APPENDIX 2e - EIS SPECIFICATION FOR WORKSTREAM 5 – LOCAL EXHAUST VENTILATION

Workstream 5 – Local Exhaust Ventilation

1. Purpose

1.1. Periodic inspection and testing is required to ensure that the exposure of substances hazardous to health is either prevented or, where this is not reasonably practicable, adequately controlled, in accordance with the Control of Substances Hazardous to Health Regulation 2002 (COSHH).

1.2. Maintenance, examination and testing of control measures is also required by COSHH. This includes thorough examination and testing of engineering controls at intervals so that controls remain effective at all times.

1.3. The objective of testing is to detect significant defects and to have them remedied to maintain control.

2. Scope

2.1. This workstream covers thorough examination and testing of local exhaust ventilation plant used for:

2.1.1. processes in which blasting is carried out in or incidental to the cleaning of metal castings, in connection with manufacture;

2.1.2. processes, other than wet processes, in which metal articles (other than of gold, platinum, or iridium) are ground, abraded or polished using mechanical power, in any room for more than 12 hours in any week;

2.1.3. processes giving off dust or fume in which non-ferrous metal castings are produced;

2.1.4. Jute cloth manufacture.

2.2. Types of LEV equipment and systems include but not limited to:

2.2.1. emission generators, such as machines used for turning, grinding, and drilling that emit dust and metalworking fluid mist;

2.2.2. emission controllers, such as LEV hoods, moveable and fixed extraction equipment (some of these may fall within the 'machinery' definition, some may be 'safety components', and so within scope);

2.2.3. general equipment associated with a need for dust control where an activity may create a contaminant cloud, such as bag weighing at a bag filling station.

3. Thorough examination and test of local exhaust ventilation

3.1. A thorough examination and test is a detailed and systematic examination sufficient to make sure that the local exhaust ventilation system can continue to perform as intended by design and will contribute to the adequate control of exposure to substances hazardous to health.

3.2. The thorough examination shall include such functional testing to provide sufficient evidence to indicate adequate control is being achieved.

3.3. The thorough examination and test is to be carried out by a person who is competent and able to make an objective assessment of the LEV.

3.4. Where engineering controls are provided to meet the requirements for prevention or control of exposure to substances hazardous to health in accordance with COSHH regulation 7, the competent person shall ensure that thorough examination and testing of those controls is carried out:

3.4.1. In the case of local exhaust ventilation plant, at least once every 14 months, or for local exhaust ventilation plant used in conjunction with a process specified in the table below, at no more than the interval specified in the corresponding entry in column 2 of the table; or

3.4.2. In any other case, at suitable intervals.

Legal maximum intervals for thorough examination and test of LEV plant used in certain processes	
Column 1 **Process**	**Column 2** **Minimum Frequency**
Process in which blasting is carried out in or incidental to the cleaning of metal castings, in connection with manufacture	1 month
Processes, other than wet processes, in which metal articles (other than of gold, platinum or iridium) are ground, abraded or polished using mechanical power, in any room for more than 12 hours in any week.	6 months
Processes giving off dust or fume in which non-ferrous metal castings are produced.	6 months
Jute cloth manufacture	1 month

4. Preparing to check and examine LEV

4.1. The competent person must ensure they are aware of the risks from the system under test. These include:

4.1.1. health risks from residues within the systems;

4.1.2. safety risks from mechanical parts of the LEV, work at height, electricity, manual handling, and moving vehicles.

4.2. The competent person and the Client shall co-operate to ensure minimal risk for both the competent person and employees (i.e. operators) who may be affected by the work. Where necessary the Client should arrange for permits-to-work and safe access.

4.3. The competent person carrying out the thorough examination and test should, where available, use the following information sources:

4.3.1. the LEV system commissioning report;

4.3.2. the LEV user manual;

4.3.3. the logbook for the system;

4.3.4. the previous thorough examination and test report;

4.3.5. any Client records of air sampling relevant to the LEV performance and information on the way operators use the LEV;

4.3.6. confirmation that there have been no changes to the LEV, layout, or process since the last test.

4.3.7. The competent person should verify that the documents apply to the system under test.

4.3.8. If none of these documents are available, the Client may request the competent person to also carry out a commissioning report that provides sufficient detail to produce information for a user manual. This additional service, and any costs, would need to be agreed between the Client and the competent person.

5. Carrying out a thorough examination and test

5.1. Thorough examination and test shall comprise:

5.1.1. a thorough visual and structural examination to verify the LEV is in efficient working order, in good repair and in clean condition;

5.1.2. review of the technical performance to check conformity with commissioning or other sources of relevant information;

5.1.3. assessment of control effectiveness.

5.2. The competent person must have appropriate equipment such as Pitot tubes, a smoke generator, a dust lamp, an anemometer and, sometimes, equipment for air sampling.

Thorough visual and structural examination

5.3. This shall include, as appropriate:

5.3.1. thorough external examination of all parts of the system for damage, wear and tear;

5.3.2. internal duct examinations;

5.3.3. checks that any filter cleaning devices (e.g. shake-down, reverse, or pulsed jet) work correctly;

5.3.4. inspection of the filter fabric. Where filters have built-in pressure gauges, checks on their function (and that the operating pressure is correct);

5.3.5. checks of the water flow and sump condition in a wet scrubber;

5.3.6. checks that the monitors and alerts/alarms are functioning correctly;

5.3.7. inspection of the air mover drive mechanism, e.g. fan belt;

5.3.8. checks for indications of effectiveness such as:

5.3.8.1. whether there are significant deposits of settled dust in and around the LEV hood;

5.3.8.2. whether any part of the system is vibrating or noisy.

Review of technical performance

5.4. The competent person shall carry out, as appropriate:

5.4.1. careful observation of processes and containment sources;

5.4.2. challenge tests with smoke with the process running, to check for effective control considering smoke leakage, eddying, and breathing zone encroachment. The competent person shall warn employees and may need smoke alarms turned off;

5.4.3. dust lamp test with the process running to check for escape of dust or mist;

5.4.4. measurements which may include, as appropriate:

5.4.4.1. airflow velocity measurements (e.g. indicated in the system documentation). This includes hood faces, branch ducts and the main duct;

5.4.4.2. static pressure measurements at suitable (appropriately marked) test points indicated in the system documentation. This includes all hoods, ducting, across the air cleaner, and fan;

5.4.5. checking the fan speed, motor speed and electrical power consumption;

5.4.6. checking direction of rotation of the fan impeller;

5.4.7. checking the replacement or make-up air supply;

5.4.8. testing alarms, by simulating a failure, and the alarm's ability to detect the failure;

5.4.9. measuring air temperatures;

5.4.10. testing the air cleaner performance (e.g. a recirculating system).

5.5. The competent person shall calculate volume flow rates and:

5.5.1. compare the results of the testing with the LEV design specification as reported in system documentation such as the user manual or other sources of performance standards;

5.5.2. diagnose the causes of any discrepancies. With the Client's consent the competent person may, where possible, make simple alterations that restore the required performance. For example, where displaced dampers cause a multi-branch system to be out-of-balance, the competent person may rebalance the system.

5.6. If the system is unsafe to continue, the competent person should stop until the system has been repaired and its original performance restored, and the competent person shall notify the Client promptly.

Assess control effectiveness

5.7. The competent person shall have performed:

5.7.1. a visual and structural examination;

5.7.2. careful observations of the process and contaminant sources and the way in which operators use the LEV;

5.7.3. suitable challenge tests;

5.7.4. appropriate measurements as detailed above;

5.7.5. comparison of measurements made with any Client records of air sampling relevant to LEV performance and information on the way operators use the LEV.

5.8. If the above criteria are met and are acceptable then control should in nearly all circumstances be adequate, and a test certificate can be issued.

6. Marking hoods

6.1. The competent person shall attach a test label to each hood when tested, where appropriate.

Labels

Test record:

Test date ……	
Next Test ……..	

Examiner ……..	

Inadequate control:

Test Date …… Examiner ……..	FAIL

6.2. The criteria for a red label are:

6.2.1. Reduced or no detectable airflow;

6.2.2. Failure of an enclosing hood to contain the containment cloud;

6.2.3. Failure of a receiving hood to intercept or contain the containment cloud;

6.2.4. Failure of a capturing hood, e.g. the capture zone does not encompass the working zone.

6.3. The competent person shall also use a red label for other parts of the LEV system that have failed.

7. Reporting

7.1. The competent person shall determine whether, in their opinion, the system is contributing effectively to the Client's overall strategy for controlling exposure to substances hazardous to health and produce a prioritised plan for any remedial actions.

7.2. The competent person shall provide the Client with a suitable report of the examinations and tests carried out and any recommendations of repairs required to be carried out.

7.3. The report must include:

7.3.1. The name and address of the Client responsible for the LEV;

7.3.2. The date of the thorough examination and test;

7.3.3. The date of the last thorough examination and test;

7.3.4. The identification and location of the LEV and the process and hazardous substance(s) concerned;

7.3.5. The operating conditions at the time of the test and whether this was normal production or special conditions;

7.3.6. A simple diagram of the LEV layout and location, with test points;

7.3.7. The general condition of the LEV system, including hood serial numbers and, where appropriate, photographs of relevant parts;

7.3.8. Information about the LEV plant which shows:

7.3.8.1. its intended operating performance for adequately controlling the hazardous substance(s) for the purposes of COSHH regulation 7[1];

7.3.8.2. whether the plant is still achieving the same performance;

7.3.8.3. if not, the adjustments, modifications or repairs needed to achieve that performance;

7.3.9. the methods used to measure performance and the action to be taken to achieve that performance, e.g. visual, smoke test, airflow measurements, pressure measurements, dust lamp, air sampling, tests to check the condition and effectiveness of the filer;

7.3.10. the results of any air sampling relevant to LEV performance;

7.3.11. information on the way operators use the LEV;

7.3.12. information on general system wear and tear and whether components may need repair or replacement before the next test;

7.3.13. the name, job title and employer of the competent person carrying out the examination and test;

7.3.14. the signature of the competent person carrying out the examination and test;

7.3.15. any minor adjustments or repairs carried out to make the LEV system effective;

7.3.16. any critical defects identified.

8. Additional Service (Optional Pricing) - Assessment of the risk to health created by work involving substances hazardous to health

8.1. In order in accordance with COSHH and employer's obligation not to carry out work which is liable to expose any employees to any substance hazardous to health, the Client may require the competent person to:

8.1.1. carry out a suitable and sufficient assessment of the risk created by the Client's work to the health of their employees and make recommendations for the steps that need to be taken in accordance with COSHH.

8.2. The risk assessment shall include consideration of:

8.2.1. the hazardous properties of the substance;

8.2.2. information on health effects provided by the supplier (of the substance), including information contained in any relevant safety data sheet;

8.2.3. the level, type, and duration of exposure;

8.2.4. the circumstances of the work, including the amount of the substance involved;

8.2.5. activities, such as maintenance, where there is potential for a high level of exposure;

8.2.6. any relevant occupational exposure standard, maximum exposure limit or similar occupational exposure limit;

8.2.7. the effect of preventive and control measures which have been or will be taken for prevention or control of exposure to substances hazardous to health in accordance with COSHH regulation 7;

8.2.8. the results of relevant health surveillance;

[1] If there is no information available on this, it indicates a need for a further assessment in accordance with COSHH regulation 6 to show compliance with COSHH regulation 7.

8.2.9. the results of monitoring of exposure at the workplace in accordance with COSHH regulation 10;

8.2.10. in circumstances where the work will involve exposure to more than one substance hazardous to health, the risk presented by exposure to such substances in combination;

8.2.11. the approved classification of any biological agent; and

8.2.12. such additional information as may be required in order to complete the risk assessment.

9. Additional Service (Optional Pricing) – Review of assessment of the risk to health created by work involving substances hazardous to health

9.1. If required by the Client, the competent person may be required to review risk assessments in circumstances where:

9.1.1. there is reason to suspect that the risk assessment is no longer valid;

9.1.2. there has been a significant change in the work to which the risk assessment relates; or

9.1.3. the results of any monitoring carried out in accordance with COSHH regulation 10 show it to be necessary,

and where, as a result of the review, changes to the risk assessment are required, the competent person shall notify the Client of such changes required to be made.

ANNEX A

Competence

Qualifications

A competent person should, as a minimum stipulation, be qualified in their practising profession.

- A Level 4 qualification (HND / HNC etc.) in a relevant engineering field.
- An NVQ Level 3 or ONC qualification (working towards a Level 4 qualification).
- Institute of Diagnostic Engineers (IDE) Accreditation
- Institute of Local Exhaust Ventilation Engineers (ILEVE) Accreditation
- Independent National Inspection and Testing Association (INITA) Accreditation
- Safety Assessment Federation (SAFeD) Accreditation
- a time served or Modern Apprenticeship

Skills and Experience

Knowledge of:

- The parts of an LEV system and their function.
- The legal requirements for the thorough examination and testing of LEV systems.
- How to recognise a damaged part from a visual inspection.
- The purpose of, and how to use, the measuring and assessment instruments and techniques.
- The most suitable instrument to test the performance of each part of the LEV system.
- The standard to which each part of the LEV system should perform.
- How to recognise when a part of the LEV is performing unsatisfactorily, based on the measurements taken and assessment methods used.
- How to check whether the LEV is effective in reducing airborne contaminant emission and operator exposure.
- How to collate and record information in a clear, concise and usable way.
- How to work safely with the LEV plant and the hazards associated with it.

Partner or Director (Chartered Engineer) should hold appropriate qualifications/accreditations and have at least 10 years relevant post-professional qualification experience.

Senior Professional (Chartered Engineer) should hold appropriate qualifications/accreditations and have at least 5 years relevant post-professional qualification experience

Professional (Incorporated Engineer) should be a professionally qualified/accredited consultant, hold one of the following qualifications and have at least 3 years relevant post-professional qualification experience

Senior Technician (Engineering Technician) should be a graduate on a recognised and accredited course for obtaining a professional qualification

Technician (Engineering Technician) should be a graduate on a recognised accredited course

Admin/Junior Technician/Apprentice

- Administration staff;
- Junior Technician (i.e. Trainee / Undergraduate)
- Apprentice with Apprenticeship entry qualifications.

Chartered Engineer

Must have experience in developing solutions to engineering problems using new or existing technologies, through innovation, creativity and change and/or they may have technical accountability for complex systems with significant levels of risk.

- Use a combination of general and specialist knowledge and understanding to optimise the application of existing and emerging technology
- Apply appropriate theoretical and practical methods to the analysis and solution of engineering problems
- Provide technical and commercial leadership
- Demonstrate effective interpersonal skills
- Demonstrate a personal commitment to professional standards

Incorporated Engineers

Must have experience in maintaining and managing applications of current and developing technology, and can undertake engineering design, development, manufacture, construction, and operation and must be able to demonstrate:

- Use a combination of general and specialist engineering knowledge and understanding to optimise the application of existing and emerging technology
- Apply appropriate theoretical and practical methods to design, develop, manufacture, construct, commission, operate, maintain, decommission and re-cycle engineering processes, systems, services, and products
- Provide technical and commercial management
- Demonstrate a personal commitment to professional standards

Engineering Technicians

Must be able to apply safe systems of work and must be able to:

- Use engineering knowledge and understanding to apply technical and practical skills.
- Contribute to either the design, development, manufacture, commissioning, decommissioning, operation or maintenance of products, equipment, processes, or services.
- Accept and exercise personal responsibility.
- Use effective communication and interpersonal skills.
- Comply with the Code of Conduct of your institution
- Exercise responsibilities in an ethical manner.

Codes of Conduct

- Act with due skill, care, and diligence and with proper regard for professional standards
- Prevent avoidable danger to health or safety
- Act in accordance with the principles of sustainability, and prevent avoidable adverse impact on the environment and society
- Maintain and enhance their competence, undertake only professional tasks for which they are competent, and disclose relevant limitations of competence
- Accept appropriate responsibility for work carried out under their supervision
- Treat all persons fairly and with respect
- Encourage others to advance their learning and competence

- Avoid where possible real or perceived conflict of interest, and advice affected parties when such conflicts arise
- Observe proper duties of confidentiality owed to appropriate parties
- Reject bribery and all forms of corrupt behaviour and make positive efforts to ensure others do likewise.
- Raise a concern about a danger, risk, malpractice or wrongdoing which affects others ('blow the whistle'), and support a colleague or any other person to whom you have a duty of care who in good faith raises any such concern
- Assess and manage relevant risks and communicate these appropriately
- Assess relevant liability, and hold appropriate professional indemnity insurance
- Notify your institution (if a member) of any significant violation of the Institution's Code of Conduct by another member.

Risk

Identifying, assessing, managing, and communicating risk

- Apply professional and responsible judgement and take a leadership role
- Adopt a systematic and holistic approach to risk identification, assessment, and management
- Comply with legislation and codes, but be prepared to seek further improvements
- Ensure good communication with the others involved
- Ensure that lasting systems for oversight and scrutiny are in place
- Contribute to public awareness of risk

Sustainability

- Contribute to building a sustainable society, present and future
- Apply professional and responsible judgement and take a leadership role
- Do more than just comply with legislation and codes
- Use resources efficiently and effectively
- Seek multiple views to solve sustainability challenges
- Manage risk to minimise adverse impact to people or the environment

ANNEX B

Definitions:

"**air cleaner**" means a device to remove contaminants form air e.g. filter, cyclone, stock, wet scrubber, electrostatic precipitator (EP)

"**air mover**" means devices that move air (e.g. fan, propeller fan, axial fan, centrifugal fan, turbo exhauster)

"**breathing zone**" means the region around operators from which they draw air for breathing. Commonly defined as being within 300 mm of nose/mouth

"**canopy hood**" means a receiving hood used over a hot process

"**capture hood**" means the source and the contaminant cloud are outside the hood. A capturing hood has to generate sufficient airflow at and around the source to 'capture' and draw the contaminant-laden air into it. Also known as capture hood, captor hood, exterior hood, external hood

"**capture velocity**" means the air velocity (metres/second) required around a source to capture the contaminant cloud and draw it into the hood

"**capture zone**" means a 'three-dimensional envelope' in front of a capturing hood, in which the capture velocity is adequate

"**competent person**" as described in Annex A

"**contaminant cloud or draught**" means the cloud of contaminated air that disperses from a source (e.g. a jet, a plume, a puff, or a cloud of vapour evaporating gently)

"**controls**" means more than just the 'hardware' and include engineering controls, including local exhaust ventilation, and systems of work and supervision.

"**duct velocity**" means the average air velocity measured on a duct cross-section (metres/second)

"**dust lamp**" means a parallel beam illuminates the dust cloud to produce forwards light-scattering (also known as Tyndall beam, Tyndall lamp)

"**eddy**" means a region in airflow with a rotary motion, contrary to the main flow

"**electrostatic precipitator (EP)**" means a type of particle filter. Charged particles are attracted to a plate of opposite polarity, to which they attach

"**Local Exhaust Ventilation (LEV)**" means the use of extraction to remove contaminated air at or near to its source. Includes local extract ventilation, extract ventilation, dust extraction, mist extraction, fume extraction, vapour extraction.

"**manometer**" a simple pressure-indicating device e.g. on hoods

"**Pitot tube**" means a device to measure static and total pressure

"**process**" the way that airborne contaminants are generated

"**working zone**" means the volume in the workplace where an activity is generating a contaminant cloud