UK Air Quality Monitoring Networks Health and Safety Guidance

Version 2 Issue 2 - June 2023

We are the Environment Agency. We protect and improve the environment.

We help people and wildlife adapt to climate change and reduce its impacts, including flooding, drought, sea level rise and coastal erosion.

We improve the quality of our water, land and air by tackling pollution. We work with businesses to help them comply with environmental regulations. A healthy and diverse environment enhances people's lives and contributes to economic growth.

We can't do this alone. We work as part of the Defra group (Department for Environment, Food & Rural Affairs), with the rest of government, local councils, businesses, civil society groups and local communities to create a better place for people and wildlife.

Published by:

Environment Agency
Horizon House, Deanery Road,
Bristol BS1 5AH

www.gov.uk/environment-agency

Further copies of this report are available from our publications catalogue: http://www.gov.uk/government/publications or our National Customer Contact Centre: 03708 506 506

Email: enquiries@environment-agency.gov.uk

Table of Contents

1. Purpose and Scope

The purpose of this document is to provide consistent guidance for Environment Agency contractors regarding health and safety (H&S) at air quality monitoring sites in the UK, in particular, those funded in full by the Environment Agency and our network contract managers. This will ensure that all users are aware of fire and electrical safety requirements and that risk assessments and site safety have been addressed uniformly and to a satisfactory standard. The air quality monitoring networks covered by this guidance document are:

- The Automatic Urban and Rural Network (AURN)
- The Heavy Metals Network
- The Hydrocarbons Network
- The Polycyclic Aromatic Hydrocarbons (PAH) Network
- The UK Eutrophying and Acidifying Pollutants (UKEAP) Network
- The Black Carbon Network
- The Particle Numbers and Concentrations Network
- The Toxic Organic Micro-Pollutants (TOMPs) Network
- The UK Urban NO_2 (UUNN) Network.

All chapters of this guidance document are relevant to all readers, with the exception of section 0, 'Responsibilities of Stakeholders', where you need only read the responsibilities relevant to your role. The information contained within this guidance document has been provided by a large number of sources.

As co-ordinator of health and safety information, Ricardo Energy & Environment, the Environment Agency and their partners have used all reasonable skill and care with regard to the collection and collation of this information, but makes no representation or warranty, expressed or implied, and accepts no liability concerning the fairness, accuracy or completeness of the information. The guidance on risk assessments and health and safety legislation is just a summary, or a signpost, of the risks that are involved, and third parties are responsible for ensuring they meet UK Health and Safety legislation. Ricardo Energy & Environment accepts no liability whatsoever to any third party for any loss or damage arising from any interpretation, use of or reliance upon any information or view contained within this guidance document.

1.1. Purpose for Affiliated Sites -

It is recognised that affiliate site owners may have health and safety approaches for their sites and assets that differ to this guidance, and as the responsible asset / site owner they may choose to take a different approach. If taking a different approach to anything set out in this guidance, we ask that your approaches where different are clearly communicated to the network manager(s) for the site, the Local Site Operators, and all site users. Your approach should include still using the cascade procedure for any health and safety issues, and updating relevant risk assessments in the health and safety database, to ensure the systems in place are still relevant.

2. Health and Safety Legislation

2.1. Health and Safety at Work Act 1974

Many core health and safety requirements flow from the Health and Safety at Work Act 1974 which places responsibilities on both employers and employees.

2.1.1. Employer Duties

Section 2 of the Act places the following duties on employers:

"It shall be the duty of every employer to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all his /her employees" and in particular, that such a duty extends to:

- Provision and maintenance of plant and systems of work that are, so far as is reasonably practicable, safe and without risks to health;
- Arrangements for ensuring, so far as is reasonably practicable, safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances;
- Provision of such information, instruction, training and supervision as is necessary to ensure, so far as is reasonably practicable, the health and safety at work of their employees;
- So far as is reasonably practicable as regards any place of work under the employer's control, the maintenance of it in a condition that is safe and without risks to health and the provision and maintenance of means of access to and egress from it that are safe and without such risks;
- Provision and maintenance of a working environment for their employees that is, so far as is reasonably practicable, safe, without risks to health, and adequate as regards facilities and arrangements for their welfare at work. This means that the premises, and the means of entry and exit, must be, as far as reasonably practicable, safe and without risks to health.

2.1.2. Employee Duties

Under Section 7 of the Act all employees have a duty while at work to:

- Take reasonable care for the health and safety of themselves and of other persons who may be affected by their acts or omissions at work; and
- Co-operate with employers or other persons so far as is necessary to enable them to perform their duties or requirements under the Act.

2.1.3. Other Sections

Other sections of the Act clarify that the duties of all employers (and self-employed persons) extends to ensuring, as far as is reasonably practicable, the safety of persons other than employees, for example, contractors, visitors, the general public and clients.

Employers must also prepare and keep under review a safety policy and to bring it to the attention of their employees (s.2(2)). Trade unions may appoint safety representatives and demand safety committees. The representatives have a right to be consulted on safety issues (ss.2(4), (6) and (7)). Since 1996, employers have had a duty to consult all employees on safety matters. No employer may charge an employee for provision of health and safety arrangements (s.9).

2.2. Use of Risk Assessments

See section 4 which covers risk assessments in detail.

2.3. Keeping up to date

It is recommended that all organisations involved in air quality monitoring review the current health and safety legislation at least annually and update their documented health and safety procedures to ensure these regulations are adhered to and are adequately and clearly explained to all employees.

It is good practice for all organisations to produce and regularly review procedures covering such health and safety legislation.

A list of known relevant legislation is included in Appendix A.

2.4. More Information

More information about health and safety legislation produced by the Health and Safety Executive is available at http://www.hse.gov.uk.

3. Responsibilities of Stakeholders

Stakeholders are all contractors, subcontractors and volunteers who make visits to, own or manage air quality monitoring sites, namely:

- Network Managers
- Site Owners and/or Land Owners
- Local Site Operators (LSOs)
- Equipment Support Unit (ESU)
- Quality Assurance and Quality Control Unit (QAQC)

Please read the section appropriate to your role(s).

3.1. Legal Duty

By law, everyone has a duty while at work to take reasonable care for the health and safety of him/herself and of other persons who may be affected by his/her acts. Individuals must also cooperate with employers or other persons so far as is necessary to enable them to perform their duties or requirements under the Health and Safety at Work Act 1974 (see section 2).

This means that every person who undertakes work under contract to the Environment Agency will play their part in ensuring that safe systems of work are in place in accordance with health and safety laws and regulations for all locations where the work is carried out. The Health and Safety Database only covers the air quality monitoring stations managed/ run on behalf of the Environment Agency and the work carried out at these locations. It does not cover associated laboratories or workshops. The Environment Agency may occasionally audit or ask that an audit be carried out on the monitoring station safe systems of work and request copies of relevant documentation.

3.2. Network Managers

Many sites contain equipment from multiple networks and therefore one site may have multiple Network Managers. For the purposes of health and safety, the lead Network Manager has additional responsibilities. At sites with AURN equipment, the lead Network Manager is the AURN CMCU (Central Management and Control Unit). At sites without AURN equipment, the lead Network Manager shall be determined by the Environment Agency (EA) as appropriate.

Responsibilities

- Familiarise yourself with the Health and Safety Database and how to use it.
- Upload safety information to the Health and Safety Database, including electrical test dates and electrical safety status (lead Network Manager only), PAT test dates, special risks at each site and risk assessments.
- Provide information and support to ensure that LSOs and ESUs are able to carry out their responsibilities.

- Review risks and prepare a risk assessment for work carried out at each site, including transport to and from the site and the movement of gas cylinders into the site.
- Ensure actions are taken to mitigate the risks identified in the risk assessment (e.g. purchase of safety equipment, display of H&S information at site, staff training and communication).
- Use the Health and Safety Database to check the safety status of the site before each visit.
- Ensure that LSOs and ESUs carry out a ‘take two’ risk assessment on arrival at the site. A ‘take two’ risk assessment is a short and simple visual check of the key risks to review whether it is safe to carry out work; note this should include a visual check of any working at height equipment such as ladders prior to use.
- Follow the Cascade procedure (section 0) and notify the Health and Safety Coordinator of any new or site-specific risks.
- Follow advice from the Lead Network Manager and Ricardo Energy & Environment Project Health and Safety Coordinator.
- Ensure contact details for your organisation and all other stakeholders are regularly updated and sent to the Ricardo Energy & Environment Project H&S Coordinator.
- Other responsibilities as specifically identified in the Network Manager’s contract.
- Comply with health and safety laws and regulations (see www.hse.gov.uk)

At Environment Agency-owned sites, the responsibility of the site owner may have been delegated through a contract to the Network Manager. Network Managers will ensure that they are fully aware of their contractual obligations regarding health and safety responsibilities, including notifying the fire service about the presence of gas cylinders at the sites. In addition, some instruments contain sources of ionising radiation and in some cases there may be a requirement to register with the Health and Safety Executive (HSE): please refer to Section 8 for further information on this.

3.3. Site and Land Owners

At Affiliate AURN sites, the site owner may be the Local Authority or another body or individual, who is fully responsible for the actions below. For EA-owned sites, the responsibilities are passed on through contract to the lead Network Managers. It is possible that the Site Owner/Land Owner and Local Site Operator may be the same organisation or individual, in which case they should read and comply with the responsibilities for both roles.

Responsibilities

- Liaise with the Network Manager to ensure that the air quality monitoring site infrastructure is safe and can be accessed safely.
- Carry out electrical testing in accordance with section 5.

- Liaise with the Network Manager to review risks and prepare a risk assessment for work carried out at each air quality monitoring site, including transport to and from the site and the movement of gas cylinders into the site.
- Where appropriate, ensure actions are taken to mitigate the risks identified in the risk assessment (e.g. purchase of safety equipment, display of H&S information at the air quality monitoring site, staff training and communication).
- Some sites may contain equipment which belongs to other networks or is used for other purposes. This may or may not be Environment Agency-owned. The risk assessment should include any risks associated with such additional equipment. However if you do notice anything dangerous please advise the site owner immediately
- Use the Health and Safety Database to check the safety status of the site before each visit.
- Follow the Cascade procedure (section 0) and notify the Network Manager and Health and Safety Coordinator of any new or site-specific risks.
- Ensure contact details for your organisation are up to date and sent to the Network Managers
- Communicate with the Network Manager and Ricardo Energy & Environment Project Health and Safety Coordinator on any health and safety issues, and make it clear if your approaches differ to that in the guidance to manage a risk.
- Comply with health and safety laws and regulations (see http://www.hse.gov.uk) .

3.4. Local Site Operators and Equipment Support Units

Responsibilities

- Familiarise yourself with the Health and Safety Database and how to use it.
- Review risks and prepare a risk assessment for work carried out at each site, including transport to and from the site and the movement of gas cylinders into the site. The risk assessment should be submitted via the online form in the Health and Safety Database.
- Ensure actions are taken to mitigate the risks identified in the risk assessment (e.g. purchase of safety equipment, display of H&S information at site, staff training and communication).
- Use the Health and Safety Database to check safety status of the site before each visit.
- Carry out a ‘take two’ risk assessment on arrival at the site. A ‘take two’ risk assessment is a short and simple visual check of the key risks to review whether it is safe to carry out work, note this should include a visual check of any working at height equipment such as ladders prior to use.
- Follow the Cascade procedure (section 0) and notify the Network Manager and Ricardo Energy & Environment Project Health and Safety Coordinator of any new or site-specific risks.

- Follow advice from the Network Manager and Ricardo Energy & Environment Project Health and Safety Coordinator.
- Ensure contact details for your organisation are up to date and sent to the Network Managers.
- Other responsibilities as specifically identified in the LSO/ESU contract.
- If you need to follow your employer's or affiliated site owner's guidance that differs to this guidance, then please make sure your risk assessments explain your alternative approach.
- Comply with health and safety laws and regulations (see http://www.hse.gov.uk).

3.5. Quality Assurance and Quality Control Unit

Responsibilities

- Familiarise yourself with the Health and Safety Database and how to use it.
- Review risks and prepare a risk assessment for work carried out at each site, including transport to and from the site and the movement of gas cylinders into the site. The risk assessment should be submitted via the online form in the Health and Safety Database.
- Ensure actions are taken to mitigate the risks resulting from the risk assessment (e.g. purchase of safety equipment, display of H&S information at site, staff training and communication).
- Use the Health and Safety Database to check the safety status of the site before each visit.
- Carry out an assessment on arrival at the site. A ‘take two’ risk assessment is a short and simple visual check of the key risks to review whether it is safe to carry out work, note this should include a visual check of any working at height equipment such as ladders prior to use.
- Follow the Cascade procedure (section 0) and notify the Network Manager and Health and Safety Coordinator of any new or site-specific risks.
- Update the Health and Safety Database with any new risks that have come to light.
- Follow advice from the Network Managers and Ricardo Energy & Environment Project Health and Safety Coordinator.
- Ensure contact details for your organisation are up to date and sent to the Network Managers.
- Other responsibilities as specifically identified in the QAQC Unit contract.
- Comply with health and safety laws and regulations (see http://www.hse.gov.uk).
- If you need to follow your employer's or affiliated site owner's guidance that differs to this guidance, then please make sure your risk assessments explain your alternative approach.

3.6. Cascade Procedure

In the event of a substantial risk being identified at any site, the person identifying the risk shall immediately enter the information into the Health and Safety Database using the online risk assessment form. (You can do this either by adding a new risk assessment form, or by adding a new risk to an existing risk assessment). If the level of risk is 'Substantial' or 'Intolerable' (see section 0), the Database will immediately generate a warning email message to all stakeholders who have included the site in their 'My Sites' list. This is therefore the quickest way to start the cascade process, for all risks, even short-term ones such as a leaking roof or electrical fault.

You should also contact your Network Manager, who will make sure the cascade process has been started and that all stakeholders are notified. The Network Manager is responsible for advising the course of action and keeping stakeholders updated until the issue is resolved. The full cascade procedure is illustrated in table 1. Contact details may be found in section 13.

If for any reason you are unable to initiate the cascade procedure by entering the risk into the Health and Safety Database, contact your Network Manager and ask them to do this. If unable to contact them, the issue should be reported to the Ricardo Energy & Environment Project Health and Safety Coordinator at AQSafety@ricardo.com. If this is the case, please let them know you have not been able to enter the risk into the Health and Safety Database.

In the event of an accident or incident, local site procedures apply – you should leave the air quality monitoring site immediately, and contact the emergency services if necessary before cascading this information to the Ricardo Energy & Environment project H&S coordinator and Network Manager.

Notes:

- It is assumed that at AURN sites, the CMCU will take responsibility for contacting the site owner. At all non-AURN sites the lead Network Manager for the site will contact the site owner.
- The EA will include the Devolved Administrations where relevant to monitoring stations (i.e. in their country and in lessons learned).
- The Ricardo Energy & Environment Project H&S Coordinator will ensure that the gas suppliers are informed as necessary about restrictions on site access/issues, if this has not already been done via the H&S Database.

'Relevant network' managers means Network Managers who have co-located instrumentation at that site. All Network Managers are to be included in 'lessons learned' emails. To contact the relevant Network Manager – please co-ordinate via the Environment Agency (contact links in section 13).

Table 1 Health and Safety Cascade for Environment Agency Monitoring Networks

Step 1: Person Identifying Risk/Issue:	LSO	ESU or QAQC Unit	H&S Coordinator (Ricardo)	Network Manager	Site/land Owner
Personnel in Step 1 identifying the issue are required to contact all the personnel listed under their column.	Their Network Manager H&S coordinator	Their Network Manager H&S coordinator	All relevant network managers EA	H&S coordinator EA Their ESU/LSO Site/land owner	Their Network Manager H&S coordinator
Step 2 Cascade 1:	H&S coordinator	H&S coordinator	Network Managers	H&S coordinator	H&S coordinator
Personnel in step 2 required to contact the personnel listed under their column	Any other relevant Network Managers EA	Any other relevant Network Managers EA	Site/land owner Their ESU/LSO and QAQC	Any other relevant Network Managers	Any other relevant Network Managers EA
Step 3 Cascade 2:	Network Managers	Network Managers		Other Network Managers	Network Managers
Personnel in Step 3 required to contact the personnel listed under their column	Site/land owner Their ESUs/LSOs and QAQC	Site/land owner Their LSOs/ESUs and QAQC		Their ESUs/LSOs and QAQC Site/land Owner	Their ESUs/LSOs and QAQC
Step 4: Network Manager to provide updates on the issue and confirmation that issue has been resolved to be circulated by email to all parties including lessons learned. Ricardo Energy & Environment as H&S coordinator to ensure this step is taken.					

4. Risk Assessments

Each monitoring station shall have an up to date risk assessment that covers, in detail, all health and safety risks associated with the site. This risk assessment should be reviewed and updated at least annually. Risk assessments shall include, but are not necessarily limited to the following:

- Adverse Weather (section 4.1).
- Slips, trips and falls (see section 4.2: also section 7 in relation to work at height).
- Driving and travel (see section 4.3).
- Fire hazards (see section 6 for fire extinguisher policy).
- Lone working (see section 4.5).
- Use of gas cylinders - please see section 0 of this guidance.
- Manual handling (see the HSE 'Risk at Work - Manual Handling' web page at https://www.hse.gov.uk/toolbox/manual.htm).
- Use of electrical tools and equipment.
- Substances hazardous to health (COSHH).' The HSE web page at https://www.hse.gov.uk/toolbox/harmful/coshh.htm provides guidance on how to carry out a COSHH assessment.
- Asphyxiation risk (see section 9.1).
- Equipment containing sources of ionising radiation (section 8).
- Site-specific risks (animals, water, machinery, personal safety etc.)

Risk assessments are specific not only to the monitoring site but also to each organisation, dependent on the organisation's equipment, staff, internal health and safety procedures, and responsibilities for work at the site. Therefore, each organisation shall have a risk assessment for every site that they attend or manage.

It is a good idea to use a standard monitoring site risk assessment as a starting point but the risks at each site will be different and therefore it is necessary to consider each site separately and generate a site-specific risk assessment for each site individually.

Risk assessments must be entered into the Health and Safety Database (see section 12.1) using the online form. This is the route by which this information is stored and disseminated. This can be done quickly and easily by any stakeholder with a user account. (Changes to risk assessments will need approval by Network Managers). A separate risk assessment is required for each organisation visiting each site, although you may complete a single risk assessment for multiple sites if the risks are the same at each site. Please see section 0 for further information on the Health and Safety Database.

An example risk assessment is given in section 4.7. This is neither exhaustive nor tailored to the individual site. Further guidance on specific risks is given below. Any moderate or higher risks must be communicated to the Network Manager (see

section 13) and the Ricardo Energy & Environment Project Health and Safety Coordinator – again, this is currently done via the Health and Safety Database.

If you are at a monitoring site and discover a substantial or intolerable risk, leave the site immediately and report the risk in accordance with the cascade procedure in section 0.

4.1. Adverse Weather

It may be necessary to visit a monitoring site, or carry out tasks such as sample changeovers, at any time of year. The likelihood of an accident, such as a slip, trip or fall, is increased in adverse weather. We make the following recommendations to eliminate or reduce the risk:

- If the weather conditions are such that you feel your personal safety is at high risk, please do not attempt to start or continue planned work. Site operators shall notify the Network Contractor when this situation occurs.
- Make sure you wear suitable warm/waterproof clothing and stout footwear for the weather likely to be encountered on site. If a long site visit is anticipated, take some refreshments.
- In hot weather, take plenty of drinking water with you.

4.2. Slips, Trips and Falls

- Wear appropriate footwear for the location and task in hand.
- At walk-in enclosures, keep the interior tidy, and the floor free from trip hazards such as trailing wires.
- At urban sites, do not leave equipment on the pavement where it could be a trip hazard to the public.
- Deal with any spillages promptly to avoid a slipping hazard.
- Notify the network manager if the floor of the enclosure interior is becoming damaged or deteriorated: this could be a trip hazard.
- Take care in the area around the monitoring station, particularly if the ground or pavement is uneven. Inform the Network Manager of trip hazards in the immediate surroundings.
- Notify the Network Manager where access to the site is found to be defective or unsafe.
- Please refer to section 0 in relation to working at height and use of ladders.

Further guidance can be found on the HSE website, here: https://www.hse.gov.uk/toolbox/slips.htm .

4.3. Driving

Many contractors travel to the monitoring stations in vans or cars as opposed to public transport. Often this is necessary, due to the need to transport bulky equipment or gas cylinders. Driving is recognised as a risk, hence the following recommendations are made to reduce the likelihood of an accident.

It is the driver's responsibility to ensure any vehicle is roadworthy before they use it. Do not attempt to drive the vehicle if there is any doubt of its roadworthiness.

- Make sure the vehicle you are driving is suitable for the purpose. The vehicle must have enough space to carry all equipment safely and securely. The vehicle must not be overloaded either at each axle or the gross weight. Consider the use of a 4-wheel drive vehicle if rough off-road terrain is likely to be encountered. Ensure you are familiar with the vehicle you plan to use.
- Make sure you have a full driving licence, ensure the vehicle being driven has a valid MOT, ensure that you adhere to the Highway Code and ensure that you have suitable insurance for driving to the sites.
- Check the weather reports and plan your journey time accordingly to ensure that any site work is not carried out in darkness.
- When equipment must be left unattended in the car, put it out of sight to reduce attention and reduce the risk of theft.
- Ensure the vehicle has sufficient fuel for the journey.

4.4. Accident Reporting

All accidents, incidents or near misses whether or not an injury has occurred must be reported to the Network Manager. This will be in addition to any other reporting arrangements that you may have yourself. A near miss at your site could be an accident at another, prevention is better than cure.

Any related risks must be added to the Health and Safety Database (see section 12 for information on this). Any risks of sufficient magnitude to raise the monitoring station's overall risk level to 'high' will generate an automated warning email to all potential visitors to that site.

4.5. Remote Locations/ Lone Worker

Some network's monitoring sites are located in rural and remote areas of the UK. Lone working in remote areas could present problems where illness, accident or personal physical attack occurs. The probability of any of these occurring is low but the following recommendations are made to further reduce the risk.

It is strongly recommended that any person with a recognised medical condition, which could put them at greater risk; should consider whether they are suitable for carrying out the work, or whether any special precautions need to be taken.

Where lone working is involved the site operator must ensure that the risk assessment addresses the following points and has suitable controls in place to mitigate the risks:

- Inform someone when you are going to site and how long you expect to be. Be aware of how to summon assistance if needed.
- Take a charged mobile phone with you; if going to an area where signal coverage may be poor, be aware of where the nearest landline is located. Where needed,

and if practical, you might choose to make regular phone calls back to the office, e.g. every hour.

- Take a personal alarm. Check the batteries regularly. Please note that it is sometimes possible to call 999 from a mobile phone even if your provider has no network coverage as other networks may have coverage and can be used for 999 calls.
- Consider the use of personal GPS-based personal alarms.
- Avoid carrying any other valuables.
- Carry out site visits during daylight.
- Make sure suitable first aid arrangements are in place;
- Make sure you have access to suitable work equipment consistent with the requirements of lone working;
- You should have received suitable training for lone workers;
- Emergency response arrangements should be in place and all lone workers be aware of them.
- There should be an emergency action plan in place, i.e. the means of following-up a site visit if the person undertaking the visit does not return within the prearranged time. For example, if your office or home is some distance from the site you could arrange to alert someone closer to the site to go and check, such as an estate/reserve ranger.

4.6. Indicating Silica Gel

The indicating silica gel found in zero air scrubbers should all be of the orange type. There should be no blue silica gel at any AURN sites: this was phased out some time ago, as the blue colour (cobalt chloride) is considered harmful. If you find any blue silica gel, it must be disposed of as hazardous waste. If this is found on site contact your Network Manager who will be able to assist with the disposal.

The dust from silica gel is hazardous. There should normally be no need to handle silica gel. However, if any silica gel is spilt, (for example, if a zero air scrubber is broken) do not attempt to deal with it but contact the ESU. Also please let the CMCU know.

4.7. Risk Assessment Example

Risk	Cause (these may not all be applicable)	Countermeasure in place (refer to PPE, protocols, training, routine checks, provision of first aid kits, emergency procedures, equipment safety checks, fire extinguishers etc)	Likelihood	Impact	Rating (likelihood x impact)	Extra actions required
Fire hazards/ explosions	Gas cylinders, arson, presence of litter, faulty electrics					
Lone worker accidents	No access to mobile phone, certain medical conditions					
Accident during travel to/ from site	Road traffic accident, driving when tired, during bad weather conditions					
Fall from height	Inappropriate ladder, no guard rail, slippery surface					
Slips and trips	Untidy site, trailing wires, spillages, inappropriate footwear					
Manual handling	Lack of training, moving heavy or bulky items, lack of equipment or PPE					
Electrical accident	Degradation of wires, incorrect wiring, ingress of water					
Working with hand tools	Lack of PPE or training, faulty, old or badly maintained equipment					

Risk	Cause (these may not all be applicable)	Countermeasure in place (refer to PPE, protocols, training, routine checks, provision of first aid kits, emergency procedures, equipment safety checks, fire extinguishers etc)	Likelihood	Impact	Rating (likelihood x impact)	Extra actions required
Personal safety/security	Theft and personal assault					
Accidents due to bad weather	Icy, wet or windy conditions					
Site specific risks	Presence of animals, watercourses, insanitary rubbish, presence of substances hazardous to health, leaky gas cylinders, asbestos, chemicals.					
General health and safety	Tiredness, lack of concentration, noise, cramped site					
Unsafe structure of building	Damage by vandalism, falling trees, traffic accidents, weather, general degradation					
Risks to members of the public	Equipment left on pavement					
Oxygen depletion risk	Accidental venting of nitrogen balance gas cylinder causing low oxygen levels in monitoring station cabin.					

Likelihood	Impact	Rating
Highly Unlikely (1) Unlikely (2) Likely (3)	Slightly Harmful (1) Harmful (2) Extremely Harmful (3)	Trivial (1) Tolerable (2) Moderate (3) Moderate (4) Substantial (6) Intolerable (9)

5. Electrical Safety Testing

The Electricity at Work Regulations 1989 (EaWR) require precautions to be taken against the risk of death or personal injury from electricity in work activities. Electrical safety testing at monitoring stations is one element of complying with these statutory requirements. This is covered under two separate requirements; the need for the fixed electrical circuits to be tested for integrity and safe operation, and In-Service Inspection and Testing of electrical equipment. This includes PAT but also user checks and formal visual inspections such as those specified in the PPM (planned preventative maintenance) requirements. For Environment Agency owned sites these are organised by the Network Manager.

At sites owned and fully funded by the Environment Agency, it is the responsibility of the Lead Network to arrange both Fixed Installation Testing and In-Service Inspection and Testing of electrical equipment. This is usually carried out by the ESU. Electrical safety inspections of all monitoring equipment are undertaken on a regular basis during site servicing.

At affiliated sites, the individual site owners are responsible for making suitable arrangements for compliance with the EAWR for the management of their own asset. The owner of the affiliated site is responsible for Fixed Installation Testing (unless otherwise agreed). Where EA equipment is installed in, or connected to, the affiliated asset then the Lead Network shall ensure that the affiliated site meets the requirements of the EAWA for the interfaces relevant to the EA's assets. The Lead Network shall arrange for In-Service Inspection and testing of electrical equipment owned by the EA as above.

Where Local Authority-owned equipment is installed at an otherwise EA/DA’s funded site, it is the owner’s responsibility to arrange electrical testing of the equipment not covered by EA funding. The Lead Network must ensure that no Local Authority-owned equipment remains connected to the EA owned asset in the event that there is no in-date valid certification for the equipment.

5.1. Fixed Circuit Testing

Fixed circuit electrical testing is a requirement under the Electricity at Work Regulations 1989 (EaWR) with the testing regime described in IET Wiring Regulations 18th Edition (BS7671:2018). The recommended frequency of testing for installations such as those used for air quality monitoring stations is three (3) years, (note: the periodicity of in-service inspections and fixed electrical circuit testing is to be determined by the site owners and therefore different rules may apply for affiliate sites). EaWR states:-

- All systems shall at all times be of such construction as to prevent, so far as is reasonably practicable, danger.
- All systems shall be maintained so as to prevent, so far as is reasonable practicable, such danger.
- Every working activity shall be carried out in such a manner as not to give rise, so far as is reasonably practicable, to danger.

- Any equipment provided under these Regulations for the purpose of protecting persons at work on or near electrical equipment shall be suitable for the use which it is provided.

The Health and Safety Executive (HSE) recommends that to comply with the regulations, an inspection and testing programme should be undertaken at all places of work. Periodic inspection and testing is necessary because all electrical installations deteriorate due to a number of factors such as damage, wear, tear, corrosion, excessive electrical loading, ageing and environmental influences.

5.2. In-Service Inspection and Testing of equipment

The 'Inspection and Testing of In-Service Electrical equipment', forms part of the compliance processes required of the Electricity at Work Regulations 1989 (EaWR).

The Health and Safety at Work Act 1974 puts the duty of care upon 'duty holders' which applies to both the employer and the employee to ensure the safety of all persons using the assets. Provision and Use of Work Equipment Regulations 1998 states that every employer shall ensure that 'the result of an inspection made under the regulation is recorded and kept until the next inspection'. The combination of these regulations applies to all electrical equipment used in, or associated with, places of work.

The IET Code of Practice Inspection and Testing of In-Service Electrical equipment states that all equipment in an installation, whether permanently connected or connected to a plug and socket, should be inspected and tested in accordance with the recommendations contained within the code. Equipment types, which includes portable appliances, transportable equipment (moveable), hand held equipment, stationary equipment or IT equipment, fundamentally all electrical equipment that is not part of the fixed electrical installation.

Guidance is available on the frequency at which the tests shall be performed. For equipment used in EA and Devolved Administration monitoring stations, the maximum recommended period between tests has been set at 12 months with the exception of Inspection of hand held tools and equipment which is 6 monthly.

6. Fire Extinguisher Policy

If you discover a fire at a monitoring site you must evacuate the site as quickly as possible and keep a safe distance away while you alert the emergency services and local residents (if there is any risk that the fire or smoke might spread to neighbouring buildings where people are present). You should only tackle a fire if you feel it is safe to do so and so that the extinguisher can be used from outside the monitoring station at a safe distance from the fire, or if a fire hinders your exit. Fire extinguishers shall be provided at monitoring sites as follows:

- CO_2 extinguishers at all stations where a person can enter inside.
- CO_2 extinguishers at all other sites which have the potential to cause adjacent structures or nearby premises to set alight.

There is no requirement for extinguishers to be installed in remote locations. Remote locations are places that could be defined as being far from any centre of population and with no other structures in close proximity.

In addition, there is no requirement for an extinguisher to be provided at small roadside cabins where a person cannot gain entry into the monitoring station.

7. Working at Height

The PM_{10} and $PM_{2.5}$ monitoring instruments used in the AURN have inlets which require periodic cleaning. The LSO will usually need to use steps or a ladder to access the inlet for this purpose. This work is covered by the Work at Height Regulations 2005. ('At Height' is defined as a place where a person could be injured falling from it, even if it is at, or below, ground level.)

The information below is adapted from the AURN Health and Safety Bulletin on working at height, available on the AURN Hub and the Health and Safety Database.

The hierarchy below is used for managing and selecting equipment for working at height:

- AVOID working at height where possible.
- PREVENT falls using appropriate access equipment.
- REDUCE the impact. Where equipment or other measures cannot eliminate the risk of a fall, use appropriate equipment to minimise the distance and consequences of a fall should one occur.

Ladders shall be used only in the following situations:

- Work duration is a maximum of 30 minutes.
- Work is 'light' carrying no more than 10 kg up the ladder.
- Where three points of contact can be maintained at the working position – where this is not possible other measures will be required to prevent a fall or reduce the consequences of one.

7.1. Ladder Safety

The following guidance should be followed when using a ladder:

- Do not overreach – your navel should remain inside the stiles and both feet should be on the same rung
- Don't overload it – consider workers' weight and the equipment or materials they are carrying.
- Avoid holding items when climbing – Consider using a tool belt or other means of securing items
- Do not use the top three rungs of the ladder
- Ladders being used to access the roof of the cabin shall be 1m above the landing point of the roof and shall be secured. Make sure the ladder is long enough and high enough to reach.
- Only use a ladder on firm ground, where the ground is not firm use a board to spread the load. Ensure the ladder rungs are level before stepping onto the ladder.
- Always grip the ladder and face the ladder rungs while climbing or descending.
- Ensure the surface the ladder is placed on is clean (no oil, moss or leaf litter) and free of loose material (sand, packing material) for the ladder feet to grip.

- Secure the ladder either through fixing the ladder to a suitable point (such as ladder anchor bolts positioned on the housing)
- If the ladder cannot be secured then the ladder should be ‘footed’ by another person – this should be a last resort and should be avoided where possible.
- Ensure that the ladder will not be pushed over by opening doors or pedestrians, or cause obstruction to pedestrians.
- Ladders shall be placed at the correct angle of 75° - 1 unit out for every 4 units up.
- Do not rest ladders against weak surfaces such as glazing or plastic gutters.
- Never attempt to dismantle or repair a ladder.
- Keep the ladders at site clean. Following use, wipe with a dry cloth and remove contaminants.
- Prior to using a ladder at any air quality monitoring site, the individual must ensure that they have received training appropriate to the task and equipment use from their employer. If requested to use a ladder without having received the appropriate training from your employer, please notify CMCU and do not undertake the work until training has been provided.
- Any new ladder supplied by CMCU must conform to BS EN 131 and will be issued with a set of manufacturer user instructions. Prior to use the individual must read the instructions.
- If issued with a new ladder from CMCU then you must inspect it before first use. Record the inspection of the new ladder using the Ladder Pre-use Inspection Checklist which is to be kept on site and completed by the user prior to use. The QAQC team will audit ladder records to check the ladder check lists are available and being used when visiting monitoring sites.
- Prior to each use the individual is required to complete a dynamic ‘take two’ risk assessment which includes the completion of the Ladder Pre-use Inspection Checklist. Should the Take Two assessment identify an unsafe condition then the individual shall stop work and report the condition to their employer and CMCU.
- In addition, if during use the ladder is dropped or an event happens which may impact the ladder working safely then a further pre-use check must be completed. If any damage is found or the ladder is not working correctly then do not use it and report to CMCU.

A detailed visual inspection is completed every 6 months on ladders at all fully funded sites by the Equipment Support Unit and records of the inspections are held by CMCU. In addition, a ladder tag is installed on each ladder confirming when the next inspection is due. Should an individual notice that a ladder tag is missing then notify CMCU prior to use.

7.2. Additional Note on Telescopic Ladders

- Refer to manufacturer user instructions prior to use, if not available then contact CMCU.
- Always check that all opened rung sections are locked before you climb the ladder – checking all locking catches.

- Do not put your hands on or between the rungs when you are unlocking and closing the ladder. Close each rung section carefully.
- The ladder must be wiped clean including removing any moisture before being closed.
- Ensure that the ladders are stored completely closed.
- The ladder must not be used without the rubber feet and end caps in place.

The Health and Safety Executive (HSE) has published guidance on safe use of ladders which is available online at http://www.hse.gov.uk/pubns/indg455.pdf.

7.3. Ladder Anchor Bolts and Ratchets

An assessment was carried out in early 2020 at all air quality monitoring site which require the use of a ladder. It concluded that all ladders, when in use, shall be secured with ratchets straps fastened to ladder anchor bolts, which have subsequently been installed in the air quality monitoring cabins. Ladder mats have also been provided to negate issues at sites where the ground is uneven. Please notify your network manager if your ladder mat needs replacing.

These safety measures are now a requirement if you are using a ladder to access the roof of the cabin regardless of the amount of time you will be using the ladder.

Guidance on how to use ladder anchor bolt and ratchets has been produced and your Network Manager shall provide you with this guidance as well as training material including a video, instruction document and an aide memoire to be placed on site.

7.4. Working on the Cabin Roof

In the majority of cases there will be no need to access the cabin roof: all work can be done from a ladder. At a small number of AURN sites (London Marylebone Road, Manchester Piccadilly, Chilbolton Observatory, Plymouth Centre and Southend on Sea at the time of writing), work on the cabin roof is sometimes required. These sites have one or both of the following (as necessary) in place:

- Guard rails to prevent falls from the roof. These must fully meet the requirements of the Work at Height Regulations which include a main guard rail 950mm above the roof surface, one or more lower intermediate guard rails positioned so that there are no gaps greater than 470mm, and some means of preventing a person or objects falling under the lowest guard rail.
- A fall prevention system to prevent falls off the roof or from the ladder. This must be in good condition, tested annually. (At Chilbolton there is a fall arrest system which potentially leaves the person hanging in the event of a fall: procedures are in place for rescue should this happen. Lone working on the roof at this site is not permitted).

For all sites where roof access is required, site-specific procedures are in place and must be observed. Please contact the lead Network Manager for further information.

Getting on and off the roof is a major area of risk, please ensure the ladder is secured. Be mindful of the roof becoming fragile over time: check the roof surface is safe before stepping on it.

7.5. Points to Consider

- **Weather** - review undertaking work at height in weather conditions such as strong or gusty winds or slippery conditions (ice, snow, rain). Should the weather conditions endanger health or safety then the work shall be postponed.
- **Inspection** - before undertaking any work at height the equipment to be used and the surfaces shall have a visual inspection to check for visible defects such as missing or loose parts.
- **Maintenance** - ensure ladders are kept clean, particularly the feet to ensure good contact with the ground.
- **Falling Objects** –When undertaking work at height it is necessary to do all that is reasonably practicable to prevent anything from falling.
- **PPE** - ensure correct footwear is worn whilst on site such as safety shoes or boots. The laces shall be tied. Shoes shall be clean and free from mud or other slippery contaminants.
- **Emergency Rescue** - consideration shall be given to emergency rescue should there be an incident.

8. Instruments Containing Sources of Ionising Radiation

Two instruments used in the monitoring networks covered by this document contain sources of ionising radiation:

1. The Beta Attenuation Monitor, used in the AURN.
2. The Scanning Mobility Particle Sizer (SMPS), used in the Particle Numbers and Concentrations Network (PNCN).

All instruments containing such sources must have the appropriate Environment Agency or SEPA documentation, and copies must be made available to all authorised persons e.g. LSOs and ESUs. The appropriate warning signage must be present on the instrument and not be removed.

All instruments containing sources of ionising radiation must be kept in secure buildings or monitoring station enclosures. Depending on the type of source further security may be needed, for example regular 'presence checks' to ensure the instrument has not been stolen or removed. (Some SMPS instruments have a daily 'presence check'). The Environment Agency and the Network Manager must keep accurate and up to date records of exactly where each relevant instrument is.

8.1. The Beta Attenuation Monitor

The Beta Attenuation Monitor (BAM) is one of several instruments used in the AURN for monitoring ambient concentrations of PM_{10} and $PM_{2.5}$ particulate matter. The BAM contains a small, sealed source of beta radiation (carbon 14, or 14^{C}). This is the source of the beta particles used in the measurement process.

Carbon 14 is a radioactive material and is therefore dangerous if it gets inside the body (if swallowed, inhaled or absorbed through the skin). That is not a risk here, because the source is sealed and safely contained inside the BAM. For this reason, you must not attempt to access, modify or remove the BAM's sealed beta source for any reason.

It has been found that, when the door of the BAM's case is open, a detectable amount of beta radiation may emerge from the BAM, through the slit between the tape and the source, probably having been scattered by the tape and the material on it.

Beta radiation consists of fast moving electrons. The beta radiation from 14^{C} is of relatively low energy; it cannot penetrate through the case of the BAM, can only travel around 22cm through air, and – most importantly - cannot penetrate even the outer layer of your skin.

However, it is known that direct exposure of the lens of the eye to beta radiation can increase the risk of developing the eye condition of cataracts (where the lens becomes opaque). This is a known risk for people whose eyes are directly and frequently exposed to beta radiation (such as health professionals regularly carrying out certain medical imaging procedures), and there exists an occupational exposure limit specifically for the lens of the eye.

When carrying out BAM maintenance tasks such as nozzle cleaning or tape changing, the operator will have the door open and may have their eyes close to the tape slit. While it is currently our understanding that any risk is very small, (because of the low energy of the beta radiation, and because such tasks are infrequent and do not take long), as a precaution we are recommending that safety glasses are worn when carrying out such tasks. Beta particles will not be able to pass through the plastic material they are made of.

Therefore, the following recommendations apply to Local Site Operators and others who carry out work on a BAM1020 that involves opening its door:

1. You are reminded never to attempt to access, modify or remove the BAM's sealed beta source for any reason.
2. It is recommended to wear safety glasses when working on the BAM 1020 with its door open. As well as offering more than adequate protection for the extremely small risk of any long-term eye damage from exposure to radiation the beta source, this will also minimise any other risk of eye injury from other maintenance activities such as cleaning nozzles.

Safety glasses are already provided at all AURN monitoring stations that have BAMs (because they are necessary for other work at the sites). BAMs are a safe method of measuring particulate matter and the above is an additional safety recommendation from Radiation Protection Advisors in the UK. QAQC Unit (in their role as Health and Safety Co-ordinator) would be happy to answer any questions or concerns you may have.

For work with one BAM unit, the Ionising Radiation Regulations 2017 (IRR 17) regulations do not apply. If working with more than five units, the radiation source limit on five units qualifies under the IRR 17 Regulations. The Environment Agency's Radiation Protection Advisor (RPA) has provided the following advice for AURN stakeholders to follow, given considerations from the HSE as to how the IRR 2017 regulations apply to the AURN network:

1. As the owner of the instruments, the Environment Agency shall provide some information from their RPA about the device and how to handle it safely, with advice about what to do should it get broken. This information shall be passed to the subsequent sub-contractors so that they too are aware of the hazard. This information shall be passed onto subsequent 'second tier' sub-contractors.

   If you deal with a BAM and have not had safety training, then please contact your CMCU to arrange this.

2. If five or more devices, at activity 2.2 MBq per device (5 x 2.2 MBq >10 MBq Sch7 Part 1, col 3, value in total) are in storage and within the control of the CMCU, then the CMCU shall provide the Notification (and Register as each source is calculated as being over the activity concentration 104 Bq/g (Given: activity is 2.2MBq with assumption that source mass is <220g).

   This has been done by each Management Unit and it is the Management Units' responsibility to keep this up to date.

   All employers/subcontractors involved with work involving the AURN BAMs are required to register and comply with IRR17 regulations. However, this excludes

the Environment Agency, because although in most cases they own the BAMs, they do not actually work with them.

3. ‘Second tier’ subcontractors who work with BAM’s can work with work under the advice from the primary sub-contractor if this is contractually agreed.

8.2. The Scanning Mobility Particle Sizer

The SMPS is used by the Particle Numbers and Concentrations Network (PNCN). At the time of writing, the SMPS is present at only three sites in this network: Chilbolton Observatory, London Marylebone Road and London Honor Oak Park. (All three sites are also part of the AURN and some other networks).

The risk to anyone entering the monitoring station but not directly dealing with the SMPS instrument is negligible, and no additional precautions are required.

If the SMPS instruments need to be accessed by anyone other than the PNCN managers or trained LSOs then contact NPL (using the contact details provided to LSOs etc.) for source and permit information.

There is an Environment Agency permit in place for these instruments due to the Radiation Source in the instrument; the IRR 2017 regulations also apply, so it is important that the PNCN Network Manager (currently NPL) is notified before attending to the instrument, and that the site rules put in place to comply with the Permit and IRR 2017 regulations are followed.

(Please note also that the SMPS uses butanol).

9. Regulators and Gas Cylinders in the AURN

The use of the regulators and gas cylinders in the AURN are managed by the relevant CMCUs, the QAQC team and the Standard Gases contractor to minimise risks, with relevant guidance within the LSO manual for safe practice.

Gas regulators are replaced or refurbished every five years as per the British Compressed Gases Association (BCGA) guidance.

9.1. Gas Asphyxiation Risk

The nitric oxide (NO) gas cylinders used at AURN sites for calibrating NOx analysers, and the VOC calibration cylinders at the Automatic Hydrocarbon Network sites, contain small concentrations of the relevant gas (e.g. nitric oxide, NO), with the remainder ('balance') of the cylinder contents being nitrogen (N_2). Cylinders containing this type of gas mixture are called 'nitrogen balance' cylinders. In the very unlikely event that a nitrogen balance cylinder releases its contents in the confined space of a walk-in AURN enclosure, this could result in dangerously low oxygen levels in the enclosure. For anyone working in, or entering, the enclosure under these conditions, it could result in death from asphyxiation (lack of oxygen).

It is emphasised that this is a very low risk. However, given the severity of the consequences, (i.e. potential for fatality) the following updated instructions have been issued to LSOs, ESUs and others carrying out work in the enclosures of AURN monitoring stations, or in rooms where the gas cylinders are housed. These apply to all AURN monitoring stations where this risk exists (i.e. where it is possible to walk into the enclosure/room and where nitrogen balance cylinders are present), and to all visitors. This risk does not apply at small roadside cabinet type enclosures, which are too small for a person to enter.

A list of the sites where ventilation improvement work has been done is available at the AURN hub - Login to AURN Hub- Defra, UK

9.1.1. External Store:

The ideal option for managing the asphyxiation risk is to store the cylinders in one of the following:

1. an external gas cylinder store which is outside of the walk-in cabin (e.g. a separate compartment fixed to the outside wall), or

2. a separate cylinder storage compartment within the cabin, but sealed off from it, and with passive ventilation so that any escaping gas is vented outside and not into the main cabin.

Where the gas is stored in this manner, there is no recommendation to undertake additional measures to manage the asphyxiation risk.

A list of the sites with sealed-off cylinder stores is kept on the AURN Hub. Please note that the VOC cylinders used in the Automatic Hydrocarbon Network are temperature-sensitive and cannot be kept in external cylinder stores.

9.1.2. Cabins / Rooms where Cylinder is Present:

- An asphyxiation warning sign must be displayed on the outside of the enclosure.
- The Environment Agency will install a low oxygen level sensor and alarm, in the cabin. A list of all sites with low oxygen alarms is on the AURN Hub. Do not enter a site when the alarm is on, but contact your network manager. If you believe the alarm is faulty, please follow the guidance below and leave the door open for at least ten minutes to ventilate the enclosure, before entering.
- When entering an AURN monitoring station with a walk-in enclosure, all users shall leave ten minutes as an absolute minimum from opening the door to entering, to ventilate the area and minimise any risk of oxygen depletion. This will allow oxygen levels to return to a safe level in the event a N_2 cylinder[1] venting its contents taking into consideration variables such as weather conditions, the size of the cabin and gas bottles used on site.
- After ten minutes, enter the cabin: but whilst undertaking work within the cabin, the door must be left fully open as sufficient ventilation is required in case of a release of nitrogen balance gas from gas cylinders stored within the cabin. If the door is going to be closed the user must have sufficient ventilation or risk management via other means, to mitigate the risk of creating a confined space within the air quality cabin.
- If the gases are stored in a gas cylinder store area which is not sealed off from the main cabin, this gas cylinder store door shall be left fully open instead, as the cabin and gas store area are linked air spaces.
- If any symptoms such as nausea, shortness of breath or higher heart rate occur or any sound of gas escaping is heard, then all users shall vacate the cabin as quickly as possible, even if the door is open.
- Based upon advice from BOC (the AURN gas supply contractor) who have examined the risk further, the Environment Agency has made the recommendation for employers to consider: *"Personal oxygen monitors should be part of the personal protective equipment (PPE) for any employee planning on entering or working in the cabins."* It is therefore recommended that employers provide their employees with a personal oxygen monitor, and that employees use these while working at AURN sites with walk-in enclosures and cylinders present.

9.2. Cylinder Storage

All cylinders must be supported securely during storage and use at all times. They shall be strapped to a suitable support and never left unsupported. This is especially important because the regulators are left in place.

The cylinder storage area shall be correctly labelled with the appropriate warning labels. The provision of safe cylinder storage facilities is the responsibility of the

[1] Testing completed in 2020 was undertaken with a L50 N2 cylinder. The cylinder was left to vent for 30 minutes with the door closed. Once the door opened it took 5 minutes for the oxygen levels to return to a safe working level. Testing completed at Newcastle Centre and Hull Freetown.

CMCU or Management Unit. Safety data sheets for the supplied gases are given in Appendix C of this document.

9.2.1. Safety When Changing Cylinders

When an empty cylinder is replaced, the LSO will need to remove the gas regulator and replace it on the new cylinder. Although this is a simple procedure, compressed gas can be dangerous, so the Network's QAQC units will provide training to ensure it is carried out safely. Always wear safety glasses when changing cylinders and regulators.

As well as the potential hazards associated with compressed gas, the cylinders are heavy. Take great care when handling cylinders, which shall not be lifted.

10. Adequate Ventilation

Separate to the asphyxiation risk described above, many air quality monitoring stations are confined workspaces. A lack of adequate ventilation within a walk-in monitoring cabin could lead to a build-up of carbon dioxide (CO_2), which could be unhealthy or even dangerous for anyone working inside. Bureau Veritas undertook an investigation of the risks from working in a cabin, without sufficient ventilation: the report is available on the AURN Hub and the advice in this section is informed by their findings.

Before starting work at a monitoring site, for your own safety, please check that any 'fresh air' vents have not been covered, blocked or damaged.

A list of fully funded sites known to have inadequate ventilation is available on the AURN Hub, https://aurnhub.defra.gov.uk/login.php. The Environment Agency is working through a programme to install adequate passive ventilation grilles in all EA-owned monitoring stations to manage this risk.

All passive vents within Environment Agency owned cabins have been designed around 'single person occupancy' design calculations for safe carbon dioxide (CO_2) levels.

If more than one person is working in the cabin, then the passive vents are not designed to provide sufficient venting. The door should be left open.

If your cabin is still requiring increased ventilation, then the recommendation is to work with the door open at all times, as long as it is safe to do so.

11. Visitors to Monitoring Stations

Sometimes, people other than those listed in section 0 may need to visit a monitoring station. For example, visiting researchers from universities or other organisations. This section provides guidance on precautions that shall be taken to ensure these visitors stay safe.

The risks depend on the nature of the visit, and here we consider three common scenarios.

1. **Informative visits**. These are occasions when a guest – e.g. a journalist, visiting dignitary or a job applicant - is being shown around a monitoring station (indoors or outdoors), on a one-off visit, for informative purposes only. They are not undertaking any work at the site. A responsible person familiar with the hazards at the site (this could be e.g. the Network Manager, site owner, LSO or ESU) must 'host' the visit and:

- Carry out a risk assessment for the visit.
- Provide any necessary PPE such as safety glasses and a high visibility vest.
- Take reasonable precautions such as making sure the site is tidy and free from trip hazards.
- Brief the visitor on necessary safety precautions to be observed.
- Accompany the visitor at all times while at the monitoring station.

2. **Visiting researchers – outdoors**. These visitors are carrying out scientific work but this will not require them to enter the monitoring station or have any access to the monitoring instruments. Examples include the co-location of diffusion tubes or other samplers. All samplers are fixed to the inlet cage with temporary fixings e.g. cable ties, and no modification to the enclosure would be needed. The visitor may need to use steps or a ladder but would not need to go onto the roof.
3. Recommended minimum precautions are as follows:

- The visiting researcher must get permission from the Network Manager and site owner, providing an overview of the proposed research, what it will involve, how many visits they expect to make to the site and over what period.
- The visiting researcher must provide a suitable risk assessment for the work. The Network Manager shall satisfy themselves that the risk assessment is adequate for the purpose and all necessary information is captured. A responsible person (the Network Manager, site owner or regular LSO as appropriate) must make sure the visiting researcher is advised of the hazards at the site.
- The visitor shall observe any necessary safety precautions advised by the responsible person.
- The visitor must notify the responsible person in advance of each visit.
- The visitor is responsible for checking the safety of any ladder or steps they bring to the site.
- The visitor must carry a charged mobile phone with them to the site.

- The visitor must let a ‘buddy’ know that they are going to the site, and how long they expect to be there. They shall let their ‘buddy’ know when the work is completed and they are leaving the site.
- If the visitor notices any unusual risks they must report these to the site owner.

4. **Visiting researchers – indoors**. Rarely, a visiting researcher may need to carry out work within the monitoring station enclosure. For example, trialling a new type of automatic measurement technique by co-location with the reference method.

Because the visitor is going inside the enclosure, the risks are greater, due to the presence of electrical equipment, compressed gases etc. in a confined space. The risk assessment shall reflect this.

The permission of Defra, the DA or the Environment Agency must be obtained for work of this nature, as well as that of the Network Manager. Any modifications to the monitoring apparatus or enclosure also requires such permission. Studies of this type are usually substantial research projects, and the visiting researcher(s) would normally be working closely with the Network Manager and/or site owner, who may well be involved in planning the work.

All the precautions listed above for ‘outdoor’ visiting researchers apply. In addition;

- The Environment Agency, Defra or the DA (as appropriate), must give their permission for the work and be kept informed of progress.
- The Network Manager and site owner shall be involved with the planning.
- A specific check must be made that the visiting researcher’s planned activities will not interfere with the routine measurements at the monitoring station. (e.g. if butanol is used for particle sizing measurements, as at sites with a Scanning Mobility Particle Sizer (SMPS), the fumes must have a protocol for capture/removal so that they do not interfere with any volatile organic compound - VOC - measurements).
- The visiting researcher must provide a separate risk assessment for their planned activities, which the site manager shall review, approve and keep a copy of.
- All visiting researchers shall have a site induction at the beginning of their schedule of visits.
- The Network Manager (or other designated responsible person e.g. the regular LSO) must ensure that the visiting researcher is fully briefed about the risks they will encounter.
- Visiting researchers working inside the cabin or building must always be accompanied by either the Network Manager, site owner or LSO while doing so.

Please note that in addition to the above, there may be site-specific requirements in place; for example, the need to sign in and out at some sites on secure premises. These must be adhered to. Please also note that the precautions relating to the presence of gas cylinders, in section 0 of this document, must be adhered to by visitors.

The managers of the Particle Numbers and Concentrations network have requested the following be adhered to:

- All *new* visitors shall inform the lead Network Manager for the site and be accompanied by a trained site operative such as an LSO.
- All *repeat* visitors shall inform the lead Network Manager for the site so a judgement can be made if an escort is required.

12. Health and Safety Database

The Health and Safety Database is the route by which all risks, even short-term ones, are to be recorded and cascaded. The online form makes it easy to add, edit and remove risks.

This database has been developed to allow ESUs (Equipment Support Units), LSOs (Local Site Operators), Network Managers, site owners, Defra and the Environment Agency access to upload and download selected safety information including risk assessments. The database is available to the stakeholders in all EA-managed national air quality networks listed in section 1. The login page is at https://hnsdb.defra.gov.uk/site/ . The database contains the following information:

- Site details including
- Site name, site ID, site installation date, site owner and location
- Networks operating at each site
- Electrical test dates and electrical safety status
- PAT test dates
- Network Manager
- Special risks at each site
- Risk assessments
- An overall safety status (red/amber/green), based on the worst risks from all relevant risk assessments.

Safety information is uploaded to the database via online forms by the relevant contractors, and all stakeholders may view all information in the database. This is the main route by which information on all risks, even short-term ones, is communicated and disseminated.

Please note: this document is not intended to provide detailed guidance on how to use the Health and Safety Database. For that, please refer to the separate document – “UK Air Quality Monitoring Networks Health and Safety Database User Notes”. The latest version of these guidance notes can be downloaded from the Health and Safety Database itself. All users of the Health and Safety Database must familiarise themselves with the Database and how to use it.

12.1. Entering a New Risk Assessment

Before you enter a new risk assessment, you must request a login from Ricardo. See Figure 2.

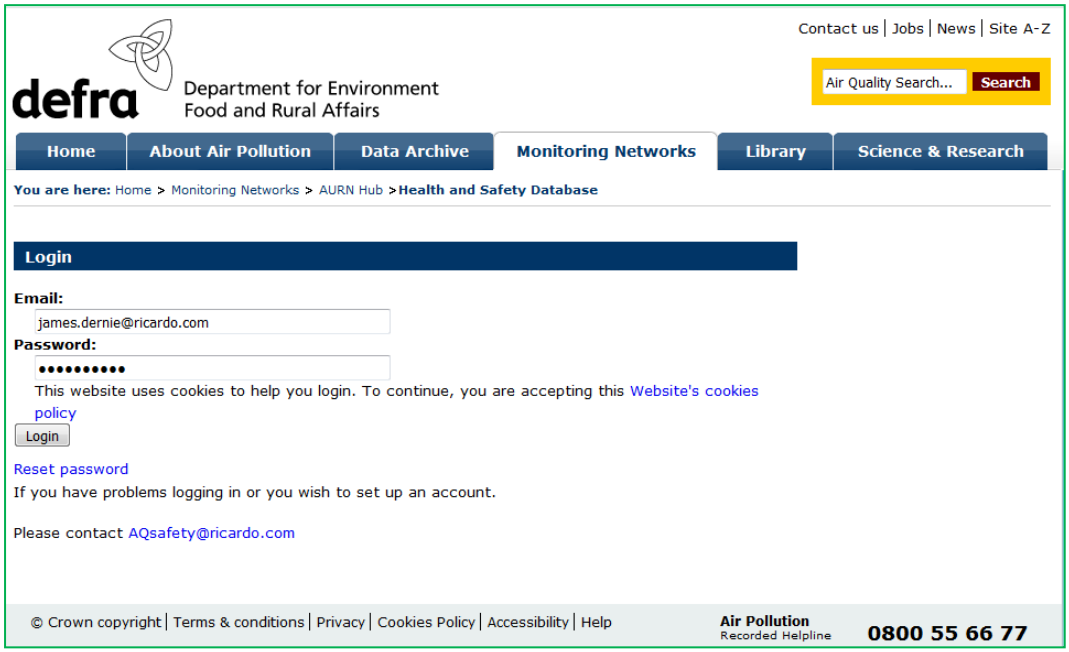

Figure 2 Health and Safety database login screen

Click ‘Upload New Risk Assessment’ see Figure 3

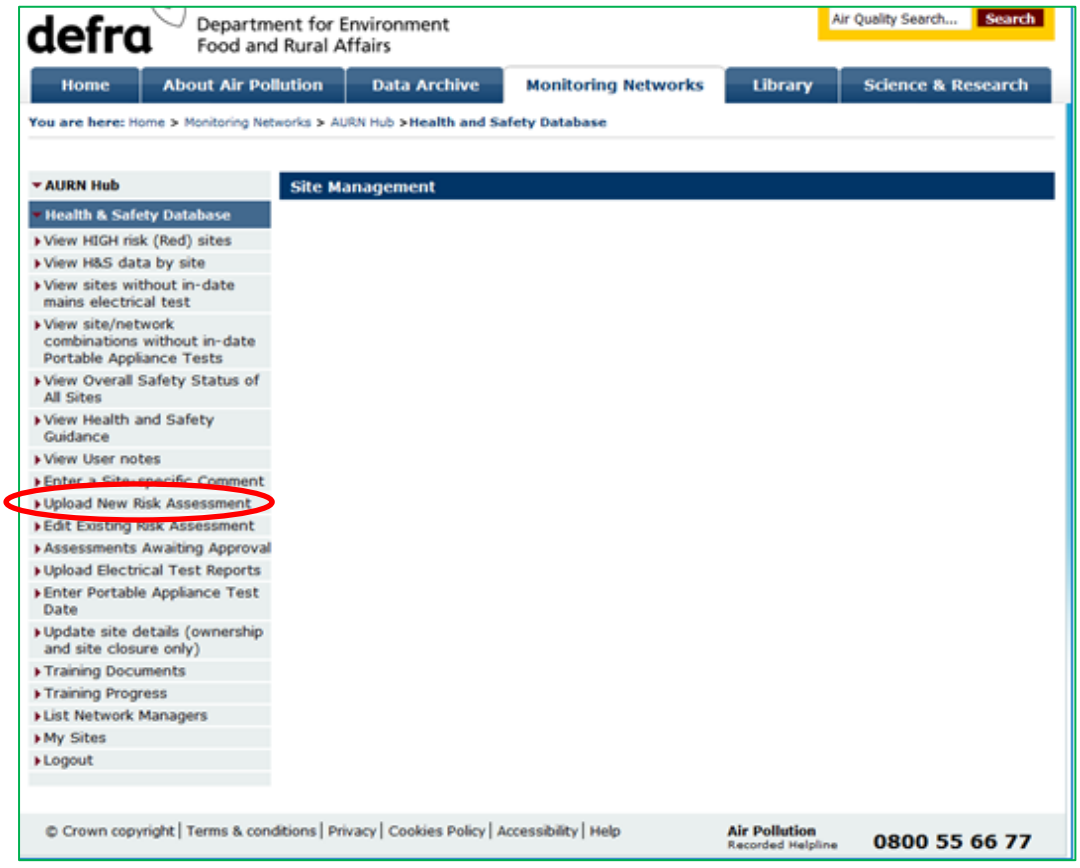

Figure 3. 'Upload New Risk Assessment'

- Use the dropdown menu and select sites, you need to select the appropriate network you wish to create a risk assessment for from the Network menu

- Then click the relevant site, choose Local Site Operator (LSO) from the 'Who does the risk apply to?' menu
- Choose the first risk you want to add and fill in the remaining cells.
- Once finished click the + button (bottom left) to add as many other risks as required then click submit assessment when finished. See Figure 4.
- A network manager will be required to approve the new risk assessment prior to it becoming visible on the H&S database; unless the overall risk rating for the site is 6 or more (High - Substantial). In this case the site will be automatically set to 'High' risk and a notification sent out to users of the H&S database that no site access is permitted.

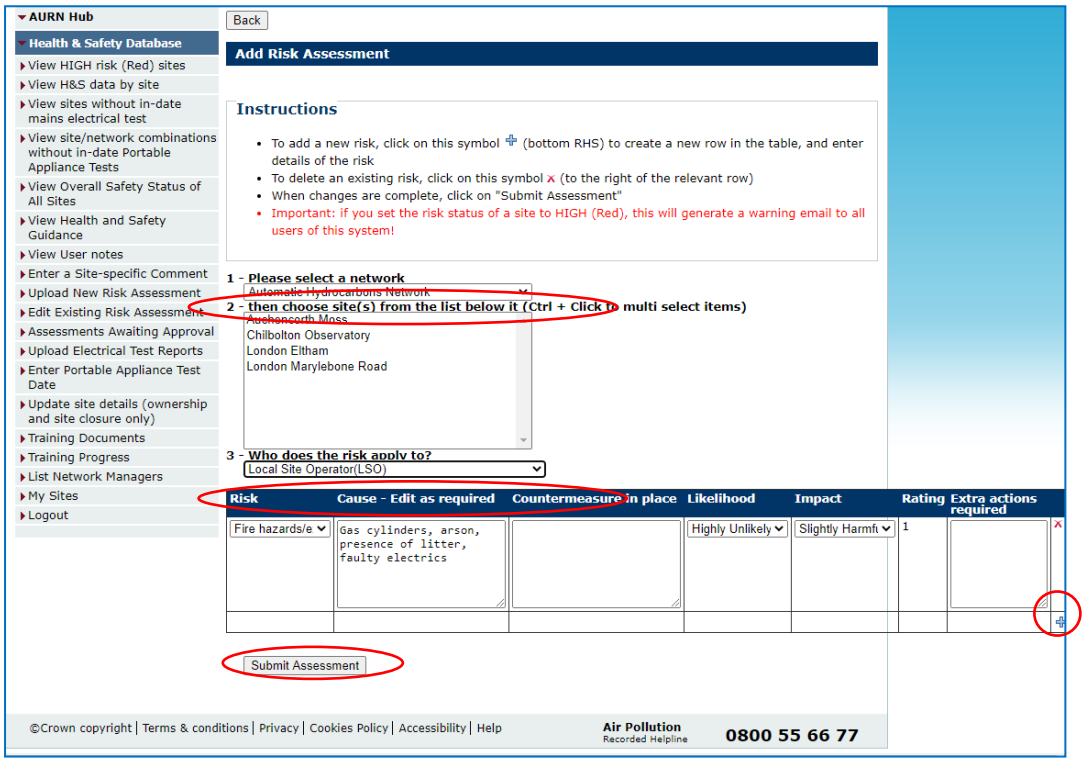

Figure 4 Choosing correct network and apply it to the LSO, then add new risks and submit

12.2. Editing an Existing Risk Assessment

Once a year (as a minimum) you need to edit your risk assessment. Access the Health and Safety database to login (Figure 5).

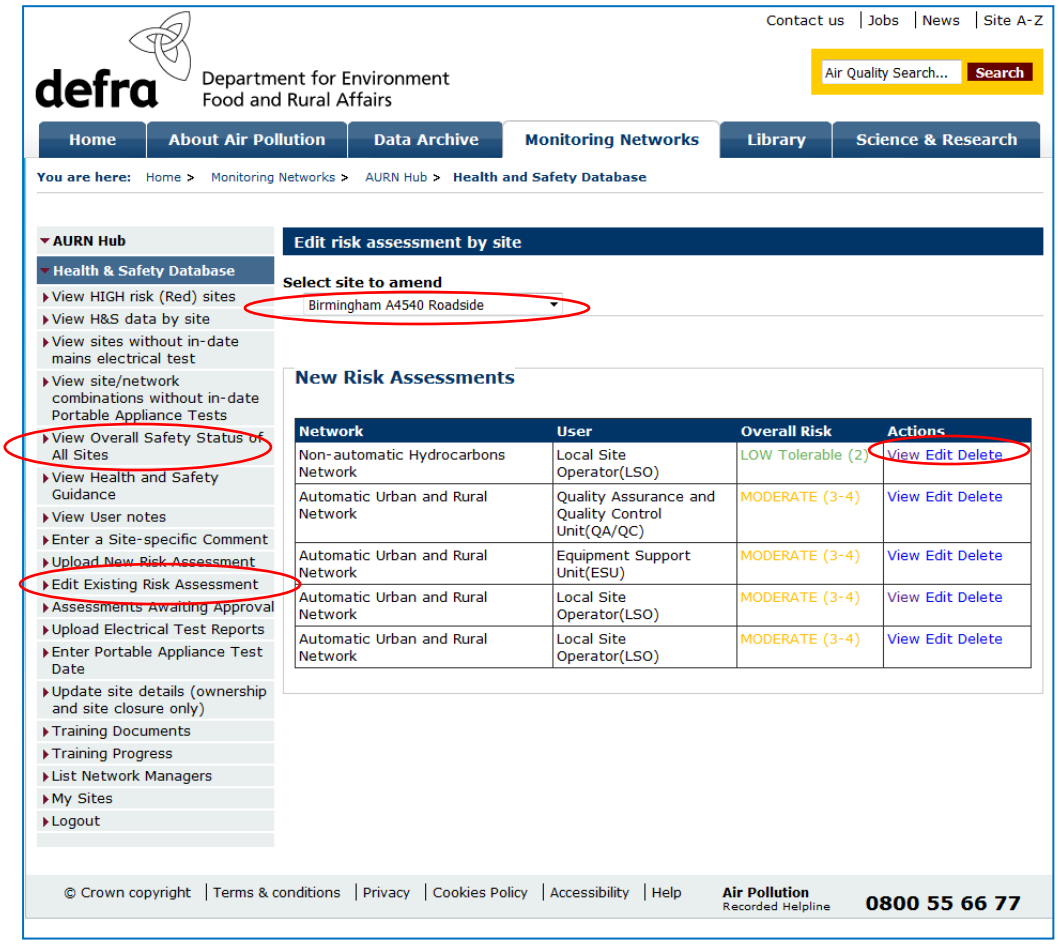

Figure 5 Edit an existing risk assessment

Click on Edit Existing Risk Assessment (RA) and choose the site from the dropdown box. Choose the Local Site Operator RA associated with the relevant network from and click on 'Edit' in the Actions column (**Error! Reference source not found.**).

You can either add a new risk by selecting the blue plus at the bottom of the table (Figure 6); or delete a risk by ticking the end column shown by the rubbish bin icon (Figure 5).

Once all changes have been made ensure that the 'submit assessment' button is clicked (Figure 6).

A network manager will be required to approve the changes prior to them becoming visible on the H&S database; unless the change increases the overall risk rating to 6 or more (High - Substantial). In this case the site's risk status will be automatically increased to 'High' (shown in red) and a notification sent out to users of the H&S database that no site access is permitted.

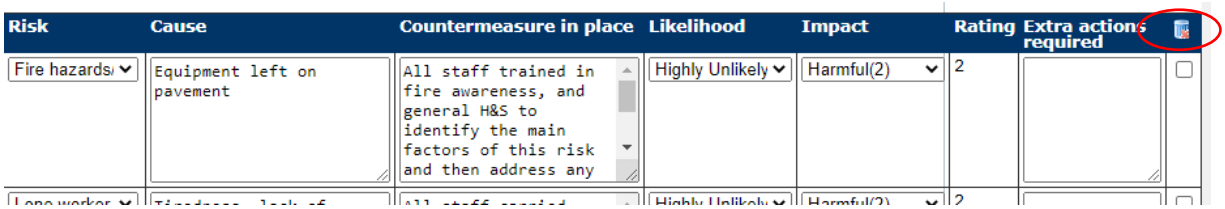

Figure 5 Delete Risk

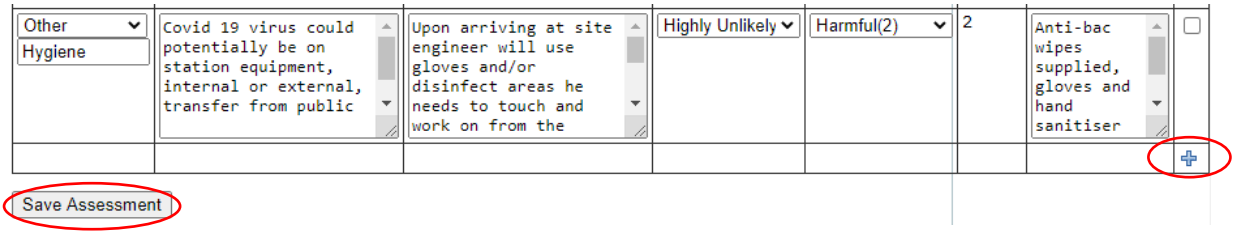

Figure 6 - Add New Risk and Save Assessment

13. AURN Contact Details

The Health and Safety Coordinator for the air quality monitoring networks covered by this document is Ricardo Energy & Environment.

Contact details for the Health and Safety Coordinator are as follows:

H&S Coordinator	AQSafety@ricardo.com	01235 753220

Contact details for EA Air Quality Network Manager for escalation of Health and Safety concerns on your network and for co-ordinating with other EA Network Managers are as follows:

AURN Network Managers

All team	Email	Phone
Samantha Britton	samantha.britton@bureauveritas.com	01841 540 584
Mandy Hinkley (H&S Support)	mandy.hinkley@bureauveritas.com	n/a
AURN Data Management Team	aurn.team@bureauveritas.com	07790800662 07870856369 07971109928 07436833030

EA Contracts Team Officers (as at October 2022 - subject to change)

All Team	AQmonitoringUK@environment-agency.gov.uk	03708 506 506
Rob Jones	robf.jones@environment-agency.gov.uk	02030 253096
Jon Brookes	jon.brookes@environment-agency.gov.uk	02077 142256
Mohammed Khan	mohammed.khan@environment-agency.gov.uk	02084748199
Danielle Tinker	danielle.tinker@environment-agency.gov.uk	02030254187
Pete Bloxsom	peter.bloxsom@environment-agency.gov.uk	n/a

Note: Contact details for all other networks are included in the relevant LSO manuals.

Appendix A: Health and Safety Legislation

- This section lists the most important health and safety legislation which is relevant to work at air quality monitoring stations, with links to where this can be found online (at the time of writing).
- The Health and Safety at Work etc. Act 1974: available online at www.legislation.gov.uk/ukpga/1974/37/introduction. Further guidance is provided by the Health and Safety Executive (HSE) website: the relevant page is at www.hse.gov.uk/legislation/hswa.htm.
- The Health and Safety (First-Aid) Regulations 1981: available online at www.legislation.gov.uk/uksi/1981/917/introduction/made. The Health and Safety Executive (HSE) website provides an overview of these Regulations at www.hse.gov.uk/pubns/books/l74.htm .
- Electricity at Work Regulations 1989 (EaWR): available online at www.legislation.gov.uk/uksi/1989/635/introduction/made. The HSE provides an overview at http://www.hse.gov.uk/pubns/books/hsr25.htm.
- Manual Handling Operations Regulations 1992 as amended by the Health and Safety (Miscellaneous Amendments) Regulations 2002: the 1992 Regulations are available at www.legislation.gov.uk/uksi/1992/2793/introduction/made, and the 2002 Amendment document at www.legislation.gov.uk/uksi/2002/2174/introduction/made. The HSE provides a free guidance document (aimed primarily at employers, managers and safety representatives), downloadable from www.hse.gov.uk/pubns/books/l23.htm .
- Provision and Use of Work Equipment Regulations 1998: available online at www.legislation.gov.uk/uksi/1998/2306/introduction/made, with HSE guidance at www.hse.gov.uk/work-equipment-machinery/puwer.htm
- Management of Health & Safety at Work Regulations 1999: available online at www.legislation.gov.uk/uksi/1999/3242/introduction/made.
- Pressure Systems Safety Regulations 2000: available online at www.legislation.gov.uk/uksi/2000/128/introduction/made, with HSE guidance available at www.hse.gov.uk/pressue-systems/law.htm
- Pressure Equipment Directive (Directive 97/23/EC) (PED): available online at CL1997L0023EN0010020.0001_cp 1..1 (europa.eu)
- Control of Substances Hazardous to Health Regulations 2002 (COSHH): available online at www.legislation.gov.uk/uksi/2002/2677/introduction/made. The HSE website provides online guidance on COSHH, at www.hse.gov.uk/coshh/index.htm.
- Work at Height Regulations 2005: available online at www.legislation.gov.uk/uksi/2005/735/introduction/made. The HSE website provides online guidance at www.hse.gov.uk/work-at-height/the-law.htm

- Regulatory Reform (Fire Safety) Order 2005: this is applicable in England and Wales, and available online at www.legislation.gov.uk/uksi/2005/1541/introduction/made. The HSE website provides online guidance on fire safety in general, at www.hse.gov.uk/toolbox/fire.htm.
- The Fire (Scotland) Act 2005: available online at www.legislation.gov.uk/asp/2005/5/introduction - applicable in Scotland.
- The Ionizing Radiation Regulations 2017: available online at www.legislation.gov.uk/uksi/2017/1075/introduction/made with guidance on the HSE website at www.hse.gov.uk/radiation/ionising/legalbase.htm.
- The IET Wiring Regulations 2018 (BS7671:2018)

Appendix B - Ladder Safety Checklist

Inspection Date	Ladder ID Number	Site Name	
Ladder Type (please tick)			
Step Ladder	Telescopic Ladder	Leaning Ladder	Other – please specify

	Y/N/NA	Additional Comments
ALL LADDERS		
Is the ladder free from obvious damage, twisting, bending and corrosion?		
Is the ladder free from contaminants? (such as dirt, mud, oil or grease)		
Are the stiles (uprights) free from any damage including bending, bowed, twisted, dented, cracked or corroded?		
Are the feet intact, in good condition, secure and free from significant wear?		
Are the fixings (rivets, screws or bolts) present, secure and damage free?		
Are the rungs in place, straight, secure and free from damage?		
Are the locking mechanisms free from damage and wear?		
Are safety catches free from damage and in good working order?		
Are the steps/treads clean and free of debris?		
Manufacturer's instructions in place at site?		
AURN unique ID number in place and legible?		
Ladder stored securely where it cannot be damaged?		
Is the ladder stable when placed on ground?		
Telescopic Ladder Additional Checks		
Are the tubes on the side of the ladder free from damage and dirt?		
Does each opened rung section lock securely?		
On the bottom of the rubber feet is the tread pattern clearly visible?		
Are the end caps in place at the top of the ladder?		
Extension Ladder Additional Checks		
All extension locks secure and free from damage?		
All ladder sections from the same ladder?		
All hinges in place, secure and free from obvious damage?		
Step Ladder Additional Checks		
All hinges in place, secure and free from obvious damage?		
Hand rails and top rails intact and in good condition?		
Ladder Accessories		
Are accessories such as stabilisers and adjustable feet in good condition and securely fitted to the ladder where applicable?		
Are the ladder anchors and ratchet straps in good condition		
Are the ladder mats present and in good condition		

Ladder fit for continued use?	
Ladder inspected by (Name and Organisation)	
Completed checklist forwarded to CMCU aurn.team@uk.bureauveritas.com	

Appendix C – Safety Data Sheets for Gases

BOC, the current Gas Supply contractor for the AURN, has provided Safety Data Sheets for each type of gas supplied to the Network. BOC Safety Data Sheets can be accessed by clicking on the relevant link in the list below.

BOC Gas Safety Datasheets

- NO 450 ppb
- NO_2 450 ppb
- SO_2 450 ppb
- CO 35 ppm
- CO 20 ppm
- Zero Air

Gas cylinders provided by the previous contractor, Air Liquide UK, are still in use at some AURN monitoring stations. Safety Data Sheets for Air Liquide gases can be accessed by clicking on the relevant link in the list below.

Air Liquide Gas Safety Datasheets

- NO < 1 ppm
- NO_2 < 1 ppm
- SO_2 < 1 ppm
- CO < 1000 ppm

The Safety Data Sheets are available on the ‘Operations’ page of the AURN Hub.

Would you like to find out more about us or your environment?

Then call us on

03708 506 506 (Monday to Friday, 8am to 6pm)

email

enquiries@environment-agency.gov.uk

or visit our website

www.gov.uk/environment-agency

incident hotline

0800 807060 (24 hours)

floodline

0345 988 1188 (24 hours)

Find out about call charges (www.gov.uk/call-charges)

Environment first:

Are you viewing this onscreen? Please consider the environment and only print if absolutely necessary. If you are reading a paper copy, please don't forget to reuse and recycle.