



# Medical Gas Systems Policy

This procedural document supersedes: CORP/FAC 3 v.2 – Medical Gas Systems Policy



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## Amendment Form

Please record brief details of the changes made alongside the next version number. If the procedural document has been reviewed **without change**, this information will still need to be recorded although the version number will remain the same.

Version	Date Issued	Brief Summary of Changes	Author
3	12 April 2021	<p>All responsibilities of a position have been recorded under the job title position.</p> <p>All responsibilities have been reviewed and updated.</p> <p>‘Executive Manager’ responsibilities have been added.</p> <p>Estates/Operational Manager responsibilities have been added.</p> <p>Documentation responsibilities are included under role responsibilities.</p> <p>The data sheet appendix removed.</p>	Andrew Ferguson
2	October 2017	<p>Minor amendments to technical detail.</p> <p>Updated references in relation to changes of name.</p>	A Leverton
1	January 2012	<p>This is a new policy please read in full</p>	A Leverton

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## 1. INTRODUCTION

This policy addresses the provision of a Medical Gas Pipeline System (MGPS) and compressed medical gas cylinder management in Doncaster and Bassetlaw Teaching Hospitals NHS Foundation Trust. It is written in line with Hospital Technical Memorandum (HTM) 02-01. The MGPS provides a safe, convenient and cost-effective supply of medical gases to points where these gases can be used by clinical and nursing staff for patient care. The Trust management recognises its commitment to maintaining the MGPS to required standards and the training of all personnel associated with its operation.

## 2. PURPOSE

### Scope and Range

This policy is intended for use by all staff involved with MGPS and medical gas users within in the Trust. It applies also to any medical gas contractor required to work on the MGPS on any of the Trust's sites. It applies throughout the Trust to all fixed MGPS and compressed medical gas cylinders. Compressed gas and vacuum supplies to general engineering workshops and pathology department equipment are separate from the general MGPS, and are not included in this policy, although the general principles in this document should be followed for these departments. MGPS terminal units define the limits of the Trust's responsibility in this policy. Equipment connected to the terminal units is not covered by this policy other than where its mode of use may affect system operation or safety.

Medical gases should not be used for non-medical purposes other than as a test gas for medical equipment. Medical air should be used as the power source for ventilators and air driven power instruments in Theatres; the routine use of oxygen as a driving gas is to be avoided.

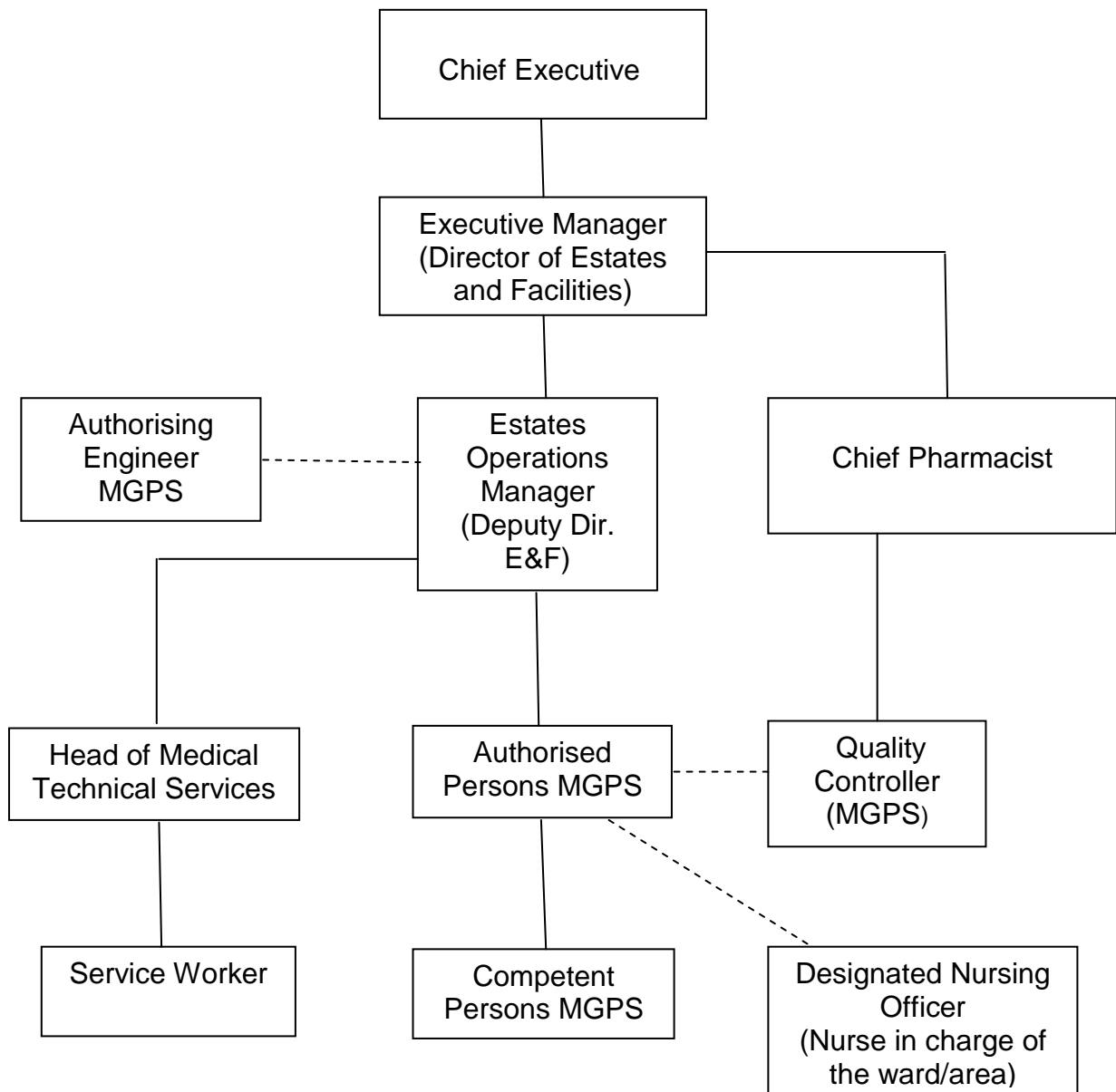
MGPS management responsibility for the Trust resides with the Estates department.

**It is the Trust policy that, before any work on the MGPS can commence, a permit-to-work form signed by an Authorised Person (MGPS) must be completed.**

A list of the trusts Authorised Persons (MGPS) is available from the Estates department upon request.

### 3. DUTIES AND RESPONSIBILITIES

This policy will be monitored on an ad-hoc basis by internal audit as part of their assurance framework and by the Medical Gases group. The policy reporting and accountability arrangements are shown in the flowchart below:



### 3.1 Authorised Staff

#### **Executive Manager – Director of Estates and Facilities**

The Executive Manager is defined as the person with ultimate management responsibility, including allocation of resources and the appointment of personnel, for the organisation in which the MGPS are installed.

The formal responsibility for the MGPS rests with the, Director of Estates and Facilities although the effective responsibility for day-to-day management of the MGPS remains the responsibility of the Authorised Persons (MGPS).

The Director of Estates and Facilities is responsible for the:

- Implementation of an operational policy for the MGPS, they should ensure that the MGPS operational policy clearly defines the roles and responsibilities of all personnel who may be involved in the use, installation and maintenance of the MGPS.
- Monitoring the implementation of the policy.
- Delegation of specific MGPS responsibilities to key personnel; the extent of such delegation should be clearly set out in the MGPS operational policy together with the arrangements for liaison and monitoring.

#### **Estates/Operations Manager – Deputy Director of Estates and Facilities**

The Deputy Director of Estates and Facilities holds responsibility for the integrity of the MGPS. Within this function, senior management shall:

- Appoint Authorised Persons MGPS following assessment and recommendation by the Authorising Engineer MGPS
- Monitor the implementation of the MGPS operational policy. In particular, the MGPS should comply with the requirements of Health Technical Memorandum (HTM) 02-01 Part A & B as far as is reasonably practicable.
- Monitor the implementation of MGPS permit to work procedures, ensuring that all work should be carried out in accordance with the permit-to-work procedures described in HTM 02-01.

#### **Authorising Engineer (MGPS) (Independent to the Trust)**

The duties and responsibilities of the Authorising Engineer are to:

- Recommend to the Executive Manager and Estates/Operations Manager those persons who, through individual assessment, are suitable to be Authorised Persons (MGPS).
- Ensure that all Authorised Persons (MGPS) have satisfactorily completed an appropriate training course.

- Ensure that all Authorised Persons (MGPS) are re-assessed every three years and have attended a refresher or other training course before such re-assessment.
- Review the management systems of the MGPS, including the permit-to-work system.
- Monitor the implementation of the operational policy and procedures.
- Subsequent to performing an assessment of a potential Authorised Person (MGPS), recommend to the Executive Manager of the submitting organisation either that the person is able to proceed to written appointment or requires further training.

The Authorising Engineer should be suitably qualified in accordance with the requirements of HTM 02-01: Medical gas pipeline systems Part B: Operational management, Section 7. Also will have specialist knowledge of MGPS, in particular the MGPS for which an Authorised Person (MGPS) will assume responsibility on appointment.

### **Authorised Person (MGPS)**

The Authorised Person(s) (MGPS) assumes effective responsibility for the day-to-day management and maintenance of the MGPS. The duties and responsibilities of Authorised Person(s) (MGPS) are to:

- Ensure that the MGPS is operated safely and efficiently in accordance with the statutory requirements and guidelines.
- Manage the permit-to-work system, including the issue of permits to Competent Persons (MGPS) for all servicing, repair, alteration and extension work carried out on the existing MGPS either by Estates or contractors.
- Supervise the work carried out by Competent Persons (MGPS) and monitor the standard of that work.
- Keep a register of Competent Persons (MGPS).
- Ensure that the Doncaster & Bassetlaw Teaching Hospitals NHS Foundation Trust MGPS maintenance specification and schedule of equipment (including all plant, manifolds, pipework, valves, terminal units and alarm systems) are kept up to date.
- Liaise closely with Designated Nursing Officers (DNO) or Designated Medical Officers (DMO), the Quality Controller (MGPS) and others who need to be informed of any interruption or testing of the MGPS.
- Provide technical advice to those responsible for the purchase of any medical equipment which will be connected to the MGPS in order to avoid insufficient capacity and inadequate flow rates.
- In accordance with the Trust policy on provision of services, provide advice on the provision and/or replacement of MGPS central plant and associated systems (the Estates department will hold overall responsibility for the provision and maintenance of MGPS services within the Trust).
- Organise training of Estates staff (and other staff if requested) and/or transfer of MGPS information as is needed for the efficient and safe operation of the MGPS.
- Assess the competency of the Competent Person (MGPS) with respect to work on the MGPS where the Competent Person (MGPS) is a member of the Estates department.
- Take suitable measures to gain assurance of the competency of Competent Persons (MGPS) from external organisations working on Trust medical gas pipeline systems

- Appoint Competent Persons (MGPS) in writing following suitable assessment of competency.
- Carry out the responsibilities of the permit-to-work procedure outlined in HTM 02-01: Medical Gas Pipeline Systems, Part B: Operational management, Section 6.91.

The Authorised Person (MGPS) will maintain copies of the following:

- Up-to-date and accurate as-fitted record drawings (including valve/key numbers/TU identification) for all MGPS.
- Any necessary MGPS insurance/statutory documentation.
- The MGPS safety valve replacement schedule (on a five-yearly basis).
- New and completed permit-to-work books for work on the systems.
- Plant history and maintenance records.
- Manufacturers' technical data sheets/manuals for all MGPS components.
- HTM 02-01 (latest edition) and any associated supplements and NHS Model Engineering Specifications.
- MGPS contractors' service contracts and ISO 9001 (or equivalent) certificates, staff training records, equipment calibration certificates (copies)
- A list of all personnel associated with the MGPS, especially the permit-to-work system.
- Emergency and other useful telephone numbers.
- MGPS staff training records

### **Competent Person (MGPS)**

All Competent Persons (MGPS) are either Estates staff, employed by Doncaster & Bassetlaw Teaching Hospitals NHS Foundation Trust or members of specialist contractor staff. External organisations providing Competent Persons (MGPS) for work on Trust premises shall be registered to BS EN ISO 9001/BS EN ISO 13458, with clearly defined registration criteria and be able to demonstrate skills in MGPS maintenance and/or installation in accordance with nationally accredited guidelines. The duties and responsibilities of Competent Persons (MGPS) are to:

- Carry out the installation and/or maintenance work on the MGPS in accordance with the Trust's maintenance specification.
- Carry out repair, alteration or extension work as directed by an Authorised Person (MGPS) in accordance with the permit-to-work system and Health Technical Memorandum 02-01.
- Perform engineering tests appropriate to all work carried out and inform the Authorised Person (MGPS) of all test results.
- Carry out all work in accordance with the Trust's Health and Safety policy and nationally accredited guidelines.
- Carry out the responsibilities of the permit-to-work procedure outlined in HTM 02-01: Medical Gas Pipeline Systems, Part B: Operational management, Section 6.92.



**Quality Controller (MGPS)**

It is the responsibility of the Chief Pharmacist to appoint, in writing, a quality control pharmacist with MGPS responsibilities.

The Authorised Person (MGPS) will be responsible for liaising with the Quality Controller (MGPS) and organising attendance as required. They should have received training on the verification and validation of MGPS and be familiar with the requirements of this MGPS operational policy. The duties and responsibilities of the Quality Controller (MGPS) are to:

- Assume responsibility for the quality control of the medical gases at the terminal units (that is, the wall or pendant medical gas outlets).
- Liaise with the Authorised Person (MGPS) in carrying out specific quality and identity tests on the MGPS in accordance with the permit-to-work system and relevant Pharmacopoeia standards.
- Organise MGPS training of pharmacy staff that may deputise for the Quality Controller (MGPS).
- Carry out the responsibilities of the permit-to-work procedure outlined in HTM 02-01: Medical Gas Pipeline Systems, Part B: Operational management, Section 6.94.

Pharmacy will maintain copies of the following:

- Calibration records of QC test equipment and records of all QC tests performed.

**Designated Nursing Officer/Medical Officer (MGPS)**

The Designated Nursing Officer/Medical Officer (MGPS), usually the Ward Sister or Departmental Manager, is the person in each department with whom the Authorised Person (MGPS) liaises on any matters affecting the MGPS and who would give permission for a planned interruption to the supply. The duties of the Designated Nursing Officer (MGPS) are to:

- Give permission for any interruption to the MGPS and should sign the appropriate parts of the permit-to work.
- Ensure (along with the Authorised Person (MGPS) that all clinical/nursing staff is aware of the interruption to the MGPS and which terminal units cannot be used.
- Act as the focal point for communications related to the MGPS and advises on any special requirements for his/her department relating to MGPS, such as provision of emergency cylinders and vacuum pumps.
- Ensure they have received training on the MGPS relevant to their departments and on the action to be taken in the event of an emergency.
- Be aware of the risks associated with medical gas systems failure and the emergency procedures that need to be adopted in such an event.

## Head of Medical Technical Services

Medical Technical Services based at Doncaster Royal Infirmary (DRI) holds the responsibility for ensuring both liquid Oxygen and compressed medical gas cylinders are available in sufficient quantities without over stocking to meets the needs of the organisation. Medical gas budgets for all sites sit with Medical Technical Services (MTS). The duties of the Head of MTS are to:

- Receive delivery notes for compressed gas cylinders, check against invoices received and pass invoices for payment.
- Order and supply cylinders of medical gases and special gas mixtures for all users of medical gas cylinders including special medical gas mixtures.
- Maintain a record of cylinder rental charges and pass rental invoices for payment.
- Ensure that cylinder gases comply with Ph. Eur. requirements
- Ensure that other gases and gas mixtures comply with manufacturers' product licences.

MTS will hold quarterly contract review meetings with the compressed gas cylinder supplier and address any issues relating to supply and delivery to the trust.

Head of Medical Technical Services will maintain copies of the following:

- Delivery notes for all medical gas cylinders.
- Sales and rental invoices for medical gas cylinders via Oracle.
- Delivery summary form (tracks cylinder stock information)
- Cylinder rental reconciliation form (monitors trends in cylinder use over six months).
- Key Performance Indicators (KPI) and bi-monthly monitoring notes.

## Service Worker

A Service Worker is a member of the Hotel Services team with particular responsibilities for medical gases. They will have undergone specialist training in the identification and safe handling and storage of medical gas cylinders, including relevant manual handling training. The duties of the Service Worker are to:

- Assist with the delivery of gas cylinders by the supplier unless un-aided deliveries are part of the agreed contract.
- Deliver full gas cylinders from the cylinder stores (as appropriate) to all wards and departments as required and return empty cylinders to these stores.
- Attach to and remove from cylinders, medical equipment regulators (or regulator/flowmeter combinations) and manifold tail-pipes.
- Identify, and remove from service, faulty (e.g. leaking) cylinders and subsequently notify MTS of the location of such cylinders.
- Ensure that all cylinder contents are used within the three-year fill/refill timescale specified by the gas supplier.
- Work safely at all times, using the appropriate personal protective and manual handling equipment, damage to which must be reported immediately to Hotel services manager.

## 4. PROCEDURES

### 4.1 Medical Gas Pipeline System Permit to Work

The purpose of the permit issued under this permit-to-work system is to safeguard the integrity of the MGPS and hence, patient safety; it is not intended as a permit to protect the safety of individuals operating or working on the system. In some cases there may be additional safety procedures to be followed under the Health and Safety at Work Act 1974 or COSHH.

A permit-to-work should always be issued before any work is carried out on the MGPS. The permit should identify the work to be carried out, and will provide documentary evidence that a system is only taken back into use when all tests have been satisfactorily completed.

### 4.2 Medical Gas Committee

Meeting twice a year as a minimum, this committee is constituted to oversee and ensure the effective management, maintenance, safety in use and quality assurance in operating and using medical gas services in compliance with the requirements of HTM 02-01 by:

- Reviewing all aspects of the MGPS operational policy.
- Monitoring clinical incidents relating to the MGPS and to determine solutions to reduce risk.
- Reviewing the business continuity plans in relation to medical gas systems.

The Medical Gas Systems Committee shall consist of:

- Trust MGPS Authorised Person.
- Nominated /Designated Nursing/Medical Officer.
- Deputy Chief Pharmacist (Chair).
- Medical Technical Services Manager.
- Hotel Services Manager or nominated representative.

Other key officers shall also be invited to join the group when appropriate.

#### Reporting Arrangements

The Medical Gas Systems Committee is a sub group of the Drug and Therapeutic Committee.

### 4.3 Planned and Unplanned Work

The following sections deal with the principles of planned and un-planned work on all or part of the MGPS, for site specific procedures please refer to the relevant site procedures file.

Shut-down of the MGPS for maintenance, extension etc.

Pre-planned work on the MGPS requiring isolation of a plant, or part of the system, will be covered by the MGPS permit-to-work system.

No isolation should take place without full liaison between the Authorised Person (MGPS) and all other disciplines.

All necessary emergency/additional gas supplies should be in place before the work starts. This may involve the provision of portable emergency supply systems and/or additional provision of cylinder regulators from MTS.

Attempts should be made to reduce gas consumption during the work.

#### **Generator operation on mains failure:**

- During changeover from electrical mains to emergency generator supplies, there is a possibility that spurious MGPS alarms, or changes in plant indications, may be generated. **These alarms must be investigated immediately** as they could represent real, rather than false conditions.
- The status of equipment such as compressors should also be checked to ensure they are operating as selected.
- On/on stand-by/on duty mode/off.

**Additionally failure of generator and mains supplies simultaneously will result in failure of the central medical vacuum system.**

It is important that clinical/nursing staffs are aware of this risk to the vacuum system and any patients using it. All relevant staff must undertake training in the use of emergency vacuum equipment.

In areas where vacuum supply is considered critical, locally-generated vacuum will have to be provided either by ejector-driven suction unit driven from the main oxygen supply via a terminal unit or a separate compressed gas cylinder (oxygen or medical air), or mains/battery driven suction unit, but it is important that, with this type of unit, the battery is maintained in a fully-charged condition. To locate portable vacuum units, call the Medical Equipment Library.

Failure of both mains and electricity supplies will also mean that the medical air compressors will not function. Emergency supplies of medical air will be provided from the automatic cylinder manifold unit, but clinical staff must attempt to conserve air wherever possible so that essential supplies to patient ventilators are maintained. Estates staff must ensure that all plant equipment and alarms have reset to full operating conditions on restoration of power.

## **Use of oxygen at high concentrations**

Where oxygen is in use in large quantities and/or in higher than normal concentrations, for example in oxygen tents and incubators, warning notices indicating “high concentration oxygen in use – danger of fire” should be posted at the treatment site.

The Fire Officer should be consulted on the use of any items within oxygen tents, and a notice worded “only items approved by the fire officer are allowed in this area” must be posted at the entrance to the treatment area. It is the responsibility of all staff in such areas to be vigilant in all aspects of the treatment, and appropriate safety training must be given in the use of oxygen under these conditions.

## **4.4 Emergency Procedures**

All medical gas supplies should ideally comprise of three sources of supply identified as primary, secondary and reserve. The following sections provide an overview of the actual supply configuration with DBTH and a description of the operation under fault conditions.

### **Oxygen system**

#### **DRI**

Oxygen is provided by two simplex vacuum insulated evaporator (VIE) systems, with each vessel mounted within separate compounds at different locations on site, one VIE acting as the primary and the second as the secondary. In the event of failure of the primary VIE, the secondary VIE will automatically provide oxygen to site.

As the VIE’s are mounted on separate plinths in separate locations and the oxygen supply is distributed via a ring main it is not necessary to provide a reserve supply.

#### **BDGH**

Oxygen is provided by a duplex VIE, with each vessel mounted on the same plinth within the same compound. In the event of a failure of the primary VIE, the secondary VIE will automatically provide oxygen to site.

There is currently no reserve (third source of supply).

#### **MMH**

Oxygen is provided by a simplex VIE and a secondary cylinder manifold. In the event of failure of the VIE, the secondary supply via cylinder manifold will provide the site with gas. The manifold supply will change banks automatically but will require cylinder replacement as a bank empties.

**Important:** Cylinder manifolds have limited capacity in relation to the normal site demand supplied from a VIE, so additional manpower may be required in an emergency situation of this kind, both to change the cylinders on the manifold and to bring the replacement cylinders to the manifold.

Measures to reduce gas consumption may also need to be taken.

It is the duty of MTS to ensure that sufficient J-size cylinders are available to maintain the gas supply and of Hotel Services to ensure that there is an emergency procedure in place for handling these cylinders.

### **Medical and surgical compressed air**

#### **DRI**

Medical and surgical compressed air is provided by quadruplex compressors at the following locations:

**Women's & Children's Hospital Plant Room** – Supplies the Women's & Children's Hospital, Parkhill, Orthopaedic Theatres 1-4 and the West Ward Block.

**Main Theatres Plant Room** – Supplies theatres 1 – 8, the East Ward Block, Enhanced Recovery Unit, South Block, South East Block and Medical Imaging

Two compressors of each quadruplex system provide the primary supply. The other two compressors provide the secondary supply. An automatic manifold provides the third source of supply. The automatic manifold supporting the medical air plant will come on line automatically and change banks automatically in the event of a failure of the primary and secondary supplies. Cylinder replacement will be the responsibility of Hotel Services. Care should be taken to prevent transfer of oil/ grease from the compressor plant to the manifold cylinder connections.

#### **BDGH**

Medical and surgical compressed air is provided by a duplex compressor system acting as the primary supply and an automatic supply manifold acting as a secondary supply.

In the event of failure of the primary supply, the automatic manifold supporting the medical air plant will come on line automatically and change banks automatically. Cylinder replacement will be the responsibility of Hotel Services. Care should be taken to prevent transfer of oil/ grease from the compressor plant to the manifold cylinder connections.

Where deemed necessary via risk assessment, local integral valve cylinders with regulators will be available as a third source of supply.

#### **MMH**

Medical and surgical compressed air is provided by a duplex compressor system acting as the only supply.

Where deemed necessary via risk assessment, local integral valve cylinders with regulators will be available as a secondary source of supply.

## **Nitrous oxide and Entonox/Equanox**

The nitrous oxide and Entonox/Equanox automatic manifold systems at each site are fitted with manually-operated Emergency Supply Manifolds (ESM). These supply gas in the event of failure of, or loss of gas from, the main manifold. The ESM will come on line automatically; it will not be necessary to open the ESM main isolating valve to ensure that gas supply is maintained. When in use, it will not change from left to right cylinder banks automatically. Estates, MTS and Services staff should be fully trained in the operation of the ESM.

Detailed instructions identifying which valves to turn and in which order shall be posted adjacent to each ESM. Due to the limited capacity of the ESM, it is essential that the pressure in the cylinders be monitored continuously while it is in use.

Manual changeover from an almost empty to a full cylinder will be required. A full one must then replace the empty cylinder. It is the duty of MTS to ensure that sufficient cylinders are available to maintain the gas supply.

## **Medical vacuum systems**

### **DRI**

Central medical vacuum is provided by triplex systems located at the following locations:

**Women's & Children's Hospital Plant Room** – Supplies the Women's & Children's Hospital, Parkhill, Orthopaedic Theatres 1-4 and the West Ward Block.

**East Ward Car Park Plant Room**– Supplies theatres 1 – 8, the East Ward Block, Enhanced Recovery Unit, A&E, South Block and Medical Imaging.

Two pumps of each quadruplex system provide the primary supply. The other two compressors provide the secondary supply. Local portable suction acts as a third source of supply.

In the event of failure of the primary supply, duty will transfer automatically to the secondary source of supply.

Vacuum within the South East Block is provided by a duplex system located in the South East Block plant room. Technically this constitutes a single source of supply with the support of localised portable suction. Though in practice, vacuum would be maintained in the event that a single compressor failed.

## **Emergency cylinder ordering procedure**

For emergency ordering, during normal working hours, the following procedure should be followed:

- Medical Technical Services will telephone the emergency number of the medical gas supplier.

- Medical Technical Services will advise the medical gas supplier that “new issues” are needed, if no empties are to be returned.
- The delivery note should then be passed to Medical Technical Services.
- Outside normal working hours the On-Call site engineer should be contacted.

**Please note:** MTS will perform routine cylinder ordering based on required stock levels and Weekly use, unless arrangements have been made to have estimated deliveries.

Hotel Services will check stocks twice weekly at DRI weekly at BDGH and MMH sites and report any deficiencies to MTS.

### **Failure of mains electricity supply**

In the event of an electricity failure, medical gas supplies should be maintained by the emergency generator system (the “essential” supply). The surgical compressed-air plant, vacuum plant, oxygen system, all manifolds and medical gas alarm systems are connected to the “essential” electricity supply and will continue to provide and monitor gas supplies as normal.

In the event of failure of both mains and generator supplies:

- The oxygen system will continue to supply gas from the storage vessel as this is not dependant on electrical supply, mains failure alarms will sound, however, the vacuum plant will not operate, and central vacuum service will be lost.
- “Normal” portable vacuum units can be used only if local electricity supplies are available. Ejector- or battery driven units will have to be used where vacuum provision is essential for critical care.
- Medical and surgical air compressors will fail, but air will continue to be supplied from Emergency Supply Manifolds where fitted.
- Nitrous oxide and Entonox/Equinox manifolds will continue to supply gas.
- Alarm panels will display a “system failure” red warning light and give an audible alarm.

If the electricity supply to an alarm panel only is interrupted, the panel will display a “system failure” red warning light and emit an audible alarm; gas supplies will not be affected.

In any of these events:

- The Estates Duty Manager will be informed of the situation via the nursing staff/telephonist.
- Hotel Services and MTS will arrange for staff to monitor manifold gas consumption, replacing empty cylinders as necessary until the electricity supply is restored.
- The Authorised Person (MGPS) in conjunction with medical Technical Services will arrange emergency cylinder/regulator supplies as necessary.
- The Authorised Person (MGPS) will monitor the situation and confirm resetting of any compressor and vacuum plant and system alarms following restoration of supply.



### **A serious leak of medical gases**

In this event:

- The Estates Manager and MTS can be contacted by the telephonist/duty nurse.
- Details of the leak should be confirmed: that is, the floor level, department, room number, the gas or gases involved and whether patient ventilators are in use.
- Outside normal working hours, the Estates Manager on-call can be contacted by the switchboard.
- It is the responsibility of the Duty Nurse to make the environment safer by open windows in the affected area(s) and close doors, in accordance with the Trusts Fire Safety Policy - Protocol 1 (CORP/HSFS 14), Section 9. CONTROL OF OXYGEN & OXIDISERS.
- It is the responsibility of the Duty Nurse to carry out isolation of medical gases to the area after ascertaining that no patients will be put at risk in any area(s) affected by the isolation.
- The Service Supervisor will remain on stand-by to provide extra gas cylinders as required.
- The Authorised Person (MGPS) will arrange for repairs to the system(s) affected to be carried out under the permit-to-work system.

A serious leak may require the attendance of the fire and rescue services this should be considered based on risk factors that will include but not be limited to, severity of the leak, type of gas, location and local isolation availability. Following a serious leak of medical gases an adverse incident form should be raised and submitted to the risk office.

### **Total or partial failure of a medical gas supply**

In this event:

- The person discovering the failure will inform the telephonist and duty nurse immediately.
- The telephonist will inform the duty senior manager, the duty porter and the Estates Manager on duty.
- Details of the failure should be confirmed: that is, floor level, department, room number(s), the gas or gases involved and whether patient ventilators are in use.
- As a precautionary measure, the telephonist will also notify critical care areas that a failure has occurred on part of the system so that they are prepared in the event of the fault extending to their departments.
- It is the responsibility of the duty nurse to check which patients may have been put at risk by the failure and, if necessary, to arrange immediate emergency medical action.
- Depending on the reason for the failure and its possible duration, the Authorised Person (MGPS) will decide the most appropriate method of long-term emergency gas provision. This may involve establishing locally regulated cylinder supplies at ward/department entrances.
- Nursing and medical staff should attempt to reduce gas consumption to a minimum during the emergency.
- Hotel Services staff will be required to monitor/replenish cylinders at any emergency stations and at plant room emergency supply manifolds.
- Medical Technical Services will arrange emergency cylinder deliveries as necessary.

- The Authorised Person (MGPS) will liaise with the Competent Person (MGPS) to complete emergency repairs needed to reinstate the gas supply, using the permit-to-work system.
- When the supply is fully restored, the Authorised Person (MGPS) will complete a critical incident form and produce a full report.

In situations where it is envisaged that there will be long-term loss of oxygen or medical air service, the duty senior manager will liaise with clinical colleagues, including the senior nurse manager, the medical director and the Authorised Person (MGPS) on the need for transfer of critically ill patients to their designated alternative treatment area as defined in the units business continuity plan as department closure may be warranted in extreme events.

### **Over - or under - pressurisation of one or more gas systems**

Local alarms are designed to indicate when system pressure(s) is/are outside the normal operating range. Excessively high or low pressures may cause medical equipment to malfunction. The Duty Nurse should report all instances of local alarm operation to the telephonist.

### **Emergency isolation of a gas supply**

Please refer to site specific procedures for emergency isolation of a medical gas supply.

### **Fire**

Procedures in accordance with Doncaster and Bassetlaw NHS Teaching Hospitals NHS Foundation Trust fire policy should be followed in the event of a fire involving, or likely to involve the MGPS. During a fire, the senior brigade officer will assume full control of the area(s) affected.

**Under no circumstances should medical gas supplies be isolated until the Designated Nursing Officer (MGPS) has confirmed that all patients likely to be affected have been evacuated and/or have alternative gas provision.**

## **5. TRAINING/ SUPPORT**

It is essential for the safety of patients that no person should operate, or work on, any part of an MGPS unless competent or supervised. MGPS training at the Doncaster & Bassetlaw Teaching Hospitals NHS Foundation Trust for all Estates staff is arranged by the Estates and Facilities Department.

A record of those trained is kept in the Estates department.

It is the duty of departmental managers to ensure that all staff working with the MGPS are competent, the Authorised Person (MGPS) may request training records of contractors' staff.

Support staff moving and handling compressed medical gas cylinders must be appropriately trained and records should be kept by the Facilities Services Manager. Refresher training should

be organised dependant on local risk assessment. Training should be carried out by the medical gas cylinder supplier or alternative competent provider.

Users of medical gas, either via the MGPS or compressed cylinders should receive appropriate training that highlights the risks associated with these gases in particular oxygen. Wards and departments should ensure all staff using or setting up equipment that uses medical gas are appropriately trained and that records of such training are kept.

Training should be conducted at frequencies not exceeding those recommended in table of HTM 02-021 part B (replicated below).

Personnel	Retraining	Re-assessment
Authorising Engineer	Every 3 years	Every 3 years
Authorised Person	Every 3 years	Every 3 years
Competent Person	Every 3 years	Every 3 years
Designated Medical Officer	Every 3 years	Every 3 years
Designated Nursing Officer	Every 3 years	Every 3 years
Quality Controller	Every 5 years	Every 5 years
Designated Porter	Every year	Every year
General Nursing staff	Every year	N/A (See note)

## 6. MONITORING COMPLIANCE WITH THE PROCEDURAL DOCUMENT

What is being Monitored	Who will carry out the Monitoring	How often	How Reviewed/ Where Reported to
Permit to work log	MGPS AP / Authorising Engineer	Annual Authorising Engineer audit and additional ad-hoc AP inspection (at least twice per annum)	Medical gas committee
External MGPS contractors	Estates contract management	Six monthly review	Medical Gas committee
Compressed gas supply and management	Medical Technical Services	Quarterly via contract management meetings	Medical Gas committee
Medical Air quality assurance	Quality Controller	Quarterly	Medical Gas Committee
Oxygen purity assurance	Pharmacy	As and when required	Medical Gas committee

## 7. EQUALITY IMPACT ASSESSMENT

The Trust aims to design and implement services, policies and measures that meet the diverse needs of our service, population and workforce, ensuring that none are disadvantaged over others. Our objectives and responsibilities relating to equality and diversity are outlined within our equality schemes. When considering the needs and assessing the impact of a procedural document any discriminatory factors must be identified.

An Equality Impact Assessment (EIA) has been conducted on this procedural document in line with the principles of the Equality Analysis Policy (CORP/EMP 27) and the Fair Treatment for All Policy (CORP/EMP 4).

The purpose of the EIA is to minimise and if possible remove any disproportionate impact on employees on the grounds of race, sex, disability, age, sexual orientation or religious belief. No detriment was identified (See Appendix 2).

## 8. ASSOCIATED TRUST PROCEDURAL DOCUMENTS

CORP/EMP 4 – Fair Treatment for All Policy

CORP/EMP 27 – Equality Analysis Policy

CORP/HSFS 14 – Fire Safety Policy

## 9. DATA PROTECTION

Any personal data processing associated with this policy will be carried out under ‘Current data protection legislation’ as in the Data Protection Act 2018 and the UK General Data Protection Regulation (GDPR) 2021.

For further information on data processing carried out by the trust, please refer to our Privacy Notices and other information which you can find on the trust website:

<https://www.dbth.nhs.uk/about-us/our-publications/information-governance/>

## 10. REFERENCES

### Further Reading

Health Technical Memorandum HTM 02-01 Medical Gas Pipeline Systems – Part B: Operational Management.

BS 341-3:2002. Transportable gas container valves. Valve outlet connections. British Standards Institution, 2002.

The Pressure Equipment Regulations 1999. SI 1999 No 2001. HMSO, 1999.

British Compressed Gases Association, Code of Practice CP44, The Storage of Gas Cylinders 2016.

The carriage of small quantities of Gas Cylinders on vehicles, Leaflet 1: Revision 15, British Compressed gases association.

**APPENDIX 1 – LIST OF MEDICAL GAS PIPELINE SYSTEM AUTHORISED PERSONS**

**This is a current list of Medical Gas Pipeline authorised persons**

Head of Operational Estates	DRI	644134
Head of Operational Estates	BASSETLAW HOSPITAL	2883
Estates Manager Mechanical		644658

## APPENDIX 2 - EQUALITY IMPACT ASSESSMENT PART 1 INITIAL SCREENING

Service/Function/Policy/Project/ Strategy	Division/Executive Directorate and Department	Assessor (s)	New or Existing Service or Policy?	Date of Assessment
Medical Gas Management – CORP/FAC 3 v.3	Trust wide	Andrew Ferguson	Existing	1/1/2021
<b>1) Who is responsible for this policy?</b> Medical Gas Committee				
<b>2) Describe the purpose of the service / function / policy / project / strategy?</b> Providing guidance on the management of medical gases in the trust				
<b>3) Are there any associated objectives?</b> Legislation, targets national expectation, standards: Compliance to HTM 02/01, Health and Safety and associated legislation				
<b>4) What factors contribute or detract from achieving intended outcomes?</b> – Financial constraints may impact on delivery of intended outcomes				
<b>5) Does the policy have an impact in terms of age, race, disability, gender, gender reassignment, sexual orientation, marriage/civil partnership, maternity/pregnancy and religion/belief?</b> Details: [see Equality Impact Assessment Guidance] - No				
<ul style="list-style-type: none"> <li>If yes, please describe current or planned activities to address the impact [e.g. Monitoring, consultation] -</li> </ul>				
<b>6) Is there any scope for new measures which would promote equality?</b> [any actions to be taken] – No.				
<b>7) Are any of the following groups adversely affected by the policy?</b>				
<b>Protected Characteristics</b>	<b>Affected?</b>	<b>Impact</b>		
a) Age	No			
b) Disability	No			
c) Gender	No			
d) Gender Reassignment	No			
e) Marriage/Civil Partnership	No			
f) Maternity/Pregnancy	No			
g) Race	No			
h) Religion/Belief	No			
i) Sexual Orientation	No			
<b>8) Provide the Equality Rating of the service / function / policy / project / strategy – tick (✓) outcome box</b>				
<b>Outcome 1</b> ✓	<b>Outcome 2</b>	<b>Outcome 3</b>	<b>Outcome 4</b>	
<i>*If you have rated the policy as having an outcome of 2, 3 or 4, it is necessary to carry out a detailed assessment and complete a Detailed Equality Analysis form – see CORP/EMP 27</i>				
<b>Date for next review:</b> 1/1/2024				
<b>Checked by:</b> Mathew Gleadall		<b>Date:</b> January 2021		