



Northamptonshire Healthcare
NHS Foundation Trust

Medical Gases Operational Policy

MMP020

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– MMP020 review Sept. 2020

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Why we need this Policy

This policy addresses the provision of a piped medical gas pipeline system (MGPS) and medical gas cylinders across the estate which it occupies. For the avoidance of doubt, MGPS is provided at Cynthia Spencer Hospice, Danetre Hospital and Berrywood Hospital. A number of clinical locations also utilise medical gases in portable cylinder format.

The MGPS provides a safe, convenient and cost-effective supply of medical gases to points where these gases can be used by clinical staff for patient care.

Northamptonshire Healthcare NHS Foundation Trust (NHFT) recognises its commitment to maintaining the MGPS to required standards and the training of all personnel associated with its operation, note that maintenance of the MGPS infrastructure is subcontracted either via PFI arrangements or through our relationship with NHS Property Services Ltd (NHSPS) as our Landlord.

What the Policy is trying to do

This policy is intended to give **safe systems of working with medical gases** to all staff involved with MGPS and medical gas cylinders used throughout NHFT.

For MGPS (where installed), this policy applies all fixed medical gas pipeline systems, the Oxygen Manifold Room, Cylinder Store(s) and Ward Areas. (Note at Cynthia Spencer Hospice and Berrywood the MGPS is limited to Oxygen provision, but at Danetre there **is also suction**, Medical Air and Nitrous Oxide-for Theatre use)

MGPS terminal units at the bedhead define the limits of Estates' responsibility in this policy – except for the servicing obligations for regulators etc.

Maintenance arrangements will clearly identify sections of systems and maintenance responsibility where this is split or shared.

Medical equipment maintenance is the responsibility of the Estates Department.

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; the routine use of oxygen as a driving gas is to be avoided.

MGPS management responsibility for NHFT resides with the Estates department.

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

Which stakeholders have been involved in the creation of this Policy

This policy is written following guidance from Health Technical Memoranda (HTM) HTM 02-01, Medical Gas Pipeline Systems supported by independent, expert advice from the Trust Authorising Engineer, Quality Controller, Estates department and Resuscitation Officers.

Any required definitions/explanations

Anaesthetic gas scavenging system (AGSS): a complete system which conveys expired and/or excess anaesthetic gases from the breathing system to the exterior of the building(s) or to a place where they can be discharged safely.

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Area valve service unit (AVSU): a valve assembly within an enclosure provided for maintenance, for connecting a temporary supply, for shutting off the gas flow to a specific area in an emergency; or for purging and testing of gas supplies after engineering work.

Authorising Engineer (MGPS): a person with suitable qualifications (e.g. a chartered or incorporated engineer) and sufficient relevant experience to oversee and audit a number of medical gas systems and their associated Authorised Persons (MGPS), and who can offer expert technical advice to MGPS managers and users. He/she will also be responsible for recommending Authorised Persons (MGPS) for appointment.

Authorised Person (MGPS): a person who has sufficient technical knowledge, training and experience in order to understand fully the dangers involved, and who is appointed in writing by the Chief Executive on the recommendation of an Authorising Engineer (MGPS). The Authorised Person (MGPS) should have read, have understood and be able to apply the guidance of Health Technical Memorandum (HTM) 02-01, especially in relation to validation and verification, and should also be completely familiar with the medical gas pipe routes, their means of isolation and the central plant. He/she should ensure that the work described in any permit-to-work is carried out to the necessary standards.

Senior Authorised Person (MGPS): will coordinate the actions of all other Authorised Persons (MGPS) within his/her area of responsibility and will manage the permit-to-work system and other MGPS safety aspects in that area.

Competent Person (MGPS): a person having sufficient technical knowledge, training and experience to carry out his/her duties in a competent manner and understand fully the dangers involved, and whose name is on the register of Competent Persons (MGPS). The register should be maintained either by a specialist contractor or by the Authorised Person (MGPS).

Service Lead/ Matron: Act as focal point for communications related to MGPS in a specified department or departments. These Service Lead/ Matrons give permission for any interruption to the MGPS.

Designated Porter (MGPS): a suitably trained person who has been given responsibility for a particular operation involving medical gas cylinders, for example, changing cylinders on an MGPS manifold.

Emergency Reserve Manifold (ERM): a manifold used as an alternative means of supply for a medical gas supply source, for example the automatic manifold supporting a duplex medical air plant. Also the ERM refers to additional manifolds that have been added to an MGPS to protect against supply failure arising from such events as main manifold failure.

Entonox®: BOC trade name for a 50/50 mixture of nitrous oxide and oxygen. Used for pain relief.

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Hazard level: the term used to describe the level of risk to a patient served by an MGPS when work on that MGPS is taking place. In this Policy two levels of hazard are defined: high and low. Either of these will be used to define the type of permit used to manage the MGPS work.

Local area alarm: an alarm indicator unit sited in areas, especially high dependency, and used to signal high or low medical gas pipeline pressure to local clinical staff.

Manifold (automatic): a device that allows connection of high pressure gas cylinders to a medical gas system. They are designed such that they will continue to supply gas in the event of an electrical failure.

Medical gas pipeline system (MGPS): the fixed medical gases pipework, the associated supply plant or pumping equipment, and the warning and alarm systems. This includes medical compressed air, medical vacuum and anaesthetic gas scavenging systems.

Permit-to-work: a form of declaration in five parts used to control work on the medical gas system. Its objective is to prevent inadvertent isolation of, or unauthorised work on, the medical gas system.

Quality Controller (MGPS): a person appointed in writing by the Head of Property Services on the recommendation of the Chief Pharmacist. The Quality Controller (MGPS) should normally be a pharmacist or other suitably trained person, and should have specialist knowledge, training and experience of MGPS and HTM 02-01. The Quality Controller (MGPS) is responsible for the quality of the medical gases; his/her duties include carrying out quality tests specified in HTM 02-01 Part A, Chapter 15.

Key duties

Chief Executive:

Ultimate management responsibility for Medical Gases and Medical Gas Pipeline Systems through the Trust rests with the Chief Executive.

The Chief Executive delegates written appointment of the Authorised Persons (MGPS) to the Head of Property Services.

The Chief Executive delegates day-to-day management responsibility for the MGPS to the Head of Property Services.

Authorising Engineer:

The duties and responsibilities of the Authorising Engineer are:

- To recommend to the Head of Property Services those persons who, through individual assessment, are suitable to be Authorised Persons (MGPS);
- To ensure that all Authorised Persons (MGPS) have satisfactorily completed an appropriate training course;
- To ensure that all Authorised Persons (MGPS) are re-assessed every three years and have attended a refresher or other course before such re-assessment;
- To review the management systems of the MGPS, including the permit-to-work system;
- To monitor the implementation of the operational policy and procedures

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Authorised Person (MGPS):

The Authorised Persons (MGPS) assume effective responsibility for the day-to-day management and maintenance of the MGPS.

The duties and responsibilities of Authorised Persons (MGPS) are:

- to ensure that the MGPS is operated safely and efficiently in accordance with the statutory requirements and guidelines;
- to 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;
- to supervise the work carried out by Competent Persons (MGPS) and monitor the standard of that work (a register of Competent Persons (MGPS) must be kept);
- to ensure that the MGPS maintenance specifications and schedule of equipment (including all plant, manifolds, pipework, valves, terminal units and alarm systems) are kept up to date;
- to liaise closely with Service Lead/ Matron, the Quality Controller (MGPS) and others who need to be informed of any interruption or testing of the MGPS;
- to 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 Trust policy on provision of services, provide advice on the provision and/or replacement of MGPS central plant and associated systems;
- to organise such training of Estates and Hotel Services staff (and other staff if requested) and/or transfer of MGPS information as is needed for the efficient and safe operation of the MGPS.

Competent Person (MGPS):

All Competent Persons (MGPS) are craft persons, employed by K&H Medical Ltd, Kiers Facilities Management, Clugston Facilities Management or Mitie Technical Facilities Management (or sub-contractors working on their behalf)

All Competent Persons (MGPS) shall be registered to BS EN ISO 9001/BS EN ISO 13458, with clearly defined registration criteria.

The duties and responsibilities of Competent Persons (MGPS) are:

- to carry out work on the MGPS in accordance with maintenance specification;
- to 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;
- to perform engineering tests appropriate to all work carried out and inform the Authorised Person (MGPS) of all test results;
- to carry out all work in accordance with the Trust health and safety policy.

Quality Controller (MGPS)

It is the responsibility of Head of Property Services to appoint, in writing, on the recommendation of the Chief Pharmacist, 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.

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;

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- To 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;
- To organise MGPS training of pharmacy staff who may deputise for the Quality Controller (MGPS).
- Ensure that cylinder gases comply with Ph. Eur. requirements;
- Ensure that other gases and gas mixtures comply with manufacturers' product licences.

The Trust appoint Medical Gas Testing Services as the Quality Controller (MGPS) for testing.

Service Lead/ Matron:

The duties and responsibilities of the Service Lead/ Matron are:

- Service Lead/ Matron (MGPS) are the Matron/ clinical Lead responsible for a series of wards/Department or Lead Nurse in charge of a ward will be appointed by the Trust's Director of Nursing, AHP's & Quality and will undertake suitable training for the role.
- It is the responsibility of the Authorised Person (MGPS) to liaise with the Service Lead/ Matron when any interruption to gas supplies is to be undertaken.
- NO INTERRUPTION to a medical gas supply can take place without the WRITTEN permission of either a Service Lead/ Matron (MGPS) i.e. by signing of an appropriate MGPS permit to work.
- Most work at department/ward level will be authorised by the relevant Service Lead/ Matron (MGPS).
- Major supply interruptions will require the permission of a Service Lead/ Matron (MGPS).

However, in the event of any work outside normal working hours (08.00 -16.30), responsibility for liaison with the Authorised Person (MGPS) will be the on-call Estates Manager. The clinical responsibility for signing any necessary permits will be that of the Nurse in Charge.

During emergency situations it will be the responsibility of the Nurse in Charge to liaise with the Authorised Person (MGPS) to co-ordinate necessary remedial work, which may involve provision of alternative gas supplies etc.

Although the AP (MGPS) will be able to advise on suitable training for the Service Lead/ Matron (MGPS), it is the responsibility of the Director of Nursing, AHP's & Quality to organise and monitor such provision.

Portering Staff (MGPS):

Portering Staff (MGPS) will have undergone specialist training in the identification and safe handling and storage of medical gas cylinders, including relevant manual handling training.

Portering Staff (MGPS) will undertake the following duties:

- assist with the delivery of gas cylinders by BOC;
- deliver full gas cylinders from the cylinder stores to the Ward Area and return empty cylinders to these stores;
- transfer gas delivery notes from the delivery driver to the Hotel Services Administrator;
- attach to and remove from cylinders, medical equipment regulators, manifold tail-pipes;
- attach cylinders to and remove them from, medical or anaesthetic equipment;

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- identify, and remove from service, faulty (e.g. leaking) cylinders and subsequently notify the Hotel Services Administrator of the location of such cylinders;
- perform a weekly check on cylinder stocks and report any deficiencies to the Hotel Services Administrator;
- Ensure that all cylinder contents are used within the three-year fill/refill timescale specified by the gas supplier.

The Designated Porter (MGPS) must work safely at all times, using the appropriate personal protective and manual handling equipment, damage to which must be reported immediately to their line manager.

Policy detail

Security – access

The MGPS manifold is located within a locked room. Competent Persons (MGPS) should be allowed, on proof of identify, to gain access by signing out the relevant key from Estates.

Signage

Appropriate identification and safety warnings should be displayed in accordance with current requirements. See Appendix B for approved formats.

A notice should state the location of the keys and be fixed to the manifold room door.

Cylinder storage

A central (main) cylinder store is located adjacent to the Oxygen manifold room, access is gained via the porters or contracted staff.

Area Valve Service Unit (AVSU) Summary

A locked box containing an isolating valve in enclosure with breakable glass front (area valve service unit (AVSU) is provided at the entrance to the ward / department areas where MGPS is installed / operational.

This valve provides facility for both routine and emergency isolation of the Oxygen gas supply.

This valve box contains an emergency inlet port, which is gas-specific. This may be used to supply gas to the ward when the main supply fails or is shut down for essential engineering work.

Access

Under normal events, only the Authorised Persons (MGPS) using the appropriate key from the Estates Department medical gases key cabinet should access the AVSU under control of a permit-to-work.

The key cabinet contains a list identifying the AVSU with corresponding key number.

In the event of an emergency, access to the valve boxes and AVSU's may be gained by breaking the glass access panel.

A member of the nursing staff will perform this action after steps have been taken to ensure that no patient is compromised by isolation of the gas supply.

The MGPS permit-to-work system

The aim of the MGPS permit-to-work system is to safeguard the integrity of the medical gas system and, therefore, the safety of the patients.

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A permit must be raised before any work (except changing of manifold or emergency isolation by a member of the nursing staff) can be undertaken on any part of the medical gas pipeline system. Granting of a permit-to-work and the way in which the work is carried out must follow the directions of Health Technical Memorandum 02-01 unless otherwise defined in this policy.

Responsibilities for signing a permit-to-work lie with the Service Lead/ Matron in each department. Nursing staff should ensure that colleagues are advised of the interruption to the gas supply and its estimated duration.

Nursing staff should also ensure that all affected terminal units are appropriately labelled.

Planned interruption

A planned interruption will be needed for repair, extension or modification to the existing MGPS. An Authorised Person (MGPS) shall supervise any planned interruption in strict accordance with the permit-to-work system in Health Technical Memorandum 02-01. The Quality Controller (MGPS) shall be involved in any planned interruption from the initial planning stage.

The Authorised Person (MGPS) shall assess the hazard level of the work to be carried out in accordance with the definitions that are given in the following sections for high and low hazard work.

High hazard work

Any work on the MGPS, such as cutting or brazing, that will introduce hazards of cross-connection and pollution will be classified as high hazard.

Cross-connection, performance, identity and quality tests shall be required before the MGPS is taken back into use.

The Quality Controller (MGPS) should be included in any discussions that may lead to an interruption of the MGPS.

Two weeks before the planned interruption, the Authorised Person (MGPS) shall liaise in person with the Designated Nursing staff of the ward or department(s) concerned. At the same time, the Authorised Person (MGPS) will complete part 1 of the permit-to-work form.

Service Lead/ Matron(s) of the ward or department(s) involved will be made aware that their signatures will be required on the date on which the work is due to take place.

The requirement for portable cylinders or vacuum units will be determined and confirmed, with details of the interruption, by a memorandum from Hotel Service to the Service Lead/ Matron(s).

The Authorised Person (MGPS) will provide all details of the work to be carried out in part 1 of the permit-to-work form, including any other permits (for example for "hot works" or for entry into confined spaces).

Work shall only commence when the senior duty nurse(s) for the ward or department are satisfied that no patients will be put at risk by the shut-down of the MGPS and has/have signed part 1 of the permit-to-work form.

The Authorised Person (MGPS) will then supervise isolation of the AVSU by the Competent Person (MGPS) after:

- a) Confirming isolation details by consultation with the Competent Person (MGPS); and
- b) Examining the sketch on the fourth sheet of the permit and any additional drawings (if available). Medical gases – HTM 02-01 Medical gas pipeline systems – Part B: Operational management

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Once the system has been isolated and depressurised, the Competent Person (MGPS) will sign:

- a) part 2 and
- b) (together with the Authorised Person (MGPS)) the fourth sheet of the permit-to-work form, and then commence

The Competent Person (MGPS) will sign part 3 of the permit to certify that work has been completed and contact the Authorised Person (MGPS) so that the installation may be examined and tested.

Depending on the extent of high hazard work, the Authorised Person (MGPS) will determine and carry out, with the assistance of the Competent Person (MGPS), the necessary tests and examination of the system(s) in accordance with Chapter 15 "Validation and verification" in Part A of Health Technical Memorandum 02-01.

When these tests have been completed satisfactorily, the Authorised Person (MGPS) will initial the relevant spaces and sign part 3 of the permit.

The Quality Controller (MGPS), with the assistance of the Authorised Person (MGPS), will carry out identity and quality tests on the system(s) in accordance with Chapter 15 "Validation and verification" in Part A of Health Technical Memorandum 02-01.

When these tests have been completed with satisfactory results, both will sign part 4 of the permit. Unsatisfactory results may lead to cancellation of the permit.

The Quality Controller (MGPS) will receive the pink copy of the permit-to-work form from the Authorised Person (MGPS).

Note: Estates will retain the white copy, the original (yellow) copy and the fourth sheet in the permit-to-work book. Photocopies (signed and dated by the Authorised Person (MGPS) and the Competent Person (MGPS)) of the white copy may be issued to the Competent Person (MGPS) on request.

The Service Lead/ Matron will accept the system back into service by signing part 5 of the permit and will undertake to notify his/her colleagues that the system is fit for use.

Low hazard work

Any work on the MGPS which will not introduce any hazard of cross-connection or pollution will be classified as low hazard work.

A performance test will be required before the MGPS is taken back into use.

If there is any doubt as to the hazard level classification of a particular permit-to-work, advice should be sought from the Authorised Person (MGPS).

Low hazard work on terminal units is normally the result of a leak on an individual terminal unit due to a faulty valve or seal, but may also include work on plant which does not interrupt gas supplies. This type of work is usually carried out at short notice because of the need for minimum disruption to patient care.

The Authorised Person (MGPS) may have to arrange a portable cylinder or vacuum unit so that the terminal unit can be taken out of service.

The Authorised Person (MGPS) will fill out the relevant section of part 1 and the fourth sheet of the permit-to-work form. The Authorised Person (MGPS) will liaise with, and fully brief, the senior duty nurse of the ward/department, who will then sign part 1, if required.

The Authorised Person (MGPS) will provide all details of the work to be carried out in part 1 of the permit-to-work form. These should relate directly to the sketch on the fourth sheet of the permit.

When satisfied with the extent of the work, the Competent Person (MGPS) will sign:

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- a) part 2 and
- b) (Together with the Authorised Person (MGPS)) the fourth sheet of the permit-to-work form, and then commence work.

The Competent Person (MGPS) will sign part 3 of the permit to certify that the work has been completed, and contact the Authorised Person (MGPS) for the installation to be examined and tested.

The Competent Person (MGPS), with the assistance of the Authorised Person (MGPS), if necessary, will carry out flow, pressure drop, mechanical function and gas-specificity tests on the serviced terminal unit(s).

Other equipment function tests, for example on plant, will be made to the satisfaction of the Authorised Person (MGPS).

The Authorised Person (MGPS) and Competent Person (MGPS) will initial the relevant spaces and sign part 3 of the permit.

When satisfied with the test results, the Authorised Person (MGPS) will sign part 4 of the permit, or indicate that further work is necessary.

The senior duty nurse of the ward or department will accept the MGPS back into service by signing part 5 of the permit, and will undertake to notify his/her colleagues that the system is fit for use or requires further work.

Actions in the event of a medical gas alarm

On detection of a local alarm indication, for example in a ward area, the senior duty nurse should contact the Estates Helpdesk to confirm that a fault has been signalled.

Disabling the alarm system, other than when due authorisation has been obtained from an Authorised Person (MGPS) is absolutely forbidden as this may compromise patient safety.

There should always be a 'normal' light. If there is no 'normal' light then there is a fault of some kind, possibly just with the alarm panel.

Estates should investigate this fault.

Alarms should be tested weekly by a Competent Person (MGPS).

Operation of the test button will confirm operation of all audible/visual indicators.

Nursing staff should be advised of this test.-

Cylinder management

Cylinders must be appropriately stored at all times; this includes the use of storage racks and trolleys. Cylinder stores must be correctly marked by signage and be appropriately ventilated. Storage areas must be appropriately secure to prevent unauthorised use or theft of cylinders.

Medical Gas cylinders may be obtained from the gas cylinder store by contacting the Trust portering service. Before Removal and attachment to any device, the cylinder operating pressure must be checked and confirmed that it is correct for the device to which it is being attached.

All medical gas cylinders connected to manifolds are checked by portering staff at the end of each day to ensure oxygen supplies do not run too low overnight.

Cylinders are barcoded and the supplier BOC scans each cylinder delivered and empty returns.

Porters monitor expiry dates on J size cylinders in the plant room manifold and stores at Danetre and Cynthia Spencer.

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Portable gas cylinders are checked by clinical staff, any close to their expiry date are returned to Hotel Services in order to co-ordinate collection.

Oxygen at Berrywood Hospital is managed by Kier.

Patients who require a medical gas to be available for administration during transfer from one area to another should normally be accompanied by a trained member of the nursing staff though this may not be necessary in patients who are designated medically stable by their clinical team. The need for trained supervision should be assessed prior to transfer. If the patient is not accompanied by a nurse clear instructions must be provided for personnel involved in the transfer. These should include the medical gas delivery device and flow rate.

Where patients require treatment with a medical gas at home subsequent to their hospital stay, arrangements must be put in place to ensure that an oxygen supply is available

Cylinder Storage

Excessive numbers of medical gas cylinders must not be stored on wards.

It is the responsibility of the Service Lead/ Matron for each ward/department to determine the numbers of medical gas cylinders that should be stored, and to ensure that this number is not exceeded or met.

Cylinders must be stored in the main cylinder store on / in appropriate racking and secured with a locally approved device or system to prevent cylinders from falling over.

In transit and in the forward cylinder store, they must be secured by an approved means on suitable trolleys, and when static in the forward cylinder store, or in use at the bedside must be secured to prevent falling with a locally approved device in accordance with EFA/2010/008. Special rules apply for mental health and learning disability inpatient areas, and for emergency use of oxygen.

Cylinders must only be stored in designated storage areas, where access is controlled. All rooms that cylinders are stored in must be appropriately labelled, to ensure that the presence of oxidising, cryogenic or asphyxiant gases is known in the event of fire or other emergency.

Dealing with Faulty Cylinders

Any leaking cylinders must be reported to the Service Lead/ Matron/ Nurse in Charge who must inform the Medical Gas Cylinder Supplier immediately, and remove the defective cylinder from use.

The Medical Gas Cylinder Supplier must arrange for the immediate removal of such cylinders from the wards and premises. The removal of cylinders may need to be delayed pending SI investigations if the cylinder incident is reportable under RIDDOR. Cylinders involved in a RIDDOR reportable incident must be impounded until they are cleared for release by the Trust Health and Safety advisors or the Health and Safety Executive.

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.

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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 Estates.

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 always 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.

It is important that clinical/nursing staff are aware of this risk to the vacuum system and any patients using it.

Estates staff must ensure that all plant equipment and alarms have reset to full operating conditions on restoration of power.

Emergency procedures

General statement

Emergency supply manifolds are attached to all medical gas systems.

Oxygen system

In the event of failure of the primary oxygen manifold supply, the secondary oxygen manifold (ESM) supply will automatically provide MGPS with gas.

The secondary manifold supply is manual only and will require constant monitoring when in use.

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

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

Note: The Hotel Services Department will perform routine cylinder ordering based on required stock levels and weekly use.

Portering will check stocks weekly and report any deficiencies to the Hotel Services Administrator.

For emergency ordering, the following procedure should be followed:

- The Hotel Services Administrator will telephone the emergency number of the medical gas supplier.
- Upon delivery by the medical gas supplier, the duty porter should check the delivery against the request and sign the driver's delivery note.
- The note should then be passed to the Hotel Services Administrator.

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 oxygen system manifold 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 its supply manifold system;
- Alarm panels will display a "system failure" red warning light and give an audible alarm.

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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 Authorised Person (MGPS) will be informed of the situation via the nursing staff/Estates Helpdesk;
- Portering and Estates will arrange for staff to monitor manifold gas consumption, replacing empty cylinders as necessary until the electricity supply is restored;
- The Authorised Person (MGPS) will arrange emergency cylinder/regulator supplies as necessary;
- The Authorised Person (MGPS) will monitor the situation and confirm resetting of system alarms following restoration of supply.

A serious leak of medical gases

In these events:

- The duty porter and the Authorised Person (MGPS) will be contacted by the Nurse in Charge;
- Details of the leak and location 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 on-call Estates Manager will notify the Authorised Person (MGPS);
- it is the responsibility of the Nurse in Charge 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 Nurse in Charge will issue appropriate instructions to make the situation safe, such as to open windows in the affected area and close doors, in accordance with the fire policy;
- the duty porter 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.

Total or partial failure of a medical gas supply

In these events:

- the person discovering the failure will inform the Nurse in Charge immediately;
- the Nurse in Charge will inform the duty senior manager, the duty porter and the duty Authorised Person (MGPS) of the leak;
- 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 Nurse in Charge 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 Nurse in Charge 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;
- portering staff will be required to monitor/replenish cylinders at any emergency stations and at plantroom emergency supply manifolds;
- Hotel Services will arrange emergency cylinder deliveries as necessary;

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- 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, which will be given to the Head of Property Services within 24 hours of the incident.

In situations where it is envisaged that there will be long-term loss of oxygen, the Nurse in Charge will liaise with clinical colleagues, including the senior nurse manager and the Authorised Person (MGPS) on the need to deploy portable oxygen cylinders or defer treatment.

Contamination of a medical gas supply

It is not unusual for a smell to be noticed when using “plastic” equipment hoses to deliver gas to a patient. This smell usually disappears rapidly after first use of the hose, and will generally be familiar to operatives.

However, if either operatives or patients complain of any unusual or strong smells from equipment, the situation must be treated seriously and immediate action taken to ascertain the cause.

Where it is obvious that the smell is coming from the pipeline rather than a piece of connected equipment, **the gas supply must not be used.**

In such an event, the fault should be treated as a complete gas failure to that area and the actions described above taken **immediately.**

It is very important that, if such an incident occurs, the telephonist advises **all** departments of the problem, especially critical care areas.

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.

Fire

Procedures in accordance with the 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 Service Lead/ Matron has confirmed that all patients likely to be affected have been evacuated and/or have alternative gas provision.

MGPS record drawings and documentation

The Authorised Person (MGPS) and Head of Property Services 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;
- MGPS safety valve replacement schedule (on a five-yearly basis);
- New and completed permit-to-work books for work on the systems;
- Plant history/maintenance records;
- manufacturer’s technical data sheets/manuals for all MGPS components;
- Health Technical Memorandum 02, all latest editions of any associated supplements and NHS Model Engineering Specifications;

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- 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;
- The MGPS operational policy.
- Calibration records of QC test equipment and records of all QC tests performed.

The Hotel Services Department will maintain copies of the following:

- delivery notes for medical gas cylinders;
- sales invoices for medical gas cylinders;
- cylinder rental invoices;
- cylinder rental reconciliation form (monitors trends in cylinder use over six months);
- delivery notes for special gas and industrial gas cylinders;
- sales invoices for special gas and industrial gas cylinders;
- rental invoices for special gas and industrial gas cylinders;

Training requirements associated with this Policy

It is essential for the safety of patients that no person should operate, or work on, any part of an MGPS unless adequately trained or supervised.

MGPS training for all estates/portering staff is administered via the Estates Department, by provided external resources

A record of those trained is kept in the Estates department – and on ESR (Electronic Staff Record).

It is the duty of departmental managers to ensure that all staff working with the MGPS are appropriately trained.

The Authorised Person (MGPS) may request training records of contractors' staff.

Training on MGPS will be provided as follows:

Staff Group	Type of Training	Frequency
Portering Staff and designated clinicians	Gas cylinder handing and changing	Annually
Authorised Person (MGPS)	MGPS systems	Every 3 years
Competent Person (MGPS)	MGPS systems	Every 3 years
Service Lead/ Matron (MGPS)	MGPS systems	Every 3 years
General Nursing Staff	Medical Gases	Annually role specific
Quality Controller	MGPS systems	Every 5 years

How this Policy will be monitored for compliance and effectiveness

The MGPS operational policy should be reviewed 2 yearly.

The table below outlines the Trusts' monitoring arrangements for this document. Policy will be monitored for compliance and effectiveness The Trust reserves the right to commission additional work or change the monitoring arrangements to meet organisational needs.

Aspect of	Method of	Individual	Monitoring	Group or	Group or
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compliance or effectiveness being monitored	monitoring	responsible for the monitoring	frequency	committee who receive the findings or report	committee or individual responsible for completing any actions
Duties	To be addressed by the monitoring activities below.				
Integrity of Medical Gas Pipeline Systems – compliance with HTM 02-01	Annual Audit by Authorising Engineer	Head of Property Services	Annually	Medical Gases Committee	Head of Property Services
Review of training needs versus training delivered	Review of Training Needs Analysis	Resuscitation Officer	Annually	Medical Gases Committee	Medical Gases Committee
Monitoring of medical gas-related incidents	Review of related incident reports	Health & Safety Risk Manager	On-going	Medical Gases Committee	Health & Safety Risk Manager
Compliance with MHRA Alerts	Audit of Medical Device Alerts	Head of Property Services	Annually	Medical Gases Committee	Health & Safety Risk Manager
Where a lack of compliance is found, the identified group, committee or individual will identify required actions, allocate responsible leads, target completion dates and ensure an assurance report is represented showing how any gaps have been addressed.					

For further information

- Health and Safety at Work etc. Act 1974
- Management of Health and Safety at Work Regulations 1999
- Workplace (Health, Safety and Welfare) Regulations 1992
- Provision and Use of Work Equipment Regulations 1998
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995
- Control of Substances Hazardous to Health (COSHH) Regulations 2002
- Pressure Equipment Regulations 1999
- Pressure Systems Safety Regulations 2000
- Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972
- Medicines Act 1968
- Manual Handling Operations Regulations 1992 (as amended 2002)

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- Personal Protective Equipment at Work Regulations 1992
- Electromagnetic Compatibility Regulations 2005
- Electricity at Work Regulations 1989
- Other guidance applicable to medical gas pipeline systems
- Health Technical Memorandum 02-01 – ‘Medical gas pipeline systems’:
 - Part A: Design, installation, validation and verification
 - Part B: Operational management
 - Supplement No 1–‘Dental compressed air and vacuum systems’
- National Health Service Model Engineering Specification C11 – ‘Medical gases’
- Estates and Facilities Alert EFA 2010/008. Unsecured Oxygen Cylinders.
- European Pharmacopoeia standards for medical gases, including medical compressed air
- Health and Safety policy
- Fire policy

Equality considerations

The Trust has a duty under the Equality Act and the Public Sector Equality Duty to assess the impact of Policy changes for different groups within the community. In particular, the Trust is required to assess the impact (both positive and negative) for a number of ‘protected characteristics’ including:

- Age;
- Disability;
- Gender reassignment;
- Marriage and civil partnership;
- Race;
- Religion or belief;
- Sexual orientation;
- Pregnancy and maternity; and
- Other excluded groups and/or those with multiple and social deprivation (for example carers, transient communities, ex-offenders, asylum seekers, sex-workers and homeless people).

The author has considered the impact on these groups of the adoption of this Policy

It is unlikely that the operation of this policy and associated procedures and protocols will lead to unlawful discrimination. The appropriate and reasonable adjustments will be made if required to support the administration of gas where a service user has a physical impairment.

Reference Guide

- Health Technical Memorandum 02-01 – ‘Medical gas pipeline systems’:
 - Part A: Design, installation, validation and verification

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- Part B: Operational management
- Supplement No 1–‘Dental compressed air and vacuum systems’

Document control details

Author:	Andy McLester Head of Property Management Suzanne Richardson Resuscitation Officer
Approved by and date:	TPB 21/09/2017
Responsible committee:	Medicines Management Committee – approved 19/09/2017
Any other linked Policies:	CLP009 Medical Devices Policy Procedure for the handling and administration of medical gases
Policy number:	MMP020
Version control:	1

Version No.	Date Ratified/ Amended	Date of Implementation	Next Review Date	Reason for Change (eg. full rewrite, amendment to reflect new legislation, updated flowchart, minor amendments, etc.)
1	21/09/2017	21/09/2017	21/09/2020	New policy to meet the needs of the organisation in relation to safe systems of working with medical gases to all staff involved with medical gas pipeline supplies (MGPS) and Medical gas cylinders used throughout NHFT.
1.1	11/01/2019		21/09/2020	Minor amendment to clarify general nursing training frequency – agreed at medical gases meeting.

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Terms of Reference Medical Gases Committee

Purpose of Group

To provide assurance to the Medicines Management Committee that medical gases are effectively monitored and managed within Northamptonshire Healthcare NHS Foundation Trust.

Function:

The functions of the Medical Gases Committee for Northamptonshire Healthcare NHS Foundation Trust are to:

1. Review and update the Medical Gases Policy.
2. Provide assurance that competencies are in place and validated.
3. Act as a forum for the monitoring of medical gases risk management activities.
4. To promote staff participation in the prevention of accidents, incidents and near misses
5. To assess training requirements, implement training and to monitor non-attendance of medical gas training requirements in relation to HTM 02-01.
6. To promote and monitor that medical gas policies and procedures are implemented and adhered to throughout the Trust.
7. To disseminate information and provide feedback to appropriate groups, committees, staff and other stakeholders on medical gas related issues.
8. To act as an early warning mechanism to alert for emerging risks.
9. Receive the annual Authorised Engineers Audit and take forward remedial actions.
10. Identification, development and promotion of the best practices for medical gas safety. Implementation will require co-ordination and support for process and system changes to reduce the likelihood of occurrence and reoccurrence of serious medical device incident reports.
11. Provide regular feedback to clinical staff, patient care areas and hospital committees on medical device risks and planned action to minimise these risks.
12. Co-ordinate education and training support to improve the quality of medical gas incident reports and safe medical device practices.
13. Assist in development and review of medical gas use policies and procedures.

Quorum:

A minimum of 4 group members must be in attendance. Core members of the Group are expected to send appropriate representation to the meeting if on occasion they are unable

to attend. Other professionals will be co-opted onto the group on occasions when specific topics need to be discussed.

Frequency of Meetings:

The Group will meet quarterly but may convene additional meetings as appropriate.

Reporting:

The Group will report to Trust Board via the Medicines Management Committee. Core Group members are responsible for providing feedback from meetings to their respective teams. The Chair of the group is accountable to the Director of Nursing, AHP's & Quality.

Circulation of Minutes:

The Agenda will be distributed to Group members only. Minutes of the meeting will be distributed directly to all members of the Group.

Review:

The Terms of Reference and membership of the Group will be reviewed annually.

Core Membership of the Medical Gases Committee

Resuscitation officer (Chair)

Pharmacy Lead (Deputy Chair)

In addition to the chair and deputy chair, permanent membership will comprise of nominated operational/clinical representatives from:

Child & Adult Services

Community Beds

Treatment Centre

Sexual Health Services

Estates Representative

Dental Representative

Clinical Skills Representative

Podiatry Representative

Portering Representative

Review Date: October 2018

Appendix B



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