

Guidance on Pressure Systems Safety Rules and Operating Procedures for Skilled Persons



How Pressure Systems Safety is managed
and implemented within NHS Lothian

February 2022

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1.0 Summary

This document has been written to provide clarity and a uniform approach to the safe working procedures for working on Pressure Systems.

This document provides a system for:

- Controlling work on pressure systems (as defined below)
- Minimising the risks associated with pressure systems
- The appointment of certain key individuals to oversee and perform any such work
- The documentation for use in the application of these safety rules and procedures

It is an abridged version of the full Operating Procedures for Pressure Systems aimed specifically to provide clarity for the Skilled Persons to which they apply.

2.0 Introduction

These Safety Rules and Operating Procedures provide instruction on how work on Pressure Systems is to be managed on sites and in work situations which are under the control of NHS Lothian.

The prime basis for these instructions is L122, the Approved Code of Practice for the Pressure Systems Safety Regulations 2000 (aka PSSR), published by the Health and Safety Executive. PSSR is a statutory instrument; therefore, anyone who works on pressure systems is duty-bound to abide by it in order to remain within the law.

These Safety Rules and Operating Procedures have also been written to co-exist with, and enhance the aims of the NHS Lothian “Pressure Systems Management Policy” and SHTM 08-08 “Pressure Systems: Policies and Guidance”, amongst others. (A more comprehensive list of associated legislation and HSE guidance can be found in Section 7 of the NHS Lothian Pressure Systems Management Policy.)

The Operating Procedures for Pressure Systems also apply to managers and other responsible persons and a more comprehensive document exists which relates to the overall concept of managing this discipline.

3.0 Scope and limitations

These Safety Rules and Operating Procedures apply to any NHS Lothian establishment as well as any other building or establishment not owned by the organisation, but where NHS Lothian employees carry out activities on equipment which is covered by these.

The application of these safety rules is not the sole responsibility of the Authorised Person for pressure systems (AP(PS)), but includes all those operating, maintaining, testing, inspecting or working on in any way.

These Safety Rules and Operating Procedures apply to:

- all pressure systems containing a relevant fluid (as defined by PSSR);
- Medical Gas Pipeline Systems (MGPS);

- Dental Air and Vacuum Systems (DAVS);

or any industrial gas, low temperature hot water system, LPG, boiler fuel, hydraulic system, (or other pressure system) as determined by the Authorising Engineer's site survey and Risk Assessment where a significant risk is identified.

4.0 Definitions - General

For the purpose of these Safety Rules and Operating Procedures:

a **“pressure system”** means:

- a system of one or more vessels of rigid construction, any associated pipework and protective devices;
- the pipework or manifold, with its protective devices to which a transportable pressure receptacle is, or intended to be, connected;

either of which is liable to contain a **relevant fluid**.

However, a pressure system does not include a transportable pressure receptacle (for example, a portable gas cylinder).

“Protective devices” are those devices and fittings designed to protect the pressure system against failure (for example, a safety or pressure relief valve, or a bursting disc), or those devices intended to give warning that a system failure might occur (for example, a pressure gauge or temperature gauge).

“Relevant fluid” means:

- Steam at any pressure above atmospheric pressure;
- A fluid above a pressure of 0.5 bar above atmospheric (except for steam).
- The fluid should be a gas, or mixture of gases under normal conditions within the system (compressed air, for example, or a gas which is stored as liquid above 0.5 bar, such as oxygen),
- or, a liquid which would turn into a gas if system failure occurred (for example, medium temperature hot water – which under working pressure would be at a temperature above 100°C, but if released to atmosphere due to system failure, would flash-off as steam.)

“Safe Operating Limits” are the limits beyond which the system must not be taken, such as the design pressure and temperature.

They are usually stipulated by the manufacturer for vessels and appear on a data plate. However, for more complex systems, there is a need to consider the “weakest link in the chain”, so to speak, to determine the likelihood of system failure. Hence, the possible need for pressure reducing valves and additional safety valves to be fitted to ensure all parts of a pressure system are adequately protected. The Safe Operating Limits may be determined by the Competent Person and stipulated within the Written Scheme, but ultimately the responsibility lies with the user for installed systems, to ensure that all components (especially replacement parts, for example) are suitably sized and rated for use within that system.

For an explanation of the terms “**user**”, “**owner**”, “**installed**” system and “**mobile**” system, see the separate document “**PSSR – Understanding the role between user and owner**”, published on the NHS Lothian intranet.

5.0 Definitions and Summaries of Roles and Responsibilities

“**Authorising Engineer (Pressure Systems)**” – the AE(PS) is a designated person from an independent organisation who has been appointed by NHS Lothian, based upon their qualifications and experience, who will, amongst other duties:

- carry out audits on how we manage and implement safe working practices on pressure systems within the confines of the law and our own rules;
- publish the findings of each audit in a report;
- reports their findings and recommendations to the senior Estates management in person, including the Designated Person (this is usually the Head of Hard FM);
- assess suitable candidates for the role of Authorised Person (Pressure Systems) and make recommendations of their capacity in this role;
- provide guidance on best practice and compliance when consulted by an AP(PS)
- define the category of risk to each pressure system following a site audit.

“**Authorised Person (Pressure Systems)**” – the AP(PS) is usually a member of the Estates management who has been successfully assessed by the AE(PS) and has consequently been appointed by the Designated Person (PS). Based upon the conditions of their appointment, the AP(PS) will, amongst other duties:

- Take charge of the management of the day-to-day running of the pressure systems on site to ensure that all routines are carried out in a safe and compliant manner;
- Ensure, to the best of their ability, that the pressure systems policy and operating procedures are implemented and that all relevant staff and contractors are aware of their own roles;
- Oversee repairs, modifications and installations of pressure systems or associated equipment and determining the appropriate level of control;
- Raise and issue the relevant documents to implement a Safe System of Work for all maintenance tasks as and when required;
- Oversee and certify the isolation of pressure systems (for which they have been authorised by the AE(PS)) prior to issuing a permit-to-work;
- Liaise with the AE(PS), the Competent Person(PS) and with other managers as and when necessary to ensure that effective actions are implemented and managed, for example, statutory examinations of pressure systems, repairs or remedial actions due to non-compliances;
- Assess and appoint in writing mechanical tradespersons within the company as being competent to work on pressure systems, and to ensure that they also receive any necessary training, support or mentoring to supplement their competency;

- Determining who will be the Person-in-Charge of any working party.

There may be more than one AP(PS) with responsibility over any one site, in which case only one of these can assume the role of “duty AP(PS)” at any one time (to ensure the correct level of control over Safe Systems of Work).

“**Competent Person** (Pressure Systems)” – in this discipline, the context of Competent Person is as described within the Pressure Systems Safety Regulations 2000 (aka PSSR), and its associated ACOP. They are commonly referred to as the “Insurance Inspector”, although this is a misnomer.

Broadly speaking, it is a third-party organisation who provide impartial examination of pressure systems as part of a statutory obligation, and consequently issue written reports of their findings. They have the ability to provide guidance to their clients on best practice or practicable solutions to certain problems in order for them to be able to comply with the law. They will, under the circumstances of finding particular plant safety defects, notify the HSE or Local Authority. However, they do not hold the powers of authority of the HSE and therefore cannot enforce changes, repairs or cessation of use.

“**Person-in-Charge**” – The role of the Person-in-Charge in the context of Pressure Systems - PiC(PS) – is to directly supervise, or carry out, work on a pressure system for which they are in receipt of a Permit-to-Work (for pressure systems) or a Standing Instruction (SI).

The PiC must be an appointed **Skilled Person** for the type of equipment or system for which the Permit-to-Work or Standing Instruction is to be issued, if they are NHS personnel. If the PiC is a contractor, then the AP(PS) issuing the relevant safety documents must satisfy themselves that the contractor is suitably trained and competent to carry out these duties.

An AP(PS) cannot act in the capacity of a PiC whilst working in the capacity of the duty AP(PS) for that system or location; i.e. an AP cannot issue a permit for themselves.

Duties of the PiC for Pressure Systems include:

- Ensuring that adequate emergency arrangements are in place before commencing the works;
- Ensuring that all necessary safety equipment is available and suitable for use prior to work;
- Preparing the Task Risk Assessment for the work to be carried out, submitting this to the AP(PS) **before** the relevant safety documentation is issued and ensuring that the contents of the Risk Assessment for the task are communicated to all members of the work team;
- Ensuring that all members of the work team are competent, fit and capable to carry out the work required;
- Ensuring that all members of the work team are aware of the method of work set out in the agreed Method Statement for the task, the means of communication, the emergency arrangements and the requirements of these Safety Rules and Operating Procedures;
- Being fully conversant with, and able to ensure compliance with the conditions set out in the pressure systems Permit-to-Work and the associated Safety Programme and Statement of Isolation;

- Signing the Statement of Isolation and relevant Permit-to-Work, or Standing Instruction, as appropriate, to accept responsibility as PiC(PS) for the task(s) described;
- Applying the PiC safety lock to the pressure systems LOTO key-box prior to work commencing and keeping the key safe upon their person;
- Ensuring that the only work carried out is that for which the Permit-to-Work or Standing Instruction is valid;
- Stopping work and withdrawing all personnel, tools, plant and equipment from the point-of-work if, for any reason, the conditions of the Safety Programme and Statement of Isolation or Permit-to-Work cannot be met;
- Reporting to the duty AP(PS) any incident, dangerous occurrence, defects found or other exceptional circumstance arising during the work carried out under the PTW or Standing Instruction (SI);
- Cancelling the appropriate PTW or SI if work is stopped for any valid reason;
- Closing the PTW or SI as complete once all tasks have been successfully concluded;
- The PiC must always be present at the work site whenever any work is being carried out.

“Skilled Person” – In the context of this discipline, a Skilled Person is someone who is deemed to have some level of competency for working on pressure systems, based upon their level of appointment. **Therefore, a Skilled Person must only work on the type of pressure system or equipment for which they have been appointed.**

However, in general, duties of the Skilled Person for Pressure Systems include:

- working in accordance with these Operating Procedures;
- taking reasonable care of the health and safety of themselves and of any other person who may be affected by their actions or omissions;
- only using equipment for which they have been trained and in the manner in which they have been trained;
- reporting to the Person in Charge any defects found in the tools, plant and equipment to be used in the works.

6.0 Pressure Systems Risk Categorisation

These Operating Procedures introduce the concept of two levels of risk for pressure systems. The purpose of these risk levels is to provide guidance on the ultimate level on control necessary for working on any particular pressure system.

The AE(PS) will conduct a Site Survey to assess each system and assign them with either a High Risk or Low Risk.

In all cases, the following systems are to be categorised as **High Risk**:

- Steam Systems

- High Temperature Hot Water Systems (where the shut-off temperature of the safety temperature limiter is $>110^{\circ}\text{C}$)
- High Pressure Compressed Gas Systems (>10 Bar g)

All other Systems are to be assessed and categorised by the AE(PS), however, examples of **Low Risk** Systems (under normal operating conditions) are:

- point of use air compressors
- Medical Gas Pipeline Systems (MGPS)
- Natural Gas and LPG Systems

The AE(PS) may determine that other systems may pose a hazard that requires control by the implementation of these Operating Procedures (e.g. hydraulic systems, LTHW systems, high-pressure systems not containing relevant fluids). Details of these additional Systems are to be documented and filed in the Pressure Systems Document Register.

7.0 Associated Materials

- [Pressure Systems Risk Assessment Procedure](#)
- [Planning and Performing Suitable Isolations Procedure](#)
- [Management of Pressure Systems Safety Guidance](#)
- [The Pressure Systems PTW/SI Decision Tree](#)
- [Procedure for Pressure Systems work requiring a PTW](#)
- [Procedure for Pressure Systems work requiring a SI](#)
- [NHS National Services Scotland/Health Facilities Scotland: Scottish Health Technical Memorandum 08-08 Pressure Systems: Policies and Guidance](#)
- [NHS Lothian: Control of Contractors Policy](#)
- [NHS Lothian: Adverse Event Management Policy](#)
- [NHS Lothian: Adverse Event Management Procedure](#)
- [NHS Lothian: Pressure Systems Management Policy](#)

8.0 References

Legislation:

[The Health and Safety at Work, etc Act 1974 \(HSW Act\)](#)

[Pressure Systems Safety Regulations 2000 \(S.I 2000 No.128\) \(PSSR\)](#)

[Pressure Equipment Regulations 1999 \(PER\)](#)

[Management of Health and Safety at Work Regulations 1999 \(MHSWR\)](#)

[Provision and Use of Work Equipment Regulations 1998 \(PUWER\)](#)

[Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 \(RIDDOR\)](#)

[The Confined Spaces Regulations 1997](#)

[Construction \(Design and Management\) Regulations 2015 \(CDM\)](#)

Health and Safety Executive Guidance and Procedures:

L122 – Safety of Pressure Systems: The Pressure Systems Safety Regulations 2000, Approved Code of Practice and Guidance

L153 – Managing health and safety in construction: CDM Regs 2015, Approved Code of Practice and Guidance

L21 – Management of Health and Safety at Work: Management of Health and Safety at Work Regulations 1999. Approved Code of Practice and Guidance.

L22 – Safe Use of Work Equipment: Provision and Use of Work Equipment Regulations 1998, Approved Code of Practice and Guidance

GS4 – Safety Requirements for Pressure Testing

INDG178 – Written Schemes of Examination

INDG261 – Pressure Systems – A brief guide to safety

INDG436 - Safe Management of Industrial Steam and Hot Water Boilers

PM60 – Steam Boiler Blowdown Systems

PM73 – Safety at Autoclaves

HSG39 – Compressed Air Safety

HSG65 – Managing for Health and Safety

HSG129 – Health and Safety in Engineering Workshops

HSG253 – The Safe Isolation of Plant and Equipment

Other references:

Turner PES: Pressure Systems Skilled Persons course notes

There are two types of risk assessment used within the Safe System of Work for pressure systems:

- Isolation Risk Assessment
- Task Risk Assessment

1.0 Isolation Risk Assessment

This document is produced by an Authorised Person (PS) on a pre-formatted form (**see appendix #**) prior to the isolation of the pressure system taking place. It is to take into account the hazards facing the person carrying out the isolation (the same AP(PS) or another), in order to mitigate those risks to an acceptable level (usually from high to low).

The Isolation Risk Assessment may be unique for the pressure system in question, or a pre-existing one for a similar system may be used, **provided that it is checked by the AP(PS) and signed to say that it is relevant and applicable.**

The reference number of the Isolation Risk Assessment is to be referenced within the Safety Programme and Statement of Isolation to which it pertains.

A copy of the signed Isolation Risk Assessment should be placed within the Safety Programme.

2.0 Task Risk Assessment

The Task Risk Assessment is, of course, relevant to the work to be carried out on a pressure system once the safe isolations are in place.

This should be completed before work is to take place – however, it should be noted that Point-of-Work risk assessment is an on-going process and therefore it is critical that all members of a working party are familiar with the contents of the Task Risk Assessment, as re-assessment may be necessary should any part of the working environment change.

For contractors to the NHS, the Task Risk Assessment will constitute part of the basic RAMS.

The Task Risk Assessment may be unique for the job in hand, or a generic one may be suitable, provided that it is checked to ensure that it is relevant and applicable to the actual task to be carried out.

Therefore, if a generic Task Risk Assessment is to be used, a copy of it must be signed and dated by the Person-in-Charge (PiC) of the working party as proof that this has been done.

A unique reference number can also be given. This can be based upon the date used; e.g. 18/09/2020 – 01. This number will be used on the Pressure Systems work permit, if used.

Points to note:

- Generic Task Risk Assessments are kept within the Pressure Systems Document Register.
- If a new Task Risk Assessment is likely to become a generic type; i.e., if the task is likely to be repeated at a future time and/or different location on site, then it should be copied before it is signed and dated by the PiC and the original committed to the Pressure Systems Document Register.
- It is good practice for the Task Risk Assessments to be reviewed annually by the AP, however, in effect the Task Risk Assessments are reviewed every time that they put into use.
- The Task Risk Assessment must be submitted to the AP(PS) before the relevant safety documentation is prepared. It must also be shown to the rest of the working party and discussed as part of the pre-job brief.
- A copy of the Task Risk Assessment which has been signed and dated by the PiC should be kept and filed with the safety documentation used for the work (Pressure Systems Permit-to-Work or Standing Instruction).

Instructions for carrying out a Task Risk Assessment are out-with the scope of this document. This is covered as part of the Skilled Persons for Pressure Systems training course. However, handy reference can be found [\[hyperlink to be added\]](#)

A model Task Risk Assessment form can be found [\[hyperlink to be added\]](#)

3.0 Level of Control

In terms of Pressure Systems, intrusive work should be carried out on either:

- a Permit-to-Work (PTW)
- a Standing Instruction (SI)

The level of control for a particular task should be determined by the AP(PS).

Details of each are given below under Safe System of Work.

Planning and Performing Suitable Isolations

For work on pressure systems, there is a great and obvious need for the emphasis of safe isolation. Whilst no two types of plant may have the same physical requirements for isolation, the procedures to be implemented are common.

1.0 What do we mean by the term isolation?

'Isolation' is the separation of that plant or equipment from every source of energy (pressure, electrical, fuel, heat, mechanical, etc) in such a way that the separation is secure.

2.0 Key stages to isolation:

1. **Identify the hazards and carry out an isolation risk assessment** - this is an assessment of the failures that could occur during the isolation activity, the likelihood of these failures and the consequences.
2. **Selection of the isolation scheme** – what is the appropriate type and level of control?
3. **Planning and preparation of equipment** – this includes the identification and preparation of the equipment involved in the task, and any other areas of plant that may be affected. The purpose and methodology of the isolation must be clearly understood and communicated.
4. **Implementation of the isolation** – installation of each point of the isolation scheme. An initial isolation may be required to allow the installation of a final isolation, for example in the removal of a section of pipework in order to fit a blank.
5. **Draining, venting, purging and flushing** – the safe removal of all of the hazardous substances from the system.
6. **Testing and monitoring the effectiveness of the isolation** – it is imperative to prove the integrity and effectiveness of each isolation before intrusive work begins. Isolations must be secured, monitored and maintained throughout the intrusive activity.
7. **Carrying out the intrusive activity** – this is basically working on a system which would normally contain hazardous substances (for example, this could be steam, hot water, compressed air, etc). It is therefore necessary to maintain isolation integrity throughout this step.
8. **Reinstatement of plant** – once work is completed, this is the safe removal of isolations and the reinstatement of plant integrity.

Remember: *the removal of isolations and returning services to an item of plant can be hazardous in nature, and so needs a certain amount of thought process to ensure safety of the operators and equipment.*

3.0 Isolation Methodology

Pressure System Isolation

The isolation methodology used within NHS Lothian Estates is to be determined by the risk exhibited by the system.

The isolation methodology to be adopted is to be based upon the Health and Safety Executive publication '**HSG 253: The Safe Isolation of Plant and Equipment**', which is to be used as the lead reference when determining isolation.

As per '**HSG 253: The Safe Isolation of Plant and Equipment**', the selection criteria for system isolation within NHS Lothian Estates will fall into one of the four categories shown below:

Method 1: Positive Isolation

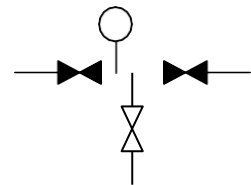
This is where the equipment to be worked on is de-energised, a section of pipework leading to it has obtained proven isolation and the pipework is then suitably plugged or blanked to prevent any loss of containment should any valves be passing.

Full system depressurisation.

This is where all parts of the system are de-energised and controls put in place to prevent re-energisation until all parts are re-assembled to make it safe to do so.

Method 2: Semi-proven or proven Double Block and Bleed (DBB)

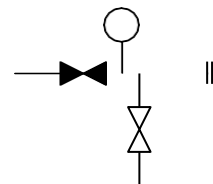
This is where each isolating valve can be proven independently with at least one bleed point in the system.



Method 3: Single Block, Bleed and Blank (SBBB)

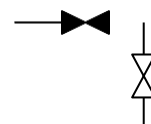
This is where only one isolation valve can be proven, by way of a bleed to allow the down-stream system to be disconnected and a blank to be safely fitted whilst the system up-stream of the valve is live.

If no bleed exists, then Method 1 or Method 2 must be implemented temporarily further up-stream to allow a blank to be fitted.



Method 4: Single Block and Bleed (SBB)

This method can only ever be adopted on low hazard systems as a last resort, and must be assessed by the AP.



There are occasions where two-stage isolations are required. For example, Method 4 would be required before a blank could be fitted to make this a Method 3 isolation.

In such instances, if the fitment of a blank can be safely carried out within a relatively short duration and if safety precautions are in place, this can be carried out under the control of the AP. A Permit-to-Work does not have to be issued for the fitment of a blank.

In all cases where a Safety Programme and Statement of Isolation are in use, the pressure system isolations should be carried out by, or supervised by the AP(PS).

The AP(PS) must witness the isolation and satisfy him/herself that the isolations are sound and that all safety precautions are in place before signing the Statement of Isolation as proof that this has been done.

Alternative methods of isolation for a pressure system not covered by the four methods above, for example pipe freezing, or running a system at reduced pressures or temperatures, can only be used with written consent by the AE(PS) on a case basis.

Steam Systems isolation

For work on steam systems, particular considerations have to be made due to the pressures involved, the scalding effect of steam and the likely-hood that one or more isolation valves may pass over time.

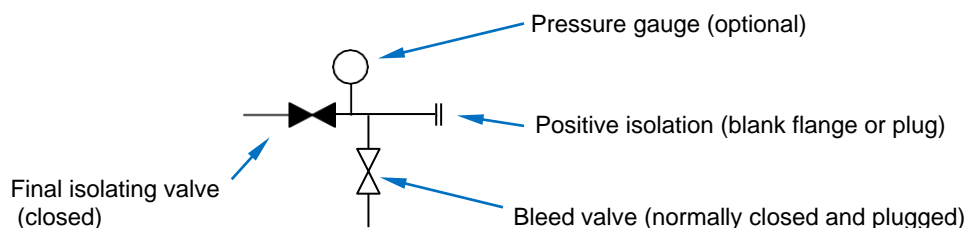
For **short-term isolations** – which are those which can be re-instated within a single shift – it is acceptable to employ proven or semi-proven DBB isolations with an open end. The isolation valves must still be suitably locked-off under a Statement of Isolation by the AP(PS), however.

For longer or extended-term isolations – which are those which will expand over more than one shift (perhaps days, or even weeks) and will be left unattended, then a **positive isolation** must be implemented.

This would usually be implemented as a two-stage isolation, supervised by the AP(PS) under a Statement of Isolation. Proven DBB isolations must be made before the pipework can be broken into and the positive isolation made.

Ideally, the positive isolation will be made near to an isolation valve, with a short T-piece fitted between the valve and the blank/plug. The T-piece can then be fitted with a bleed valve, which will normally be closed and plugged, but which will be used during the re-instatement process.

A pressure systems Permit-to-Work would be issued for the equipment to be worked on as a means of ensuring that it has been suitably de-energised, isolated, drained and vented before work begins.



Re-instatement

Care and consideration must be given to re-instatement of pressure systems involving fluids within the High Hazard category, such as steam or MTHW, for example. This is particularly relevant when a positive isolation has been installed, as this process has the potential to be breaking into a live system, hence the requirement to install a bleed valve between the last isolating valve and the blank or plug. It *may* be necessary for the up-stream valves to be proven before the positive isolation can be removed and the pipework to the equipment be re-assembled.

A clear operating procedure for any re-instatement may need to be produced by the AP(PS).

Electrical Isolation

Electrical isolations may be carried out by the AP(PS) or the working party in order to ensure the necessary system isolation / depressurization can be achieved for items of plant such as pumps, compressors, heating elements and electrically actuated valves.

However, this only applies where a readily accessible switch or circuit breaker can be operated and a safety lock fitted in the “off” position.

Where fuses are required to be removed, or electrical connections need to be physically removed, then the AP(LV) has to be informed and a qualified electrician has to be involved to carry the necessary task(s) out and prove the system is safely isolated.

Other Services

The AP(PS) can carry out or over-see the isolation of other services such as fuel oil, control air and feedwater. Such a strict methodology of isolation as for the relevant fluid may not be required, as localised pumps as well as valves can usually be isolated. Nevertheless, suitable precautions must be taken; especially as such services may be common to other parts of a larger system. An example would be fuel and feedwater services within a boiler house containing more than one boiler, only one of which is being isolated for maintenance. In such an instance, the blow-down system should also be considered as a potential source of pressure.

The disconnection of natural gas or LPG must only be undertaken by a Corgi registered (or similar approving body) fitter and carried out in accordance with the current gas safety regulations. Such regulations would also apply to any re-connection, testing, and re-instatement of such services.

Similarly, the disconnection of certain services, (for example refrigeration, especially where any refrigerant gases are required to be decanted in order to allow physical disconnection of the system,) will require forward planning and the involvement of personnel with the relevant skills and expertise to ensure safety, compliance and continuity of services.

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1.0 Management of Pressure Systems Safety

In broad terms, the Authorised Person is responsible for maintaining the Pressure Systems management system. Where more than one AP is on site the responsibility is shared, however any appointed Co-ordinating AP will have ultimate responsibility.

The management system will include such items as the Pressure Systems Document Cabinet, the Pressure Systems Document Register, safety programme documents, LOTO equipment, Asset Registers, Written Schemes of Examination, inspection reports, test certificates, risk assessments, audit reports and appointment documentation; i.e., all the things that prove that a coherent system of management and control is in place.

Whilst a full explanation of these contents is out-with the scope of this document, it must be understood that the management system is there for a reason; primarily that any pressure system within our control can be and will be operated and maintained safely by all concerned, without exception or exemption.

Those parts of the management system which are directly relevant to the Skilled Persons will be described in the following sections.

2.0 Safe System of Work

A Safe System of Work (SSW) is one whereby the job is managed effectively, utilising competent people, the right tools and equipment, in a methodical, risk-based and agreed manner. A permit-to-work (PTW) alone does not provide a SSW; a PTW is merely a record of what is allowed to happen and by whom, and requires other supporting evidence such as Risk Assessments and Method Statements (RAMS), training records, etc.

However, it is important that we document our SSW. Doing so provides evidence of what has been done and the level of controls in place. This is not only useful should things go wrong; it allows us to review our practices and reflect on what improvements could be made, and if nothing else, it provides historical evidence of work carried out.

In terms of work on pressure systems, typical components of a SSW are:

2.1 Safety Programme and Statement of Isolation (SP/SOI)

This document will be prepared by and completed by the AP(PS). It is utilised whenever an isolation on a live high risk system needs to be made in order to make it safe for work to be carried out. The AP(PS) will utilise an Isolation Risk Assessment and once the isolation has successfully been carried out, proven and safety locks applied, he/she will then sign the SP/SOI **before** issuing any work permits for that system as proof that the system is safe to work on.

The nominated Person-in-Charge of the working party (PiC) will sign the SP/SOI to acknowledge that the system is safe to work on, as demonstrated by the AP(PS).

Any persons receiving work permits (of any type related to the tasks) are to sign on to the SP/SOI at the opening and cancellation or closure of those permits.

2.2 Valve Guards, Safety Signage and Safety Locks

In order to ensure that a physical isolation can remain in place for the entirety of the intrusive activity, some form of mechanical device is employed which ensures that that isolation cannot be altered unwittingly. Valve guards, of which there are various designs, are utilised to form a physical barrier to prevent the valve being operated once they are locked off. They are designed so at least one safety padlock can be used to secure them. Some valves, electrical isolation switches and circuit breakers have inherent points for a safety padlock to be fitted without the use of additional guards, although safety hasps may be fitted to allow multiple safety padlocks to be employed. In each case, whenever safety locks are used, it is recognised good practice to reinforce this with appropriate safety signage (for example, displaying warning notices such as “Do not Operate” or “Valve Closed”, etc). This is especially relevant for remote isolation points.

2.3 Permit-to-Work (PTW)

For pressure systems, a Permit-to-Work is required where the integrity of a system is to be breached, when either:

- The system is classed as high risk, or
- The system is classed as low risk but the approved or acceptable method of isolation is not achievable.

(The exception to a PTW is the initial stage of a two-stage isolation which is done under the direction of the AP)

The pressure systems PTW will record the following information:

- The date, type and location of the pressure system;
- The serial number of the Statement of Isolation which makes the work possible;
- A brief description of the work to be carried out under the permit;
- The Task Risk Assessment which applies to the work detailed (as provided by the PiC);
- Any other permits issued relevant to the task (e.g., confined space, hot works);
- The name and signature of the person (AP) issuing the permit, along with the date and time it was issued;
- The name and signature of the person (PiC) accepting the permit, along with the date and time it was received;
- The name and signature of the person (PiC) closing the permit, along with the date and time it was closed;
- The name and signature of the person (AP) receiving the closed permit, along with the date and time it was closed;
- Whether the work was cancelled or completed. If cancelled, a description of why should be detailed on page 2 of the permit and signed by the PiC.

Upon closure, the PiC should also sign Section 3 of the SP/SOI where all issued permits are recorded.

The PTW does not record all members of the working party, only the PiC. A full list of the working party members (Skilled Persons, labourers, maintenance assistants, etc) can be provided as part of the Method Statement.

Issue, acceptance and cancellation of a PTW:

- The AP(PS) must nominate a Person-in-Charge (PiC) from the skilled persons in the working party. Naturally, a working party of one automatically makes that SP the PiC.
- Before any documents can be issued or isolations made, the AP and PiC must discuss and agree what work is to be done, what is feasible, what, how and when the isolations are to be made to make the work possible and safe, what other precautions or SSW needs to be put in place and any foreseeable outcomes which need to be mitigated.
- The PiC must then draw-up a suitable Task Risk Assessment and Method Statement. These may be previously adopted or “generic” examples, but they must be agreed to as applicable and relevant for the necessary task by the AP(PS).
- Meanwhile, the AP(PS) draws up the Isolation Risk Assessment and SP/SOI, which is then implemented at the agreed time and finally signed by the AP as proof that the system is safe to work on.
- Before the PTW is issued the AP demonstrates the system or component part which has been isolated. All keys for the safety locks used in the isolation are deposited within the LOTO keybox and the safety padlocks for the AP and PiC are applied and the keys retained.
- The AP(PS) is to issue the PTW immediately before the work is to commence and it will remain in force until the work is completed, or, if for some reason it cannot be completed, until the job has to be abandoned.
- Ideally, the PTW should be issued at the point-of-work. It is reasonable to expect a delay between the SP/SOI being signed off by the AP and the PTW being issued in order to allow time for the system to cool down to a reasonable temperature for work to be carried out safely. This should be monitored and confirmed by a calibrated infra-red temperature gauge.
- The identity of the pressure system or component parts to be worked on are confirmed, along with the safety arrangements at the point of work and at points of isolation, special instructions or safety measures and lines of communication.
- The AP then issues the PTW and the PiC signs to accept it. The PiC also signs the SP/SOI to acknowledge the system isolations and permit issue.
- Once the work is completed, the PiC should contact the AP and together they should inspect the components / system worked on for quality and integrity, along with the work area in general. The PiC can then sign the permit to close it and this should be counter-signed by the AP to cancel it as complete. Signatures are also required in Section 3 of the SP/SOI.

- If both parties can agree that the isolations can be removed so that the system can be re-instated, then both the PiC and the AP must remove their safety padlocks from the LOTO keybox to enable the AP to begin the process of removing all system safety locks.
- If, for any reason, the planned work cannot be completed, the PiC must inform the AP at the earliest opportunity. Once this situation has been confirmed, the Pic must sign the PTW to cancel it, with an explanation of the circumstance given on page 2 of the permit. This should be counter-signed by the AP to cancel the permit as stopped. Again, signatures are also required in Section 3 of the SP/SOI.
- Dependant on the circumstances of the permit cancellation, a decision will have to be made as to whether the system is re-instated at that point in time or not.

When the duty AP(PS) issues a pressure systems PTW, this can only be issued to a Skilled Person (as PiC) or to another AP. An AP cannot issue a PTW to themselves.

A Permit-to-Work is not required for routine operational tasks without the use of tools; for example, sampling, water treatment, changing over duty plant or draining air receivers.

Work on low risk systems where a PTW is not required is to be controlled by the use of a Standing Instruction.

2.4 Standing Instruction (SI)

A Standing Instruction may be issued by the duty AP(PS) to Skilled Persons for either one-off or a repetitive task on pressure systems where a PTW is not appropriate.

In broad terms, if the pressure system is simple and the necessary isolations are basic and present low risk, then a PTW would not be appropriate because there would not be a need for a Statement of Isolation by the AP. The isolations would be carried out by the PiC of the working party, as per the instructions detailed on the Standing Instruction document (as a PTW requires a SOI). An example would be the isolation of an air receiver on a simple, point-of-use compressed air system.

A Standing Instruction may also be used for tasks which require working on a live system, providing the AP(PS) is satisfied that the risks are low; examples could be replacing a pressure gauge on a low pressure system where suitable isolations are available, or the replacement of a 2nd-fix valve on a medical gas terminal unit.

Note: *with regard to changing or repairing 2nd-fix valves on live medical gas pressure systems, a Standing Instruction is used to reinforce the Safe System of Work put in place to protect the working party. It does not replace the need for a Low Hazard MGPS work permit. However, MGPS permits are unique in that they exist to protect the end user (i.e., patients), rather than the people working on those systems. Skilled Persons working on such systems should have received suitable training on a CP(MGPS) course as a minimum.*

Standing Instructions contain the following information:

- location and type of system to which the instruction refers
- isolation procedure (if applicable) and detail of tasks to be carried out
- any special instruction or safety measures applicable
- name of Skilled Person and employer

- the validity period of the SI

Standing Instructions must contain enough detail with respect to the procedure required to be undertaken by the Skilled Person to ensure that the system is safe before the commencement of work.

- They may contain specific instructions, or refer to an attached procedure which details the instructions for an isolation and de-pressurisation to be undertaken to allow a task to be carried out safely.
- There could be several such procedures supporting a Standing Instruction, as it could cover more than one item of plant or system.

Standing Instructions are to be supported by Task Risk Assessments which cover both the isolation procedure and task, in a similar manner to those which are adopted by the PTW system.

Issue, acceptance and cancellation of a Standing Instruction:

- A Standing Instruction can be drawn up and issued by the duty AP(PS), or simply issued - for those Standing Instructions which are already drawn up and valid for a period of time (for repetitive tasks).
- The Skilled Person who is to sign on to the Standing Instruction is to provide a suitable Task Risk Assessment for the job involved, or agree with the AP(PS) that any TRA accompanying the Standing Instruction is applicable.
- Having understood the instruction(s) and being prepared to undertake the task(s) therein, the Skilled Person is to sign and accept the Standing Instruction. On signing the acceptance of the instruction, the Skilled Person authenticates the instruction as valid and becomes the Person in Charge (PIC) of the permitted task(s).
- For Standing Instructions applying to **one-off, specific tasks**, the PIC should return the SI to the AP(PS) and cancel it at the completion of the job and confirm this, or
- if the job cannot be completed, and needs to be abandoned, the PIC should return the SI to the AP(PS) and the SI should be cancelled. The reason for cancellation should be noted on the SI and in the Pressure Systems Operation Record by the AP.
- For Standing Instructions for **repetitive tasks** and **which are valid over a period of time**, the PIC should inform the AP when the job has been completed (or whether it has been abandoned for some reason), but the SI is cancelled by the AP on the date of expiry. *(The completion of the job would be recorded on the Skilled Persons job card and on the MGPS Low Hazard work permit, in the case of a 2nd-fix TU repair.)*
- The only exception to this is if the isolation(s) and or task(s) relating to the entire scope of the Standing Instruction are no longer feasible for some reason, at which point the SI would need to be cancelled and the reasons recorded as described above.
- A Standing Instruction can be cancelled by the duty AP at any time; the date and reason should be noted on the document and in the Pressure Systems Operation Record.

2.5 The Pressure Systems Operating Record (PSOR)

This document is generally populated by the duty Authorised Person and serves as a day-to-day record of what Safe System of Work documents are open and have been issued (these include Safety Programmes/Statement of Isolations, Permits-to-Work and Standing Instructions), as well as those which have been closed and cancelled.

The PSOR also documents which isolations have been carried out, which systems have been reinstated and any modifications to pressure systems or changes in practice.

Anyone who is involved in working with Pressure Systems can write within it, providing the information is legible, accurate and relevant.

2.6 The Pressure Systems Document Register

This register of document(s) is maintained by the lead AP(PS) for the site and contains all relevant information for the pressure systems on that particular site, as well as instructions, policies and procedures which are pan-Lothian. Some contents are filed separately for practical reasons.

Whilst the Register is kept within a locked cabinet, any person whose work is concerned with pressure systems should know about its whereabouts and access to it is available upon request from the duty AP(PS).

2.7 Safety keys and the LOTO key box

The LOTO key box is used for the safe keeping of all keys for any safety padlock which is in use. (LOTO stands for Lock-Off, Tag-Out). Safety padlocks differ from working padlocks in that they only have one key, which is numbered. Also, the padlock can usually only be locked whilst the key is in the barrel of the lock, so that it is not locked by mistake.

During pressure systems isolation, once the safety locks are applied to the valve guards, they should be bunched together and labelled, then deposited into the safety LOTO key box. The box is then closed and secured with a minimum of two padlocks; one for the AP, and one for the PiC of the working party (or one for each PiC if there is more than one working party). The keys for these padlocks are then kept safely on each respective person.

This procedure ensures that no safety locks can be removed until both / all parties are ready for the locks to be removed; usually once the work is complete (or abandoned) and the work permits closed / cancelled. It therefore ensures isolations remain in place and systems are safe until work is complete, or at least until all parties concerned are happy for the locks to be released.

Any key for any type of padlock or interlock can be deposited into the LOTO key box, provided it is relevant for the job to be carried out safely and suitable for the isolation to be in place for the duration of the task. As all keys for safety padlocks are individually numbered, it does not matter if a safety padlock for an electrical isolation is applied to the same bunch as the safety padlocks for the steam isolating valves, for example. However, any keys which are added singularly should be individually labelled, or a note added in the statement of isolation so that they can be readily identified later on. In any case, whenever specific locks are utilised in isolations, the keys for those should be handed to the AP(PS) for safe-keeping within the LOTO keybox.

3.0 Training and Assessment for Skilled Persons

It is assumed that all those who are termed Skilled Persons have attained some level of competency and experience with mechanical and pressure systems.

It is concerned best practice for any Skilled Person candidate to have completed a SP(PS) competency course provided by a specialist training company.

Ultimately, however, the level of competency for a Skilled Person working on pressure systems will be based upon their skills, training, knowledge, attitude and experience. This will provide the basis for their appointment by the lead AP(PS) for the site.

With regard to contractors who are working as a Skilled Person, it is up to the duty AP(PS) to ensure that they are sufficiently trained and competent to carry out their prescribed tasks on a pressure system. Whilst this may seem to have been decided by others, based upon the company's reputation and portfolio, an AP(PS), having a duty of care, does have the right to call into question any individual they have reason to believe falls short of the prerequisite merits.

For NHS employees, a Skilled Person has to be appointed by the lead AP(PS) for the site, based upon the criteria above. It is therefore possible that the appointment comes with certain limitations. This is to ensure compliance with the law, but also serves to protect the individual from being tasked solely to work on equipment for which they are unfamiliar or untrained to operate or maintain.

A Skilled Person with such limitations may form part of a working party with one or more Skilled Persons who are competent and appointed, to work on pressure systems or equipment beyond their current capability in a trainee capacity, in order to gain suitable knowledge and experience, on the condition that the PiC provides adequate supervision throughout.

Therefore, a Skilled Person must only work on the type of pressure system or equipment for which they have been appointed.

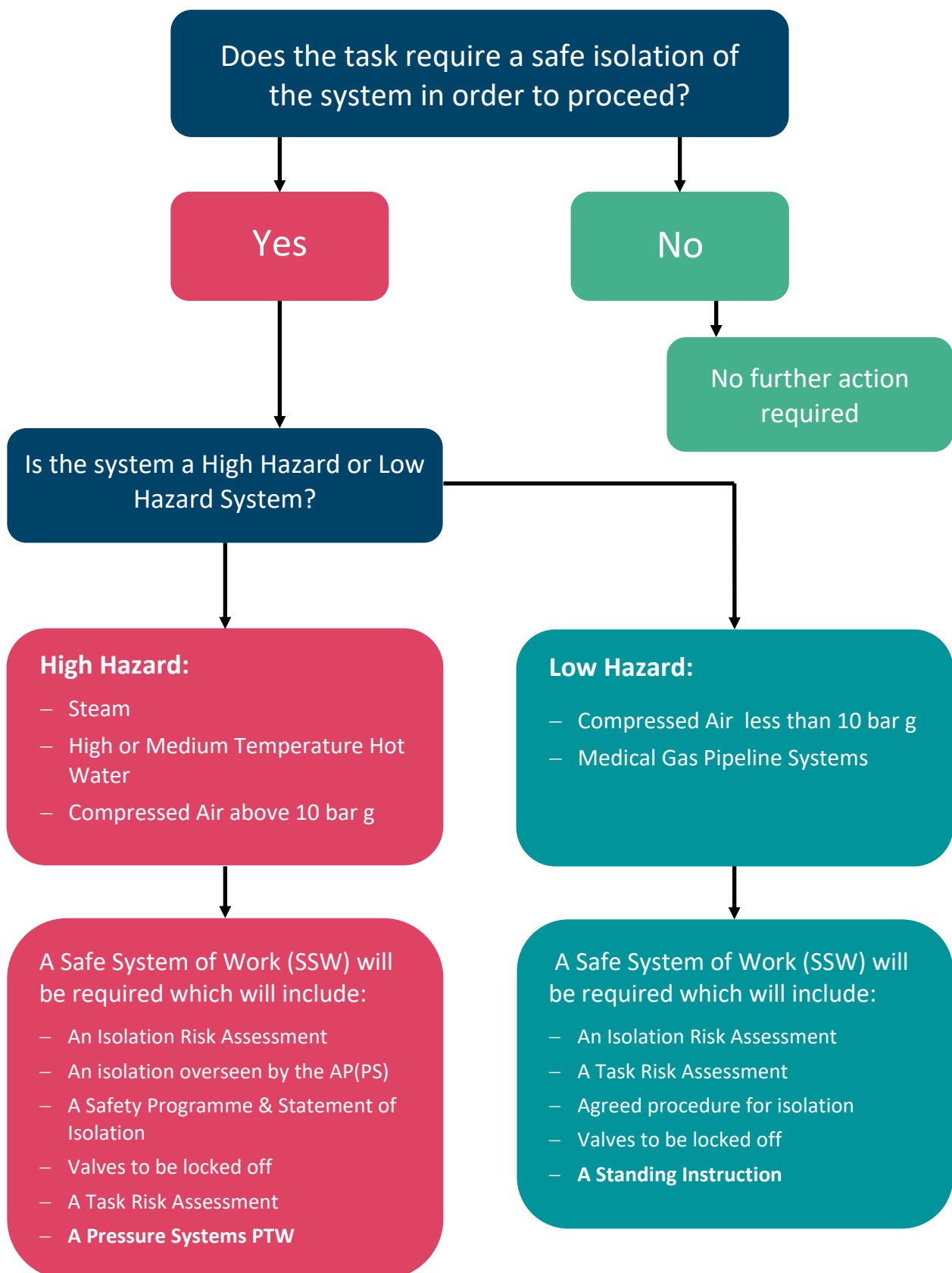
Points to note:

- In general, training course qualifications last for three years (or as stated on the qualification).
- Appointments will be reviewed as per the appointment certificate, or reviewed at a period of three years. However, at the discretion of the lead AP(PS), they may be cancelled at any time. All appointments are documented and certificates kept in the Pressure Systems Document Register. Each appointed Skilled Person should be notified in writing of their appointment by the AP(PS).
- A Skilled Person can be re-assessed at any time by the lead AP(PS), especially if there is doubt over an employee's capability or suitability in that role.
- Re-assessment will be necessary for a Skilled Person to advance the scope of their current appointment; for example at the completion of an apprenticeship.
- Assessment of a Skilled Person takes the form of a series of written and oral questions on a one-to-one basis by the lead AP(PS), in order for him/her to satisfy themselves that the Skilled Person has attained a level of understanding of how safe working with pressure systems is managed, their roles within that safe system of work, as well as possessing the

overall skills, knowledge, attitude, training and experience desired in order to be able to fulfil the role of Skilled Person to some reasonable degree. The outcome of this will determine what limits, if any, are to be imposed upon that person's appointment, and whether further training or monitoring is required.

- In any case, each assessment is to be recorded, with all assessments being fair and equal, in order to reflect the Qualities of NHS Lothian.

Pressure Systems Permit-to-Work (PTW) or Standing Instruction (SI) Decision Tree



Procedure for Pressure Systems work requiring a PTW

1. Plant to be identified; system hazards and nature of isolations necessary to be confirmed. Consult with AP(PS) over nature of the task.
2. AP(PS) to satisfy himself that the Skilled Persons are competent to carry out the task and are suitably appointed.
3. The Person-in-Charge (PiC) of the working party to be nominated by the AP(PS). Using the key stages of isolation, the extent and methodology of the isolations necessary to be agreed by the AP(PS) and the PiC.
4. The AP(PS) will then:
 - Produce or confirm a suitable Isolation Risk Assessment
 - Produce a Safety Programme & Statement of Isolation
 - Identify the plant and systems, conduct the necessary isolations and prove
 - Apply the necessary valve guards and safety locks and signage
 - Sign off the Statement of Isolation on the Safety Programme
 - Deposit all keys for the safety locks into the LOTO keybox, secure it with the safety padlock for the AP(PS) and keep the key safe.
5. The PiC will, meanwhile:
 - Produce or confirm a suitable Task Risk Assessment and Method Statement for the required activity
 - Ensure that all other requirements for safe working are in place; e.g., tools and equipment, safe access and egress, suitable lighting, barriers and signage, emergency equipment and the need for any other work permits (such as confined spaces, hot works, etc).
6. The AP(PS) will, upon receipt of the Task Risk Assessment and Method Statement from the PiC, produce a Pressure Systems Permit-to-Work (PTW)
7. The AP(PS) will then demonstrate to the PiC that the plant to be worked upon is suitably isolated from all hazardous systems, and is appropriately cooled, drained and vented.
8. The PiC will then:
 - Sign and accept the Statement of Isolation.
 - Apply the safety padlock for the PiC to the LOTO keybox and retain the key.
 - Once the system is deemed safe to work on, the AP(PS) will sign and open up the Pressure Systems PTW.

- Once happy that all conditions are in place, the PiC will sign and accept the PTW and all relevant parts of the Safety Programme.
 - The PiC will then obtain any other relevant work permits from the relevant AP's or managers and brief the other members of the work party before work begins.
9. The AP(PS) will complete the Pressure Systems Operating Record appropriately.

From hereon in, one of two scenarios are likely:

1. The PiC oversees the work to completion:

- The Pic confirms that the work is complete to the AP(PS).
- The PiC then signs off the work as complete on the Pressure Systems PTW and signs off the permits on Part 3 of the SP/SOI.
- The PiC removes the PiC safety padlock from the LOTO keybox and hands back to AP(PS).
- PiC to ensure any other work permits used are closed.
- AP(PS) signs off and closes the Pressure Systems PTW.
- AP(PS) to up-date the PSOR.

2. The PiC concludes that the work cannot be completed and must be abandoned:

- The PiC is to inform the AP(PS) and reach a conclusion.
- The PiC must then cancel the Pressure Systems PTW. Part b of the PTW to be completed and signed by the PiC.
- PiC to then sign off Part 3 of the SP/SOI.
- The PiC removes the PiC safety padlock from the LOTO keybox and hands back to AP(PS).
- AP(PS) signs off and cancels the Pressure Systems PTW.
- AP(PS) to up-date the PSOR.

The AP(PS) must ultimately decide whether the situation can be rectified, for example by implementing further isolations, then issuing further PTW, or whether the task needs to be abandoned completely.

Once the intrusive activity is completed / cancelled as described in the steps above, the final stages leading to reinstatement of the plant are:

- AP(PS) to remove their safety padlock from the LOTO keybox, and retrieve the keys for the safety locks for the appropriate plant.
- Safety locks, signage, valve guards and /or interlocks to be removed by the AP(PS).
- All necessary systems to be systematically introduced to the plant by the AP(PS), or by the PiC and working party under the AP's direction.
- System integrity to be checked and confirmed by the AP(PS), who will then cancel the SP/SOI accordingly.
- AP(PS) to up-date the PSOR.

Procedure for Pressure Systems work requiring a SI (Standing Instruction)

1. Person-in-Charge (PiC) to confirm the nature of the work required with the Authorised Person (AP(PS))
2. AP(PS) to acknowledge whether the task is a repetitive one or a one-off event.
 - An Isolation Risk Assessment will be required.
 - A Task Risk Assessment will be required.
 - For simple systems, both of these assessments may be on the same document.
3. An agreed procedure for isolation of the plant must be in place and accompanying the SI.
4. For an SI in place for repetitive tasks, the PiC will sign onto the current SI.
 - The PiC must inform the AP(PS) when the work is complete.
 - The AP(PS) will record the issue and cancellation of the SI task in the PSOR.
5. For an SI for one-off events, the AP(PS) will need to draw up a specific SI, with any particular requirements necessary highlighted.
 - The PiC will sign onto the SI before work begins and then sign off it upon completion, or to cancel it if the work cannot be completed for any reason.
 - The AP(PS) will record the issue and cancellation of the SI task in the PSOR.