Trust Policy	Worcestershire Acute Hospitals NHS Trust

Medical Gas Policy

Department / Service:	Estates
Originator:	Simon Noon
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Approved by:	Ray Cochrane / Medical Gas Committee / Medicines Safety Committee, Trust Management Executive
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Target Organisation(s)	Worcestershire Acute Hospitals NHS Trust
Target Departments	Estates, Technical Services, Pharmacy, Facilities, Nursing
Target staff categories	Managers, Nurses, Technicians, Porters

Policy Overview:
This Policy will outline how the Trust Manage the Delivery of Medical Gases by the Medical Gas Pipeline System to patients in accordance with the requirements of HTM02-01

Key amendments to this document

Date	Amendment	Approved by:
January 2022	New document approved	TME
16th December 2025	Document extended for 6 months to allow time for review and update	Faiza Khan

Contents page:

Quick Reference Guide

1. Introduction

The Medical Gas Pipeline Systems (MGPS) are the means by which The Trust 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, gases could also be used in HSDU & Tech services.

The Trust recognises its responsibility to implement in full, the safe management of the MGPS in accordance with the statutory requirements and guidelines listed in this Policy.

The Trust accepts that safe management of the MGPS requires a high level of commitment, professional competence and adequate resources.

The Trust recognises that it is essential for key personnel to receive appropriate training relevant to their particular roles and activities.

2. Scope of this document

This Policy applies to the medical gas installation at Worcestershire Royal Hospital (WRH) Kidderminster Hospital (KTC) and The Alexandra Hospital (AHR)

3. Definitions

Duty Holder	Chief Executive. Worcestershire Acute Hospitals NHS Trust
Responsible Person (RP)	Person with the requisite knowledge and experience to ensure that the requirements of this policy are implemented
Authorising Engineer	Person with the requisite knowledge and experience to ensure that Medical Gas Pipeline Systems are managed in accordance with HTM 02-01
Authorised Person (AP)	Person who has completed an accepted Medical Gas course, is familiar with the site installation and has been appointed by the authorising engineer as an AP MGPS
Competent Person (CP)	Person who is deemed competent by the AP, has relevant training and experience, is familiar with the site installation and has been appointed by the AP MGPS
MSDS	Material Safety Data Sheet supplied by manufacturers of Hazardous Substances – required by COSHH regs – identifies precautions to be taken when using a hazardous product.
Enforcing Authority	Health and Safety Executive

UKAS	United Kingdom Accreditation Service (which is currently the sole recognised accreditation body).
MGPS	Medical Gas Pipeline System

HTM	Health Technical Memorandum – published technical guidance regarded as best practice in healthcare
Method Statement	Details of how the work is to be done safely.

4. Responsibility and Duties

Chief Executive

The Chief Executive has overall responsibility for all matters relating to the management of Medical Gases. This responsibility includes ensuring that Medical Gas management is addressed through adoption of this policy. Procedures are developed, implemented and appropriately resourced to safeguard the interests of the Trust and ensure safety of patients, staff and visitors.

The Chief Executive will ensure that financial resources are made available to support this Policy based upon an assessment of priorities.

The Responsible Person (RP)

The RP is responsible for ensuring that this policy is implemented across the Trust and by partner organisations.

For the purposes of the policy the Principal Engineer / Statutory Standards Manager will be the "Responsible Person (RP)" and will oversee the implementation of this policy on behalf of the Duty Holder (Chief Executive) for the Trust.

Authorising Engineer (AE)

The AE will be suitably qualified and experienced in line with the requirements HTM02-01 (MGPS) and will be appointed in writing, by the Trust Chief Executive or Nominated Deputy.

AE Duties

To recommend to the Trust Head of Estates and the Regional Operations Manager of the FM provider 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 initially assessed as to their fitness to be appointed and are re-assessed every three years following attendance of a suitable refresher or other training course prior to their re-assessment.

To conduct an annual audit and review of the management systems of the MGPS, including the Permit to Work System.

To monitor the implementation of the Operational Policy and Procedures.

The Trust will appoint an AE for AHR and KTC sites WRH PFI will have a separate AE appointed by Equans Facilities Management

Authorised Persons (APs)

Authorised Persons (MGPS) are suitably qualified experienced persons who will be appointed in writing by the AE, in accordance with the procedure outlined above.

A minimum of three Authorised Persons (MGPS) are required for the Trust's sites and a further 3 are required for the WRH PFI site. To clearly define responsibilities, The AEs will recommend one AP as the Senior Authorised Person (SAP) (MGPS) with overall responsibility for the systems at the AHR and KTC, WRH will have a SAP appointed by their AE

The formal responsibility for the MGPS rests with the Chief Executive and Engie Facilities Manager although Authorised Persons (MGPS) will assume effective responsibility for the day-to-day management and maintenance of the systems on all sites.

The duties and responsibilities of the Authorised Person (MGPS) are:

To ensure that the MGPS is operated safely and efficiently in accordance with the statutory requirements and guidelines listed in HTM 02-01

To be responsible for 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 be responsible for the supervision of the work carried out by Competent Persons (MGPS) and for the standard of that work (A Register of Competent Persons (MGPS) must be kept);

To ensure that the Trust's MGPS Estates Service Agreement and schedule of equipment (including all plant, manifolds, pipework, valves, terminal units and alarm systems) are kept up to date;

To liaise closely with Designated Medical / Nursing Personnel, the Quality Controller (MGPS) and others, who need to be informed of any interruption or testing of the MGPS as a result of work carried out.
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;

Provide advice on the provision and / or replacement of MGPS central plant and associated systems;

To organise such training of contractors' and staff as is required, for the efficient and safe operation of the MGPS.

Competent Person (MGPS)

Note: Competent Persons (MGPS) are suitably qualified and experienced craft persons, either directly employed by The Trust, employed by the PFI hard FM Provider or by specialist Contractors, CPs will be appointed in writing by the site AP. Medical Gas contracting companies will be **EN ISO 9001 registered**

The duties and responsibilities of the Competent Person (MGPS) are:

To carry out work on the MGPS in accordance with The Trust's Estates / Engie's Service Agreement;

To carry out repairs, alterations or extension work, as directed by an Authorised Person (MGPS) in accordance with the Permit to Work System and HTM 02-01 (2005)

To perform engineering tests appropriate to all work carried out and inform an Authorised Person (MGPS) of all test results;

Quality Controller (MGPS)

A Quality Control Pharmacist (QC) with MGPS responsibilities will be appointed to carry out the required duties on all sites. The respective Authorised Person (MGPS) will be responsible for contacting the QC (MGPS) and organising their attendance as required. A list of approved alternatives QCs will be kept by the SAP to cover non availability of usual QC.

The duties and responsibilities of the QC (MGPS) are:

To determine and report on the quality of the medical gases at the terminal units, i.e. the wall or pendant medical gas outlets; routinely or following any high hazard work

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 European Pharmacopoeia Standards.

Designated Medical / Nursing Personnel

The Director of Nursing (or nominated deputy) liaises on any matters affecting the MGPS with the Authorised Person. The Designated Medical Personnel is the Senior Consultant with responsibility for the area affected.

The Designated Medical / Nursing Personnel will give permission for a planned interruption to the supply by signing the relevant sections of the Permit to Work form after discussion with all affected parties.

For the purposes of most MGPS work at ward level, the Ward Sister or nominated deputy will act as Designated Nursing Personnel. High Hazard work e,g. cutting and brazing of pipelines in their area of responsibility will require the written authorization of Designated Medical / Nursing Personnel.

In the event of a planned interruption involving more than one department, including theatres e.g. for a major shutdown, the Theatre Matron / Directorate Manager, (or a nominated deputy) will be the Designated Medical Personnel

Training of the DMO / DNO in operational and safety aspects of the MGPS should take place on a regular basis. This training should be organised by the Chief Nurse

Designated Person (DP)

A Designated Person is a Porter with particular responsibilities for medical gases.

He / she will have undergone specialist training in the identification and safe handling, connection and storage of medical gas cylinders, including relevant manual handling and COSHH training. Designated Persons will be assessed and appointed in writing by a site AP.

Designated Persons in the Trust will be ISS employees in the PFI, Trust employees in the other hospitals.

Duties will be undertaken as follows;

a) Deliver full gas cylinders from the Cylinder Store and connect to medical gas manifolds and equipment in wards and departments and return any empty cylinders to the cylinder stores.

b) Transfer gas delivery notes from the delivery driver to the Portering Supervisor, who will then arrange delivery of these notes to the Finance Department.

c) Identify and remove from service any faulty (e.g. leaking) cylinders and subsequently notify the Portering Supervisor of the location of such cylinders, who will arrange for these cylinders to be collected by BOC.

It is essential that the Designated Person works safely at all times, using the appropriate Personal Protective and Manual Handling Equipment.

Personal Protective or Manual Handling Equipment found to be missing, or defective in any way, must be reported immediately to the Portering Supervisor.

PPE and manual handling equipment used by ISS staff will be provided and maintained by ISS.

Duty Nurse

This is the senior nurse on duty at the time of any emergency incident if the DNO / DMO is not available.

He / She is responsible for signing the emergency MGPS permit to work and will work in conjunction with the Trust Duty Manager / Trust Duty Matron, to ensure clinical risk is adequately managed. All nursing staff should have a good understanding of the medical gases in their areas and should understand the consequences of any interruptions for the patients in their care

Chief Operating Officer (COO)

The COO or their deputy has responsibility for Clinical Risk across the Trust. He / She will be consulted about operations that affect more than one area.

The COO or their deputy will identify the relevant nursing/medical personnel that need to be involved in any plans.

Site Co-ordinator

The site co-ordinator is the Duty Manager.

He / She will co-ordinate clinical requirements across the site out of normal hours and instigate any necessary escalation.

Training

AE – The AE will be a Incorporated / Chartered Engineer and will have completed / passed an Industry / Trust recognised MGPS AP and AE course, this training will be renewed three yearly

AP – Will be an experienced engineer and will have completed / passed an Industry / Trust recognised MGPS AP Course this training will be renewed three yearly or on the recommendation of the AE.

CP – Will be an experienced and trade qualified, will have completed / passed an Industry / Trust recognised MGPS CP course, this training will be renewed three yearly or on the recommendation of the AP.

Quality Controller - Will be an experienced engineer / pharmacist and will have completed / passed an Industry / Trust recognised MGPS QC Course this training will be renewed three yearly.

Designated Person – Will be a porter who has received basic training on safe handling / installation of Medical gas cylinders and is deemed competent by the AP.

The Designated Medical / Nursing Personnel – Will be suitably qualified medical Personnel, who are aware of patient requirements in regards to medical gases and the attendant risks and will understand their duties in the permit to work system and any actions to take in the event of fire or other emergency

MEDICAL GAS COMMITTEE

Any issues to do with the Medical Gases will be raised at the Medical Gas Committee, which will meet quarterly or as required, in the event of an incident, significant change in legislation or best industry practice. Medical Gas Committee shall consist of as a minimum, the Senior APs, Designated Nursing / Medical Officer, Health and Safety Manager and Portering Managers. The RP will produce a report from the Medical Gas Committee to the Medical Safety Committee, summarising the main issues and risks discussed at the Medical Gas Committee. The RP will also inform the H&S committee of any issues identified by the Medical Gas Committee. The Medical Gas Committee will produce biannual reports to the Medicines Safety Committee

5 Policy detail

INTRODUCTION

The Medical Gas Pipeline System (MGPS) has developed to meet the increased demands of modern healthcare. It is a safe and effective method of supplying a medical gas from its source of supply, through a pipeline system, to the patient via a terminal unit. It also provides a convenient and cost-effective alternative to the use of portable cylinders, compressors, and suction units, providing gas or vacuum for clinical needs without the associated problems of portage, noise and waste of space.

It is the responsibility of the Trust / Project Co to implement in full, the safe management of the MGPS in accordance with the statutory requirements and guidelines detailed in **section 6** of this document.

Health Technical Memorandum (HTM) 02-01, "Medical gas pipeline systems", provides guidance on the management of the MGPS, with particular reference to relevant statutory requirements and guidelines.

AIM

The aim of this Operational Policy is to;

Maintain the overall integrity of the MGPS to ensure the safety of staff, patients, plant and equipment

5.1 MGPS Drawings and records

Site MGPS APs will maintain;

Accurate as fitted drawings, including valve and key numbers for the MGPS installation

Statutory records, including insurance documentation

MGPS five yearly safety valve inspection schedule

Permit to Work books, including completed books.

MGPS plant history / maintenance records

O&M manuals / data sheets for MGPS plant and equipment

Contractor files, containing service contracts, PPM schedules, PPM specification, service sheets for reactive and PPM maintenance, minutes of meetings, Training records.

List of all site AEs / APs / CPs with training dates and appointment dates and re-training / re-appointment dates
Up to date contact numbers for all personnel contracted and in house involved in the MGPS installation in and out of hours.

Up to date calibration records for all test equipment including contractors test equipment.

5.2 Gas Information

Estates Department will maintain the following information

Calibration records of QC test equipment and records of all QC tests performed will be held by the AP MGPS in the Estates department.

Facilities Department will maintain the following information

Delivery notes / certificates for liquid oxygen and check against invoices received and pass invoices for payment

Delivery notes for compressed gas cylinders and cylinder rental invoices, check delivery notes against invoices received, approve and pass invoices for payment

5.3 SYSTEM ELEMENTS

Medical Air Plant

Plant summary

WRH

4 X Cyclon compare compressors, duplex dryers located in medical gas plant room WRH level 0 backed up by a 2 X 5J manual manifold

Alexandra

Consists of 3 HPC SK26 Air compressors with a Duplex MIM Drier and air receiver, backed up by a 2 x 8 Penlon Automatic Manifold located in plant room No6 / Medical Gas store

Kidderminster

Consists of 2 Atlas Copco Compressors with a Duplex MPL Drier and a receiver providing medical and surgical air, backed up by 2 x 6 Penlon Automatic Manifold for medical and surgical air

Access

Access via Key from Estates department

Maintenance

It is the responsibility of the Trust Estates / PFI Hard FM provider to ensure that all medical air receivers, protective devices and medical air pipework are examined by a Competent Person, i.e. by an engineering surveyor of an approved insurance company, in accordance with the statutory requirements of the Pressure Systems Safety Regulations 2000. These items of equipment will be included in the Written Scheme of Examination held by the Senior Authorised Person (MGPS).

The Senior Authorised Person (MPGS) is responsible for:

Routine testing of the quality of surgical, medical and dental air every 3 months in accordance with HTM 02-01 and Ph. Eur. Standards. Other testing will take place as required by HTM02-01 and the MGPS AP

ISS / Trust Porters are responsible for:
Replacing cylinders when required
Checking cylinders are in date and using older cylinders before their use by date
Replacing ESM cylinders when the central medical gas alarm panel indicates "Reserve Fault";
Replacing the ESM cylinders before the cylinder expiry date has been reached;
Ordering replacement cylinders, if stock is low;
Ensuring that the manifold areas are kept clean and tidy;
Providing appropriate tools and personal protective equipment for staff working on cylinders
Ensuring that all cylinders are supported and secured by restraints.

It is the responsibility of The Trust / Engie FM to carry out the following items of weekly Planned Preventative Maintenance (PPM) on the surgical and medical air system.

Weekly
Check oil levels. Top up as necessary.
Manually drain water from air receiver (to confirm operation of automatic drains).
Check standby compressor cut-in pressure.
Check function of oil / condense traps separators and service if required.
Record specified plant parameters (Details are given in the plant weekly PPM Report sheet).
Operate manual pump-select switch to equalise hours run on each pump.
Report any defects to the Senior Authorised Person (MGPS).

All other (emergency, quarterly and annual) maintenance will be carried out by Approved Competent Persons (MGPS) employed by the specialist contractor, in accordance with the requirements of HTM02-01 and the manufacturers' recommendations.

Medical vacuum plant

Plant summary

WRH

Consists of 4 Mim Meditech Bush type pumps and two vacuum receivers located in WRH Med Gas plant room level 0

Alexandra

Consists of Penlon Pentaplex Vacuum Plant with 5 x Rietschle Pumps and two vacuum receivers located in plant room No6

Aconbury

Consists of 3 X Becker pumps type U4.100 and a single Vacuum receiver

Kidderminster

Vacuum is supplied to the Treatment centre via a Duplex MPL Vacuum plant
Vacuum is supplied to Endoscopy Vacuum via a Duplex MGI Vacuum plant
Vacuum is supplied to A Block (GP Unit) via a Duplex Lucy Hulbert Vacuum plant
Vacuum is supplied to B Block via a Duplex APC Vacuum plant

Access

Controlled keys are to be available for these areas. All areas are accessible to MGPS APs /CPs Keys are held by the Estates department.

Appropriate identification and safety warnings are to be displayed in accordance with current requirements.

Maintenance

It is the responsibility of the Trust / Engie FM to carry out the following items of weekly Planned Preventative Maintenance (PPM) on the plant:

Weekly
Check drain flasks for liquid build up. Inform the Senior Authorised Person (MPGS) immediately if liquid is present.
Check bacteria filter pressure drop. Inform Senior Authorised Person (MPGS) if outside the limit marked on the gauge.
Check oil levels. Top up if necessary.
Operate manual pump-select switch to equalise hours run on each pump.
Check cut-in / cut-out operation of each pump.

When required: -

Change bacteria filter in accordance with the procedure in HTM 02-01.

All other (emergency, quarterly and annual) maintenance will be carried out by Approved Competent Persons (MGPS) employed by the specialist contractor, in accordance with the requirements of HTM02-01 and the manufacturer's recommendations.

<u>Cryogenic liquid oxygen plant</u>

Plant summary

WRH

The externally sited liquid oxygen supply system comprises two BOC cryogenic storage vessels (VIEs), providing primary and secondary supplies. The secondary supply will operate automatically in the event of failure of the primary supply.
The liquid is converted into gas in evaporator units mounted within the vessel compound.

Contents and pressure gauges indicate the amount and pressure of liquid in each vessel respectively. Additional telemetry equipment is used to monitor vessel contents and pressure and to

relay this information via a telephone link to the gas supplier (BOC). Transmitted information is used to initiate refill deliveries automatically.

Alexandra

The externally sited liquid oxygen supply system comprises two BOC cryogenic storage vessels (VIEs), providing primary and secondary supplies. The secondary supply will operate automatically in the event of failure of the primary supply.

The liquid is converted into gas in evaporator units mounted within the vessel compound.

Contents and pressure gauges indicate the amount and pressure of liquid in each vessel respectively. Additional telemetry equipment is used to monitor vessel contents and pressure and to relay this information via a telephone link to the gas supplier (BOC). Transmitted information is used to initiate refill deliveries automatically.

Kidderminster

Oxygen is supplied via 5 x LC 200 Cryogenic cylinders on a common manifold which serves whole site, backup is provided by a manifold of 2 x 5 J cylinders + 5 Reserve Cylinders, which are stored next to the manifold.

Access

Because of the inherent dangers of liquid oxygen (dangerously low temperature and highly supportive of combustion) the cryogenic storage systems are enclosed in a locked compound. MGPS APs / CPs will know the combination number of the padlocks.

It is the responsibility of BOC to ensure that appropriate safety warning signs are displayed in accordance with current requirements. BOC should also ensure that an emergency contact telephone number is prominently displayed on the installation. MGPS APs should ensure that these HTM 02-01 requirements are fulfilled.

As deliveries may be made at any time of day or night, it is essential that the Estates Department maintains road access at all times.

Maintenance

Liquid oxygen storage vessel(s) (VIEs) Primary / secondary supplies

The VIEs and Cryo Vessels are the responsibility of BOC

Valves on the unit will only be operated by BOC personnel, except in an emergency when, in the absence of BOC personnel, an AP (MGPS) will carry out the correct valve operations in accordance with the emergency procedure posted in the compound. It is the responsibility of BOC to ensure that this procedure is prominently displayed on the installation.

i). ISS / Trust DPs are responsible for:
Replacing the ESM cylinders before the cylinder expiry date has been reached or when the medical gas alarm panel indicates “Reserve Low”;
ensuring that the manifold rooms are kept clean and tidy;

providing appropriate tools and personal protective equipment;
ensuring that all cylinders are supported and secured by restraints;
Informing BOC when cylinders are empty and need to be replaced
Ensuring empty cylinders are collected by BOC.

ii) Site MGPS AP is responsible for:

Maintaining the delivery tanker hard standing and access;
keeping the compound clear of flammable rubbish
provision of compound services (lighting / electricity / telephone line)
compound security

Nitrous Oxide manifold systems

Plant summary

WRH

Nitrous Oxide is supplied via 2 x 6G Penlon Automatic Manifold with a1 x 2 ESM.

Alexandra

Nitrous Oxide is supplied via 2 x 6G Penlon Automatic Manifold with a1 x 2 ESM. Nitrous Oxide is supplied to 8 No operating theatres and bedhead supplies to 6 x delivery rooms in Central Delivery Suite (these are not used)

Kidderminster

Nitrous Oxide is supplied via 2 x 4 Penlon Automatic Manifold backed up by1 x 2 ESM located Theatres 1- 4 + pre op assessment room

Access

The Nitrous Oxide manifold is located in a locked manifold room. Controlled keys are to be available for the room from Estates, which are accessible to MGPS APs / CPs. / DPs

All identification and safety warnings are to be displayed in accordance with the requirements of HTM02-01.

Maintenance

All (emergency, quarterly and annual) maintenance will be carried out by the Approved Competent Person (MGPS) in accordance with the Trust / Engie Estates Service Agreement.

i). ISS / Trust DPs are responsible for:
replacing cylinders when the central medical gas alarm panel indicates "Change Cylinders";
replacing the ESM cylinders before the cylinder expiry date has been reached or when the medical gas alarm panel indicates “Reserve Low”;
ensuring that the manifold rooms are kept clean and tidy;

providing appropriate tools and personal protective equipment;
ensuring that all cylinders are supported and secured by restraints;
Informing BOC when cylinders are empty and need to be replaced
Ensuring empty cylinders are collected by BOC.

Entonox manifold system

Plant summary

WRH

Entonox is provided by 2 x 8G Penlon Automatic Manifolds backed up by 1 x 2 ESM

The ESM is not isolated and will come on line automatically in the event of main manifold failure. It will however require manual changing of banks and cylinders. One ESM manifold bottle should be isolated to provide final warning of the requirement to change bottles

Alexandra

Entonox is provided by 2 x 6G Penlon Automatic Manifolds backed up by 1 x 2 ESM. Entonox is supplied to central delivery suite (CDS) Rooms CD35,36,41,42,46,51,55 + Obs Theatre – (Entonox is currently out of use and has been isolated)

Kidderminster

Kidderminster do not have Entonox on the MGPS, Entonox is supplied via individual cylinders

Access

The Entonox manifold is located in a locked room, which has a controlled key. The room will be accessible to MGPS APs / CPs keys are held in the Estates office and by Porters

Appropriate identification and safety warning are to be displayed in accordance with current requirements.

Maintenance

All (emergency, quarterly and annual) maintenance will be carried out by the Approved Competent Person (MGPS) in accordance with the Trust Estates Service agreement.

i). Trust / ISS DPs are responsible for:
replacing cylinders when the central medical gas alarm panel indicates "Change Cylinders";
replacing the ESM cylinders before the cylinder expiry date has been reached or when the medical gas alarm panel indicates “Reserve Low”
BOC will supply and deliver replacement cylinders on an as needed basis.
ensuring that the manifold room is kept clean and tidy;
providing appropriate tools and personal protective equipment;
ensuring that all cylinders are supported and secured by restraints.
ensuring that the temperature of the Entonox cylinders on the manifold and replacement cylinders adjacent to the manifold does not fall below 10° C.

providing sufficient supports for at least 8 spare Entonox cylinders in the manifold room

NOTE: Entonox Cylinders should be stored horizontally, for 24 hours at a temperature between 10º and 35°C before use, if they have been subjected to temperatures below -6ºC.

Anaesthetic gas scavenging (AGS) systems

Plant summary

WRH

Upper Plant Room Level 3 + CT/MRI - Shire Duplex AGSS Plant, A&E Plaster Room-Shire Duplex AGSS Plant, CCU 1,2,3,4,5-Shire Duplex AGSS Plant, CCU 6,7,8,9,10-Shire Duplex AGSS Plant, HDU Critical-Shire Duplex AGSS Plant, ***West Plant Room Level 3*** Maternity Delivery 1,2,3,4-Shire Duplex AGSS Plant, Maternity Delivery 5,6,7,8,9-Shire Duplex AGSS Plant, Maternity Obsetrics-Shire Duplex AGSS Plant, Theatres 1,7,8-Shire Duplex AGSS Plant, Theatres 2,3-Shire Duplex AGSS Plant, Theatres 4,5,6-Shire Duplex AGSS Plant, Endoscopy -Shire Duplex AGSS Plant,

Alexandra

AGSS is supplied to Theatre 1&2 via 1 x Penlon Duplex
AGSS is supplied to Theatre 3&4 via 1 x Penlon Duplex
AGSS is supplied to Theatre 5&6 via 1 x Penlon Duplex
AGSS is supplied to Ophthalmology Theatre via1 x Duplex Pump
AGSS is supplied to Theatre 7 via1 x East Health Care Duplex
AGSS is supplied to MRI Unit, Cat Scan via1 x Simplex pump

Kidderminster

AGSS is supplied to Theatre 1 via 1 x Duplex AGSS pump
AGSS is supplied to Theatre 2 via 1 x Duplex AGSS pump
AGSS is supplied to Theatre 3 via 1 x Duplex AGSS pump
AGSS is supplied to Theatre 4 via 1 x Duplex AGSS pump

Access

The hospital's AGS systems are located in locked plant rooms, these rooms are accessible to MGPS APs / CPs, keys are held in the Estates department.

Maintenance

All (emergency, quarterly and annual) maintenance will be carried out by the Approved Competent Person (MGPS) in accordance with the Trust / Engie Estates Service Agreement.

Performance

It is the responsibility of the Health and Safety Advisor / Non-Clinical Risk Manager to provide evidence that the concentrations of pollutants in the areas served by AGS systems complies with COSHH Regulations.

Alarms

Kidderminster System summary

The alarm system is generally sounds at local panels, however, minor injuries has a central alarm panel which is connected to the switchboard at AHR for out of hours alarm response.

Alexandra System Summary

The alarm system sounds at local panels, however, there is a central alarm panel which is connected to the switchboard at AHR for out of hours alarm response.

WRH System Summary

Alarms are located in the Engie Estates Office, at ISS switchboard and at all nurses' stations

Maintenance

On a weekly basis all panels will be tested by a Trust / Engie Competent Person (MGPS) manually operating the "test" function button to confirm operation of all displays and the audible alarm. An Authorised Person (MGPS) will advise Clinical and Nursing staff of this test. Any faults shall be reported to the Authorised Person (MGPS).

All other (emergency, quarterly and annual) maintenance will be carried out by the Approved Competent Person (MGPS) in accordance with the Trust Estates / Engie FM Service Agreement.

5.4 Area Valve Service Units (AVSUs)

System summary

AVSUs are ward / department isolating valves set in enclosures with breakable glass fronts are typically found at the entrance to wards and departments. AVSUs are fitted with an emergency inlet port (NIST), which is gas specific. This may be used to supply gas to a ward when the main supply fails or is shut down for essential engineering work.

A description of the gas and the area served, along with valve box and box key numbers, must be provided adjacent to each valve box or AVSU, Medical staff must be consulted, fully understand the effect of and authorise turning any valve off.

Pipeline valves in ducts / ceiling voids etc. shall be locked in the normal operating position. Pipeline valves can be left unlocked if they are sited in a locked plant room, Medical Gas supplies must not be isolated without DNO / DMO permission.

Access

Under normal circumstances, access to the valve boxes and AVSUs should only be gained by an Authorised Person (MGPS) using the appropriate key from the APs medical gases key cabinet. Each key cabinet should contain a list identifying all AVSUs and valve boxes with corresponding key numbers.

In the event of an emergency, access to the valve boxes and AVSUs may be gained by smashing the breakable glass fronts on the authority of the DMO/DNO, taking care not to incur personal injury.

This action will be performed by a member of the clinical / nursing staff after steps have been taken to ensure that no patient is compromised by isolation of the gas supply.

Maintenance

All (emergency, quarterly and annual) maintenance will be carried out by the approved Competent Person (MGPS) in accordance with the Trust / Engie Estates Service Agreement.

5.5 Terminal units

Terminal unit details

All terminal units should comply with BS 5682:1984, "Specification for Medical Gas Pipelines Systems, Terminal Units, Hose Assemblies and Connections to Medical Equipment" or BSEN 737-1 1998 "Terminal units for compressed medical gases and vacuum".

Details of location, type and quantity of terminal units are to be included in the Equipment Schedule of the Maintenance Specification.

Maintenance

All (emergency, quarterly and annual) maintenance will be carried out by the approved Competent Person (MGPS) in accordance with the Trust / Engie Estates Service Agreement.

5.6 The MGPS Permit to Work System:

Aim:

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.

A Permit must be issued by an Authorised Person (MGPS) before any work is undertaken on the MGPS, except changing of manifold cylinders ,VIE filling, or emergency isolation by a member of the nursing staff.

The Permit to Work will be issued and the work will be carried out following the directions of HTM 02-01(2005) unless otherwise defined in this Policy.

Responsibility for allowing the work to be carried out lies with the Designated Medical / Nursing Officers in each Department or the Duty Nurse and they will sign the Permit to Work.

Officers should ensure that colleagues are advised of the interruption to the gas supply, and its estimated duration.

Officers should also ensure *via* Estates that all affected terminal units are appropriately labelled.

5.7 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 HTM 02-01 (2005). The QC (MGPS) Pharmacist 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. (Note that Medium Hazard is no longer used as a classification).

5.8 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.

High hazard work may require at least a planned interruption to a single ward or Department, or, at worst, a major shutdown of a system to a whole hospital site.

In such events, an Authorised Person (MGPS) must ensure that key Personnel for each and every ward or Department are informed; if necessary, holding a site meeting.

The Pharmacist should be included in any discussions that may lead to an interruption of the MGPS.

Two weeks prior to the planned interruption, the Authorised Person (MGPS) shall liaise in Person with the Designated Nursing Officers of the ward(s) or Department(s) concerned

At the same time, the Authorised Person (MGPS) will complete Part 1 of the Permit to Work Form and the fourth sheet, showing the point(s) of isolation.

The Designated Nursing Officer(s) of the ward(s) 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.

Any requirement for portable cylinders or vacuum units will be determined and confirmed, following meetings between the Designated Nursing Officer(s) and the AP the arrangements will be confirmed to all parties by E Mail

It is the responsibility of the Authorised Person (MGPS) to arrange, through the Technical Services / Porters Department, for any required portable cylinders and regulators.

If any additional portable vacuum units are required to be supplied, it will be the responsibility of the Estates / Technical services Departments concerned to procure them.

The Authorised Person (MGPS) will provide all details of the work to be carried out in Part 2 of the Permit to Work Form, including any other Permits, e.g. for ‘hot works’ or for entry into confined spaces.

Work shall only commence when the Senior Duty Nurse(s) for the ward(s) or Department(s) is / are satisfied that no patients will be put at risk by the shutdown 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(s) by the CP (MGPS), after confirming isolation details by consultation with the CP (MGPS) and examination of the sketch on the fourth sheet of the permit and any additional drawings, if available.

Once the system(s) has / have been isolated and de-pressurised, the Competent Person (MGPS) will sign Part 2 of the Permit to Work Form and, together with the Authorised Person (MGPS), the fourth sheet of the permit, and then commence work.

When the work is finished, 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 upon 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 HTM 02 'Validation and Verification'

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 HTM 02 'Validation and Verification'.

When these tests have been completed with satisfactory results, both will initial the relevant spaces and sign Part 4 of the Permit.

The Quality Controller (MGPS), with receive the pink copy of the Permit to Work Form from the Authorised Person (MGPS).

Note: It should be the normal practice of Trust / Engie Estates to retain the white copy along with the original (yellow) copy and the fourth sheet in the Permit to Work Book. Photocopies (signed and dated by the AP (MGPS) and the CP (MGPS) of the white copy may be issued to the Competent Person (MGPS) on request. Alternatively, the CP (MGPS) can retain the yellow copy on request.

The Designated Nursing / Medical Officer(s) will accept the system(s) 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.

5.9 LOW Hazard Work:

Any work on the MGPS which will not introduce any hazard of cross-connection or pollution e.g. routine maintenance or changing a terminal unit

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 Senior 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. In such events 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 Part 2 and, together with the Authorised Person (MGPS), the fourth sheet of the permit and then begin the 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, e.g. on plant, will be made to the satisfaction of the Authorised Person (MGPS).

The Authorised Person (MGPS) 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.

The Senior Duty Nurse / Medical Officer 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.

5.10 Actions in the event of a Medical Gas Alarm:

The diagrams overleaf show the actions that should be taken at each level of alarm.

On detection of a local alarm indication e.g. in a ward area in normal working hours the *Nurse in charge* (Or other nominated person*)* should contact the Estates helpdesk and report that a fault has been signalled. For AHR / KTC Outside normal working hours the Nurse in Charge should contact Switchboard who will call the Estates on call engineer.

In the event of an alarm condition on the central alarm panel, it is the responsibility of the Switchboard department (via Switchboard) to inform the appropriate staff as follows:

Estates Department. NWH
On-call Estates Engineer. ONWH

Abbreviations:
NWH= Normal Working Hours
ONWH = Outside Normal Working Hours

Notes:

Disabling the alarm system, other than when due authorization 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.

However, Estates should investigate this fault.

Alarms should be tested weekly by a Competent Person (MGPS) (Or other nominated person).

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

Nursing / Medical staff should be advised of this test.

Example - Medical Air / Surgical air

ALARM INDICATION	Action (SWITCHBOARD TO INFORM)
NORMAL	No action to be taken
PLANT FAULT	NWH - Estates ONWH - Estates (On-call engineer)
PLANT EMERGENCY	NWH - Estates ONWH - Estates (On-call engineer)
RESERVE LOW	NWH - Porters ONWH - Porters
PRESSURE FAULT	NWH - Estates ONWH - Estates (On-call engineer)
Panel Indication (all alarm panels)	
Alarm Indication	ACTION (SWITCHBOARD TO INFORM)
Power On	No action to be taken
System Fault	NWH - Estates ONWH - Estates (On-call engineer)

It is the responsibility of the AP (MGPS), to ensure that a procedure for each alarm indication is displayed next to the respective central alarm panel.

(Note diagrams showing local alarm conditions should also be laminated and posted adjacent to the panels. These are illustrated in the policy, please see appendix G)

5.11 Cylinder Management:

(Also refer to Section 8 of Volume 2 of HTM 02:01 2005).

Only designated persons (MGPS) or other suitably qualified CPs are allowed to work with cylinders.

Staff must have been trained in appropriate manual handling techniques.

Staff must be aware of COSHH risks

i) Manifold rooms must not be used as general storage areas.

ii) Store the minimum number of cylinders required - those connected to the manifold(s) and sufficient to replenish the bank(s).
For Entonox keep sufficient to replenish two banks.

iii) Keep the manifold room clean, tidy and free from oil grease and dirt.

iv) Ensure that fire extinguishers are clearly visible, of the correct type and in good order.

v) Ensure that appropriate hazard warning notices (fire/pressurised cylinders/no smoking) are clearly displayed.

vi) The manifold room will be locked at all times except during cylinder changing and essential maintenance.

vii) Only staff who have received suitable training and whose names are kept on a register, should change cylinders on manifolds.

viii) Cylinders held in manifold rooms for "ready use" must be replaced immediately on changing cylinders and empty cylinders removed to the medical gases store.
Any cylinder which is not sealed, i.e. the plastic cover is not intact, should be treated as empty.

Keys for manifold rooms are held as follows:

ROOM	Keys held by	other At all times
Porters Desk WRH	ISS Medical Gas Porter Ext 33333	ISS Porters Desk Ext 33333
Porters Desk Kidderminster	Medical Gas Porter Bleep - 3255	Medical Gas Porter Bleep - 3255
Porters Desk Alexandra	Medical Gas Porter Ext 4444	Medical Gas Porter Ext 4444
Estates Dept Office WRH	Estates Dept Offices	Estates on call via Switch

	Ext 33333	
Estates Dept Office Kidderminster	Estates Dept Offices Ext 53341	Estates on call via Switch
Estates Dept Office Alexandra	Estates Dept Offices Ext 42042	Estates on call via Switch

Directions for changing cylinders (This notice must be posted adjacent to each manifold)

The need to change cylinders will be signalled by the central medical gas alarm system - See alarms section.

5.12 DIRECTIONS FOR CHANGING CYLINDERS

1. Remove empty cylinder from the manifold one at a time, replacing each empty cylinder with a full cylinder according to the following procedure.

   (a) Check that the name of the gas and the colour around the collar of the cylinder are appropriate.

   (b) Inspect for the presence and condition of the bodok seal in the cylinder yoke. Change if necessary, taking care not to expose the surfaces to grease or oil.

   (c) Connect the cylinder to the manifold and tighten firmly by hand only taking care not to put undue strain on the manifold tail pipe.

   (d) Ensure that there are no leaks between the cylinder valve and the manifold. This can usually be determined by sound. If in doubt leak detector spray can be used, ensure any excess is wiped off with a clean cloth.

   (e) Once the bank has been fully changed check that the contents gauge is reading maximum. **IMPORTANT** Where the bank of cylinders is empty all cylinders must be changed. Failure to do this could endanger a patient's life.

   (f) Complete the cylinder change register held in the room stating date, time, number of cylinders changed and contents gauge reading. Sign the register.

   If a problem or fault is suspected advise the notify Estates or OOH notify the switch board who will call the Trust Estates on call manager or Engie Shift team.

5.13 Shutdown 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 EMBE Department or by hiring the required equipment.

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.

Additionally it must be remembered that:

FAILURE OF GENERATOR AND MAINS SUPPLIES SIMULTANEOUSLY WILL RESULT IN FAILURE OF THE CENTRAL MEDICAL VACUUM SYSTEM.

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

If portable vacuum is required, 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. However with a failed electricity supply this will not be possible using the normal electrically driven portable suction units.

For critical care use, EJECTOR DRIVEN suction units can be used. These are usually powered from the main oxygen supply via a terminal unit, or from a separate compressed gas cylinder (oxygen or medical air).

An alternative would be a BATTERY DRIVEN suction unit but it is important that, with this type of unit the battery is maintained in a FULLY CHARGED condition.

If portable vacuum units are unavailable in departments they can be hired if necessary through Technical Services / Siemens

Failure of both mains and generator 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, in order that essential supplies to patient ventilators are maintained. Limited Surgical air for AHR and KTC could be supplied via bottles supplied through NIST connectors

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 e.g. in oxygen tents and incubators, warning notices indicating:

'HIGH CONCENTRATION OXYGEN IN USE - DANGER OF FIRE'

Should be posted at the treatment site.

The Trust's Fire Officer should be consulted on the use of toys in oxygen tents and a notice worded:

'ONLY TOYS, COSMETICS ETC. APPROVED BY THE FIRE OFFICER ARE ALLOWED IN THIS AREA'
This notice 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.

Emergency procedures

Use of Emergency reserve manifolds

General statement

Emergency supply manifolds are attached to all medical gas systems.

Oxygen system:

In the event of failure of the primary Bulk oxygen supply, the Reserve Cylinder Manifold supply will automatically provide the Hospitals with gas, please note, this facility is not available at AHR

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 Hospital demand supplied from a Bulk supply, 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 should be considered.

It is the duty of Portering 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.

Medical compressed air:

The automatic manifold supporting the medical air plant will come on line automatically and will change banks automatically.

Cylinder replacement will be the responsibility of Portering. Care should be taken to prevent transfer of oil/grease from the compressor plant to the manifold cylinder connections.

Nitrous oxide and Entonox:

The Nitrous Oxide and Entonox automatic manifold systems are fitted with 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, however one bottle on the ESM will be isolated.

When working off the ESM that is the only gas supplying the hospital, the alarm panel will show both banks empty, it is imperative that departments are informed and reduce use of gas as much as possible. When one bottle is exhausted, the plant low pressure warning light will operate, the valve on the remaining cylinder on the ESM will need to be opened. All efforts should be made to connect new cylinders to the manifold before the remaining gas runs out.

Estates and Portering 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 Portering, to ensure that sufficient cylinders are available to maintain the gas supply.

NOTE THAT THE MEDICAL VACUUM SYSTEM HAS NO EMERGENCY RESERVE MANIFOLD SYSTEM. FAILURE OF THE PLANT FOR ANY REASON WILL RESULT IN TOTAL FAILURE OF THE VACUUM SERVICE

5.14 Emergency cylinder ordering procedure:

The Facilities Department will perform routine cylinder ordering, based on required stock levels and weekly use. Porters will check stocks weekly and report any deficiencies to The Portering Supervisor.
For emergency ordering, the following procedure should be followed.
Porter will telephone the emergency number of the medical gas supplier (see Appendix B).

Porters will tell the medical gas supplier that ‘New issues’ are needed, if no empties are to be returned.

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 finance once they have been checked against the invoice.

5.15 Failure of mains electricity supply:

In the event of an electricity failure, medical gas plant should be supplied by the emergency generator system and the surgical compressed air plant, vacuum plant, oxygen system, all manifolds and medical gas alarm systems 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
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.
The air compressor will fail but MA4 air will be supplied from the air ESM
AHR and KTC will have no surgical air WRH will have surgical air via the ESM
Nitrous oxide and Entonox 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 Authorised Person (MGPS) will be informed of the situation, via the nursing staff / switchboard

Portering and Estates will arrange for staff to monitor manifold gas consumption, replacing empty cylinders as necessary, until the electricity supply is restored.

The Porters will arrange emergency cylinder / regulator supplies as necessary.

The Authorised Person (MGPS) will monitor the situation and confirm re-setting of compressor and vacuum plant and system alarms following restoration of supply.

5.16 A serious leak of medical gases:

In these events:

The Duty Porter and the Authorised Person (MGPS) will be contacted by the Switchboard / Duty Nurse

Details of the leak should be confirmed: i.e. the floor level, Department, room number, the gas or gases involved and if patient ventilators are in use.

Outside normal working hours the On-call Engineer will notify the Authorised Person (MGPS), who will attend site as soon as possible.

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 Duty Nurse 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 Trusts Fire Policy.

The Duty Porter will remain on standby 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.

5.17 Total or Partial failure of a medical gas supply;

In these events:
The Person discovering the failure will inform the Switchboard and Duty Nurse immediately.

The Switchboard 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: i.e. floor level, Department, room number(s), the gas or gases involved and if patient ventilators are in use.

As a precautionary measure, the Switchboard will also notify critical areas e.g. ICU, CCU, Theatres, SCBU etc 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 will be informed by the MGPS AP 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 plant room emergency supply manifolds.

Porters will arrange emergency cylinder deliveries as necessary

The Authorised Person (MGPS) will liaise with the Competent Person (MGPS) and QC to complete emergency repairs needed to re-instate the gas supply, using the Permit to Work system.

When the supply is fully restored, the Authorised Person (MGPS) will complete a Datix report and Incident report within 24 hours of the incident.

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 as Department closure may be warranted in extreme events.

5.18 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 Switchboard advises ALL Departments of the problem, especially those involved with critical care.

Contamination of the medical vacuum system will usually be detected during routine maintenance inspection and evidenced by the presence of liquid in the on-line bacteria filter drain flask. The Infection Control Department should be informed immediately and should advise on any additional precautions required to effect filter change safely.

Portable suction units may be used in areas where there is a possibility of the vacuum system being contaminated. (The need for portable suction units should be discussed with the Infection Control Department).

It is the responsibility of the Competent Person (MGPS) to change the filter in accordance with the procedure described in HTM 02 and any additional advice from the Infection Control Department.

If the contamination is due to system misuse, the Authorised Person (MGPS) must complete a Datix report. The Risk Manager should be sited on the Datix, so that the appropriate lessons learnt communications can be sent.

Decontamination of pipework (if necessary) should be carried out in accordance with the procedure described in HTM 02 BEFORE filters are changed.

Failure of an anaesthetic gas scavenging system (AGSS)
Failure of an anaesthetic gas scavenging system results in spillage of gaseous / vaporised anaesthetic agents into the area of use of the system.

In Theatres it is likely that staff exposed to the spilled gases will exceed the COSHH recommendations for exposure when working in the area for extended periods, even though ventilation rates are high.

A local alarm 'System fail' warning and failure of the air receiver flow indicator will indicate failure of the system. Both should be inspected by operating department staff on a regular basis.

The Authorised Person (MGPS) and the Theatre Manager will be informed of the failure usually by Theatre staff, and all attempts should be made to reduce staff exposure, if operations continue with a failed system.

When repairs have been completed (under a Permit to Work signed by the Theatre Nurse Manager, or their nominated deputy) Theatre staff should be made aware (by the Person signing off the Permit to Work) that the system is back in use.

Over or under pressurisation of one or more gas systems:

Local alarms are designed to indicate when system pressure is more than I0% above or below its norm.
Excessively high or low pressures may cause medical equipment to malfunction.

The Duty Nurse should report all instances of local alarm operation to the Switchboard who should inform the AP MGPS. The AP MGPS should investigate the fault and carry out any necessary remedial work.

5.19 Emergency isolation of a gas supply:

Fire

Procedures in accordance with the Worcestershire Acute Hospitals 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 HAS CONFIRMED THAT ALL PATIENTS LIKELY TO BE AFFECTED HAVE BEEN EVACUATED AND / OR HAVE ALTERNATIVE GAS PROVISION.

5. Monitoring and compliance

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the Policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: *(Responsible for also ensuring actions are developed to address any areas of non-compliance)*	Frequency of reporting:
	WHAT?	**HOW?**	**WHEN?**	**WHO?**	**WHERE?**	**WHEN?**
	Medical Gas Policy	Review	Yearly or if an incident occurs or law changes	MGPS RP / Head of Estates	New document uploaded onto intranet.	Yearly
	Medical Gas Procedures	Review	Yearly or if an incident occurs or law changes	MGPS RP / Head of Estates	New document uploaded onto intranet.	Yearly
	Training	Review Training Matrix	Yearly or if an incident occurs or law changes	MGPS RP / Head of Estates Estates Officers	Training Matrix held on Estates drive, training refreshers done 3 yearly	yearly
	Safe system of work	Audit	Yearly or if an incident occurs	MGPS RP/ APs, Head of Estates, Risk Manager	Report issued to Director of / Head of Estates	yearly
	Incident Reports	Review	Quarterly	MGPS RP	Report issued to Director of / Head of Estates	quarterly

7 Policy Review

This Policy will be reviewed annually by the Principal Engineer / Statutory Standards Manager, the Head of Estates and the Health and Safety Manager

8 References

References: Code:

The Medicines Act 1968	
Health & Social Care act	
Health and Safety at Work, etc Act 1974	
The Management of Health and Safety Regulations 2003	
Pressure Systems Safety Regulations 2000	
Care of Substances Hazardous to Health (COSHH) regulations 2004	
Manual Handling Operations Regulations 1992	
Personal Protective Equipment at Work Regulations 2002	
HTM 02-01 part A Design, Installation, Validation and Verification	
HTM 02-01 part B Operational Management	

9 Background

a. Equality requirements

The contents of this policy has no adverse effect equality and diversity

b. Financial risk assessment

Some additional training will be required to have the necessary Responsible and competent people in place, but this is a statutory requirement.

c. Consultation

Consultation will take place with Estates and Facilities, ICT, Project Co and the Hard and Soft FM service providers, Trust risk management department and clinical staff.

Contribution List

This key document has been circulated to the following individuals for consultation;

Designation
Head of Estates
Head of Facilities
Transport Manager
Health and Safety Manager
Technical Services Manager
KTC Estates Officer
AHR – Estates Officer
Estates Head of Capital
Estates Capital Project Managers
Project Co General Manager
Project Co Deputy Manager
Equans FM Facilities Manager
Equans Technical Manager
ISS General Manager

Siemens General Manager
ISS Operations Manager

This key document has been circulated to the chair(s) of the following committee's / groups for comments;

Committee
Medical Gas Committee
Medicines Safety Committee
TMG Committee

d. Approval Process

e. Version Control

This section should contain a list of key amendments made to this document each time it is reviewed.

Date	Amendment	By:
16/08/22	Change responsible people / minor amendments	S. Noon

Supporting Document 1 – Equality Impact Assessment form

NHS Worcestershire Acute Hospitals NHS Trust

Herefordshire and Worcestershire Safe and effective health and care services

Herefordshire & Worcestershire STP - Equality Impact Assessment (EIA) Form
Please read EIA guidelines when completing this form

Section 1 - Name of Organisation (please tick)

Herefordshire & Worcestershire STP		Herefordshire Council		Herefordshire CCG	
Worcestershire Acute Hospitals NHS Trust	✓	Worcestershire County Council		Worcestershire CCGs	
Worcestershire Health and Care NHS Trust		Wye Valley NHS Trust		Other (please state)	

Name of Lead for Activity	**Simon Noon**

Details of individuals completing this assessment	**Name**	**Job title**	**e-mail contact**
	Simon Noon	**Principal Engineer**	**simon.noon@nhs.net**
Date assessment completed	**02/12/2021**		

Section 2

Activity being assessed (e.g. policy/procedure, document, service redesign, policy, strategy etc.)	**Title: Water Safety Policy**			
What is the aim, purpose and/or intended outcomes of this Activity?	To ensure the Trust is managing the Water systems in accordance with all principles of law and relevant guidance and is managing any risk through a safe system of work			
Who will be affected by the development & implementation	✓ ✓ ✓	Service User Patient	✓ ✓ ❑	Staff Communities

of this activity?	✓	Carers Visitors	❑	Other _____
Is this:	✓ Review of an existing activity ❑ New activity ❑ Planning to withdraw or reduce a service, activity or presence?			
What information and evidence have you reviewed to help inform this assessment? (Please name sources, eg demographic information for patients / services / staff groups affected, complaints etc.	This is a Technical policy which we have written in consultation with the various technical standards, ACOPs, HTMs.			
Summary of engagement or consultation undertaken (e.g. who and how have you engaged with, or why do you believe this is not required)	We have consulted our Authorising Engineer Medical Gas) We have bought this for peer review at the Medical Gas Committee and presented it to the MSG			
Summary of relevant findings	The policy has been deemed fit for purpose			

Section 3

Please consider the potential impact of this activity (during development & implementation) on each of the equality groups outlined below. **Please tick one or more impact box below for each Equality Group and explain your rationale**. Please note it is possible for the potential impact to be both positive and negative within the same equality group and this should be recorded. Remember to consider the impact on e.g. staff, public, patients, carers etc. in these equality groups.

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Age			✓	Having a policy to ensure the Trust Medical Gas systems are safe, compliant cannot be anything than a benefit to all
Disability			✓	Having a policy to ensure the Trust Medical Gas systems are safe, compliant cannot be anything than a benefit to all
Gender Reassignment			✓	Having a policy to ensure the Trust Medical Gas systems are safe, compliant cannot be anything than a benefit to all
Marriage & Civil Partnerships			✓	Having a policy to ensure the Trust Medical Gas systems are safe, compliant cannot be anything than a benefit to all
Pregnancy & Maternity			✓	Having a policy to ensure the Trust Medical Gas systems are safe, compliant cannot be anything than a benefit to all
Race including Traveling Communities			✓	Having a policy to ensure the Trust Medical Gas systems are safe, compliant cannot be anything than a benefit to all
Religion & Belief			✓	Having a policy to ensure the Trust Medical Gas systems are safe, compliant cannot be anything than a benefit to all

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Sex			✓	Having a policy to ensure the Trust Medical Gas systems are safe, compliant cannot be anything than a benefit to all
Sexual Orientation			✓	Having a policy to ensure the Trust Medical Gas systems are safe, compliant cannot be anything than a benefit to all
Other Vulnerable and Disadvantaged Groups (e.g. carers; care leavers; homeless; Social/Economic deprivation, travelling communities etc.)			✓	Having a policy to ensure the Trust Medical Gas systems are safe, compliant cannot be anything than a benefit to all
Health Inequalities (any preventable, unfair & unjust differences in health status between groups, populations or individuals that arise from the unequal distribution of social, environmental & economic conditions within societies)			✓	Having a policy to ensure the Trust Medical Gas systems are safe, compliant cannot be anything than a benefit to all

Section 4

What actions will you take to mitigate any potential negative impacts?	Risk identified	Actions required to reduce / eliminate negative impact	Who will lead on the action?	Timeframe
	None	.		
	None			
	None			
How will you monitor these actions?	**N/A**			
When will you review this EIA? (e.g in a service redesign, this EIA should be revisited regularly throughout the design & implementation)	**When policy is reviewed**			

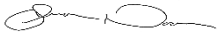
Section 5 - Please read and agree to the following Equality Statement

1. Equality Statement

1.1. All public bodies have a statutory duty under the Equality Act 2010 to set out arrangements to assess and consult on how their policies and functions impact on the 9 protected characteristics: Age; Disability; Gender Reassignment; Marriage & Civil Partnership; Pregnancy & Maternity; Race; Religion & Belief; Sex; Sexual Orientation

1.2. Our Organisations will challenge discrimination, promote equality, respect human rights, and aims to design and implement services, policies and measures that meet the diverse needs of our service, and population, ensuring that none are placed at a disadvantage over others.

1.3. All staff are expected to deliver services and provide services and care in a manner which respects the individuality of service users, patients, carer's etc, and as such treat them and members of the workforce respectfully, paying due regard to the 9 protected characteristics.

Signature of person completing EIA	
Date signed	02/12/2021
Comments:	
Signature of person the Leader Person for this activity	
Date signed	02/12/2021
Comments:	

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	No
2.	Does the implementation of this document require additional revenue	No
3.	Does the implementation of this document require additional manpower	No
4.	Does the implementation of this document release any manpower costs through a change in practice	No
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	Yes
	Other comments:	Implementation is a statutory requirement and could be considered a cost avoidance measure

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval