFFICIENCIES LIST)

O.R. 11 VERIFIED GOOD PER NFPA 99, 2012 AND IS READY FOR PATIENT USE.

THIS REPORT WAS APPROVED BY: _____

THANK YOU FOR YOUR SUPPORT OF OUR SERVICES. IN CASE OF EMERGENCY OR FOR FURTHER ASSISTANCE, CONTACT MEDICAL AIR TESTING & SERVICES, INC. VIA PHONE AT (800) 863-3247 OR (303) 279-2491. YOU MAY ALSO REACH US VIA E-MAIL AT info@medicalairsystems.com.

TESTING CRITERIA FOR VERIFICATION OF MEDICAL GAS SYSTEMS

IT IS THE INTENT OF THE MEDICAL GAS VERIFICATION TO TEST THE GENERAL OPERATING CONDITION OF ALL MEDICAL GAS SYSTEM COMPONENTS. THIS REPORT LISTS THEIR CONDITION AND ADDRESSES POTENTIAL HAZARDS. THE VERIFICATIONS ARE DESIGNED TO PROVIDE A "SYSTEM VERIFICATION" AS OUTLINED BY NPFA 99, 5.1.12.3 (2012), WHICH VERIFIES THE INSTALLATION AND PERFORMANCE STANDARDS TO WHICH THE SYSTEM(S) WAS CONSTRUCTED AND IS ONLY REQUIRED WHEN THE SYSTEM IS NEW, OR AN EXISTING SYSTEM HAS BEEN BREACHED AND/OR SYSTEM COMPONENTS HAVE BEEN REPLACED.

PLEASE BE ADVISED THAT THIS DOCUMENT IS ONLY A REPORT OF OUR FINDINGS AND THAT WE ARE NOT CONSIDERED TO BE THE AUTHORITY HAVING JURISDICTION. THE COMMENTS NOTED IN THE PREVIOUS PAGES OF OUR DOCUMENT REFER TO ANY NOTABLE CONCERNS AND/OR DEFICIENCIES THAT WERE DISCOVERED AT THE TIME OF OUR VERIFICATION.

ALL MEDICAL GAS SYSTEMS WILL BE TESTED TO THE MINIMUM STANDARDS SET FORTH BY NFPA 99, 2012 EDITION UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY. IF THERE IS ANY QUESTION AS TO WHICH CATEGORY THE FACILITY IS CATEGORIZED AS, THE AUTHORITY HAVING JURISDICTION IS RESPONSIBLE FOR DETERMINING THE FACILITY'S STATUS. THE MEDICAL GAS SYSTEMS WILL THEREFORE BE TESTED TO THOSE REQUIREMENTS.

ALL CRITICAL CARE AREAS WILL BE ASSUMED TO INCLUDE THOSE DEFINED BY NFPA 99, 2012 EDITION AND THEREFORE TESTED FOR THE REQUIRED CRITERIA UNLESS OTHERWISE NOTIFIED BY THE AUTHORITY HAVING JURISDICTION FOR THE FACILITY.

WE UNDERSTAND THAT SOME EXISTING SYSTEMS WERE INSTALLED AND TESTED TO PREVIOUS STANDARDS AND MAY NOT MEET PRESENT CODE REQUIREMENTS. NFPA 99, 5.1.1.4 (2012) ADDRESSES THESE SITUATIONS AND REFERS THEIR CONTINUANCE TO THE AUTHORITY HAVING JURISDICTION TO DETERMINE WHETHER THEY CONSTITUTE A DISTINCT HAZARD TO LIFE OR ARE NOT USEABLE.

MEDICAL GAS ZONES (E.R., P.A.C.U., PATIENT ROOMS, ETC.) ARE LISTED IN ORDER BY FLOOR AND IN SOME CASES BY BUILDING. UPON ENTERING A ROOM, OUTLETS/INLETS ARE LISTED STARTING WITH THE FIRST TO THE LEFT, PROCEEDING CLOCKWISE AROUND THE ROOM. IT IS ALWAYS OUR INTENT TO TEST ALL OUTLETS IN THE SYSTEM, HOWEVER IT IS RECOGNIZED THAT IT MAY NOT BE POSSIBLE TO TEST EVERY SINGLE ONE. SOME OUTLETS/INLETS MAY BE INACCESSIBLE OR IN USE. OUTLETS/INLETS THAT WERE NOT TESTED ARE LISTED BUT HAVE NO PERFORMANCE DATA. POTENTIAL PROBLEMS ARE NOTED ON THE COMMENT SECTION AND ARE DESCRIBED IN MORE DETAIL ON THE SUMMARY PAGES.

IT IS NOT PRACTICAL TO LIST EACH SPECIFIC PROBLEM FOUND (UNDECTABLE LEAKAGE, BENT FACE PLATE, DEFECTIVE OUTLET/INLET, ETC.). THE INTENT IS TO PROVIDE GUIDANCE FOR HOSPITAL PERSONNEL TO BE ABLE TO QUICKLY LOCATE SPECIFIC PROBLEM AREAS IN ORDER TO REPAIR AND RETEST THE SPECIFIC PROBLEM'S) NOTED.

****ALL CHAPTER AND PARAGRAPH REFERENCES IN THIS DOCUMENT ARE TAKEN FROM NPFA 99, STANDARD ON GAS AND VACUUM SYSTEMS, 2012 EDITION.****

TESTING QUALITY ASSURANCE

MEDICAL AIR TESTING & SERVICES' TECHNICAL SERVICE STAFF IS EXPERIENCED AND CONSISTS OF FACTORY TRAINED PERSONNEL WHO HAVE ALSO OBTAINED THE FOLLOWING INDUSTRY REQUIRED CREDENTIALS:

- ASME IX BRAZER
- ASSE 6010 MEDICAL GAS SYSTEMS INSTALLER
- ASSE 6020 MEDICAL GAS SYSTEMS INSPECTOR
- ASSE 6030 MEDICAL GAS SYSTEMS VERIFIER
- ASSE 6040 MEDICAL GAS SYSTEMS MAINTENANCE PERSONNEL
- ASSE 6050 MEDICAL GAS SYSTEMS INSTRUCTOR
- CMGV - MGPHO CREDENTIALED MEDICAL GAS SYSTEMS VERIFIER

ANY OR ALL OF THE FOLLOWING EQUIPMENT HAVE BEEN USED IN THE TESTING AND ANYLYSIS OF THE MEDICAL GAS SYSTEMS:

- NST MODEL G2000, MEDICAL GAS ANALYZER, S/N: 059
- FOXBORO MODEL MIB, PORTABLE AMBIENT AIR ANALYZER, S/N: 274405
- AINSWORTH MODEL A-200 DS AA, SERIES BALANCE, READABILITY OF .01MG
- 25 MM MEMBRANE PTFE FILTERS
- NYAD MODEL MA-160B, TRACE DEW POINT MONITOR, S/N: 1993
- MINIOX 1, OXYGEN ANALYZER
- MIRAN SAPPHIRE I-R ANALYZER MODEL 205BML1A3N, S/N: 205B-79520-408
- BACHARACH N2O ANALYZER MODEL 19-3314, S/N: 9475
- BACHARACH CO2 ANALYZER MODEL , S/N:
- MERIAM 0-30" HG VACUUM GAUGE MODEL 31111500, S/N: 505562
- MERIAM 0-100 PSI PRESSURE GAUGE MODEL 31110100, S/N: 505561
- MERIAM 0-300 PSI PRESSURE GAUGE MODEL 3111200, S/N: 505560
- DWYER 0-10 SCFM FLOW METER MODEL RMB-57-SSV

THE TESTING EQUIPMENT LISTED ABOVE USED FOR ANNUAL MEDICAL GAS EVALUATIONS AND FOR MEDICAL GAS SYSTEM VERIFICATIONS HAS ITSELF BEEN TESTED AND CALIBRATED TO MEET THE NECESSARY REQUIREMENTS AND THEREFORE ACCURATELY REPRESENTS THE RESULTING DATA INFORMATION IN THE FOLLOWING SECTIONS OF THE DOCUMENT.

VERIFICATION TESTING PROCEDURES PER NFPA 99, 2012 - 5.1.12.3

ZONE VALVE BOX ASSEMBLIES:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY PROPER LABELING

3) VERIFY THAT THERE IS NO LEAKAGE IN ASSEMBLY

4) PERFORM VALVE TEST

AREA ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS MONITORED

7) VERIFY CURRENT HIGH / LOW SET POINTS FOR EACH GAS MONITORED

8) VERIFY CURRENT PRESSURE / VACUUM INDICATIONS FOR EACH GAS WITH CALIBRATED GAUGES

9) CALIBRATE PRESSURE / VACUUM ALARM SENSORS PER MANUFACTURER'S RECOMMENDATIONS

MASTER ALARM PANELS:

1) VERIFY PROPER LOCATION / CONDITION

2) VERIFY EMERGENCY ELECTRICAL POWER

3) VERIFY "POWER ON" INDICATION

4) VERIFY FUNCTIONAL PERFORMANCE OF VISUAL AND AUDIBLE SIGNALS

5) VERIFY PROPER LABELING

6) VERIFY PROPER OPERATION OF ALL REQUIRED ALARM SIGNALS

7) VERIFY ALL SET POINTS FOR EACH GAS MONITORED

OUTLET / INLET STATIONS:

1) VERIFY PROPER OPERATION AND CONDITION

2) VERIFY PROPER LABELING

3) VERIFY PROPER OPERATION OF VALVES AND THAT THERE IS NO LEAKAGE

4) VERIFY PROPER OPERATION AND CONDITION OF LATCHING MECHANISM

5) VERIFY PROPER OPERATIONAL PRESSURES

6) VERIFY PROPER STATIC PRESSURES

7) PERFORM STANDING PRESSURE TESTS

8) PERFORM CROSS-CONNECTION TESTS

9) PERFORM VALVE TESTS

10) PERFORM PIPING PURGE TESTS

11) PERFORM PIPING PARTICULATE TESTS

12) PERFORM PIPING PURITY TESTS

13) PERFORM MEDICAL GAS CONCENTRATION TESTS ON ALL POSITIVE-PRESSURE GASES

14) PERFORM MEDICAL AIR PURITY TESTS (FOR SYSTEM START-UP ONLY)

15) PERFORM MEDICAL AIR QUALITY TESTS

16) PERFORM FLOW RATE AND TRANSIENT FLOW RATE TESTS

ZONE VALVE BOX FOR: O.R. 11

ASSEMBLY LOCATION: OUTSIDE O.R. 11

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	AREA SERVED	ZVB LABELED PROPERLY	ZVB LOCATED PROPERLY	PRESS/VAC INDICATOR PRESENT	ZVB VISIBLE & OPERABLE
1	1-4	CO2	O.R. 11	YES	YES	YES	YES
2	1-4	N2O	O.R. 11	YES	YES	YES	YES
3	1-4	N2	O.R. 11	YES	YES	YES	YES
4	1-4	MA	O.R. 11	YES	YES	YES	YES
5	1-4	O2	O.R. 11	YES	YES	YES	YES
6	1-4	WAGD	O.R. 11	YES	YES	YES	YES
7	1-4	VAC	O.R. 11	YES	YES	YES	YES

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: 1 - 7 LEAK TEST GOOD

NEW ZONE VALVE BOX

AREA ALARM PANEL LOCATION: EXISTING AREA ALARM PANEL

MANUFACTURER: **MODEL:**

SEE PAGE #8 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	GAS	INDICATED PRESSURE	INDICATED LOW ALARM	INDICATED HIGH ALARM	ALARM LABELED PROPERLY	ALARM LOCATED PROPERLY	SENSORS LOCATED PROPERLY	VISUAL SIGNAL	AUDIBLE SIGNAL
1										
2										
3										
4										
5										
6										
7										

TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES:

OUTLET/INLET ZONE: O.R. 11

MANUFACTURER: AMICO **MODEL:** OHIO

SEE PAGE #9 FOR EXPLANATION OF TESTING PROCEDURES

TEST #	TEST PROC.	ROOM NAME/NUMBER	GAS	GAS TESTED	STATIC PRESS/VAC	TRANSIENT/ FLOW RATE	PRESS/VAC FLOW @ 3.5 SCFM	PROPER LATCH	CORRECT INDICIA	LEAK PRESENT
1	1-16	O.R. 11	N2O	N2O	51 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
2	1-16	O.R. 11	MA	MA	53 PSIG	3.5/6.0 SCFM	50 PSIG	YES	YES	NO
3	1-16	O.R. 11	O2	O2	55 PSIG	3.5/6.0 SCFM	50 PSIG	YES	YES	NO
4	1-16	O.R. 11	WAGD	WAGD	21 " HG	4.0 SCFM	20 " HG	YES	YES	NO
5	1-16	O.R. 11	VAC	VAC	21 " HG	4.0 SCFM	20 " HG	YES	YES	NO
6	1-16	O.R. 11	VAC	VAC	21 " HG	4.0 SCFM	20 " HG	YES	YES	NO
7	1-16	O.R. 11	VAC	VAC	21 " HG	4.0 SCFM	20 " HG	YES	YES	NO
8	1-16	O.R. 11	N2	N2	175 PSIG	5.0 SCFM	170 PSIG	YES	YES	NO
9	1-16	O.R. 11	VAC	VAC	21 " HG	4.0 SCFM	20 " HG	YES	YES	NO
10	1-16	O.R. 11	CO2	CO2	50 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
11	1-16	O.R. 11	N2	N2	175 PSIG	5.0 SCFM	170 PSIG	YES	YES	NO
12	1-16	O.R. 11	VAC	VAC	21 " HG	4.0 SCFM	20 " HG	YES	YES	NO
13	1-16	O.R. 11	WAGD	WAGD	21 " HG	4.0 SCFM	20 " HG	YES	YES	NO
14	1-16	O.R. 11	O2	O2	55 PSIG	3.5/6.0 SCFM	50 PSIG	YES	YES	NO
15	1-16	O.R. 11	MA	MA	53 PSIG	3.5/6.0 SCFM	50 PSIG	YES	YES	NO
16	1-16	O.R. 11	N2O	N2O	51 PSIG	3.5 SCFM	50 PSIG	YES	YES	NO
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
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TEST #'S	COMMENTS	DATE REPAIRED	REPAIRED BY

NOTES: