Low Impact Installation checklist

Condition A – Management techniques

Biocatalysts operates Building Management Systems for many of its utilities.

All the below systems are serviced on a minimum annual basis to ensure that all controls are functioning correctly. Daily inspection of these systems takes place, any issues are recorded and addressed accordingly.

Gas – divided between five systems;

1. 1 x Domestic CHS boiler @ 28 KWH
2. 2 x Industrial CHS boiler @ 462 KWH
3. 1 x HW storage unit @ 26 KWH
4. 1 x Steam Boiler @ 380KWH max.
5. 1 x steam Boiler @ 785KWH max. (valid after Feb 2020)

All the above are controlled via building management systems which control and monitor operating times, temperature, level and pressure, etc. On steam boilers, condensate returns to the boiler.

Water – divided between three systems;

6. direct Mains Water feed – feed to building utility systems and below systems
7. Tank Water – stored water for general wash down use (3cu.m.)
8. RO Water – water for Production Process only (max.3500lt/hr)
9. Hot Water – provided via a gas calorifier *per Gas item 3. above*

Tank water is controlled via a level control system, this minimises water usage.

Internal policy restricts the use of RO water to ensure that energy usage is minimised.

Site operates to a Discharge Consent (TE647) from Welsh Water which is analysed monthly.

Compressed Air service – divided between three systems.

10. 90KW, 96% efficient variable speed drive
11. 8KW
12. 4KW (standby)

All units are controlled via pressure control devices. One compressor is the latest technology variable speed drive, and another is inverter controlled, to ensure minimum energy usage.

Electricity – divided between two systems;

13. Low Voltage (0.7 MW)
14. High Voltage (1 MW)

All systems are fitted with Power Factor Correction systems. Surge suppression devices are also in use

Internal policy promotes the 'Switching Off' of equipment when not in use to ensure that energy usage is minimised.

The company is in the process of installing energy efficient LED lighting throughout.

Temperature – Divided between three systems;

15. Environmental heating & cooling –
    a. Fan Coil Units & Lossless heat exchanger @10KW
    b. Air Handling Units @15KW
    c. Heating - Gas item 2.
    d. *Cooling* - Evaporative Cooler @60KW
16. Process Heating – Steam Boiler *per Gas items 4. & 5.*
17. Process cooling –
    a. Evaporative Cooler @38KW
    b. Evaporative Cooler@89KW

All the above are controlled via building management systems which control and monitor operating times, temperature, level and pressure, etc.

The company has recently completed insulating the roof spaces.

Condition B – Aqueous waste

Water systems are noted in Condition A above.

Water usage is split between water added to the process, effluent and foul. (see BIOCAT3 Site Plans: Site foul drainage)

Effluent is typically comprised of;

- cleaning solutions
- process waste comprising microbial waste, dilution media
- permeate

The latest Welsh Water Effluent monthly bill (Sept 2019) stated 374 cu.m. = 12cu.m/day, valid up to Feb 2020.

Site total approx. 35cu.m./day

Reference for Discharge Consent: TE647 (this discharge consent is currently under review with Welsh Water due to the extension).

Condition C – Abatement systems

No abatement systems/releases to air as described in the guidance. Two abatement systems are installed but these are purely to prevent loss of product.

- 500lt fermenter condenser
- 50lt fermenter condenser
- 500lt fermenter condenser (extension)
- 8000lt fermenter condenser (extension)

Condition D – Groundwater

No hazardous substances or non-hazardous pollutants are released into the ground, nor is it planned for them to be released.

Condition E – Producing waste

- Hazardous waste (1.5T/yr) -
    - Solvents
    - Sharps –
        - Broken Glass
        - Syringe Needles
        - Knife blades
    - Chemicals –
        - Acids, Alkalis, Salts, Alcohols, Phenols
        - Solvent & water-based paints
        - Mineral oils and greases
    - Mixed Enzymes –
        - Allergens, Protease & Non-Protease Enzymes

- Non-hazardous waste (23.1T/yr) –
    - Non-hazardous Industrial
    - Food Waste *(not animal)*
    - Paper & Cardboard
    - Plastic *(B Grade)*
    - Mixed recycling

Of the above waste, 0% went to landfill and 43% was recycled.

Condition F – Using energy

Electrical systems are noted in Condition A above. Maximum combined incoming power is 1.7MW

Therefore, Peak energy consumption is below the permit threshold of 3MW.

Condition G – Preventing accidents

Site operates a Planned Preventative Maintenance scheme and several Emergency Spill Kits are located around site. Site enforces waste management control policies and procedures.

Containment measures exist for:

- Surface water –
    - standard building design storm water gulley grilles are in use at all storm water down pipes. All down pipes are sited externally of the building.
    - An interceptor tank with isolation is in operation and inspected twice annually.
    - An emergency drain block procedure exists and is practiced weekly
- Land –

    - stored items are all kept within bunded areas which are inspected daily and emptied as necessary.
    - All bunds are sited on concreted ground.
- Sewer –
    - standard building design water gulley grilles and traps are in use at ground connections to sewer.
    - An emergency drain block procedure exists and is practiced weekly.
    - An interceptor tank with isolation is in operation and inspected annually.
    - Instruction EHS-WI-001 exists for the control of waste to drain.

Emergency Planning to prevent incidents is part of our ISO Management Systems under Section 8.2 for both ISO 14001:2015 and ISO45001:2018 (Environmental and Health & Safety respectively):

- Chemical Spillage Procedures are in place and tested at least once annually.
- Spill kit awareness training is delivered to all new starters during induction.
- Spill kit training theory, practical and refresher training is delivered to all laboratory and production staff.
- Emergency Wallets are kept on site giving details of emergency procedures, emergency contacts, chemical classifications and storage.

Condition H – Noise

Equipment is recorded on the noise risk assessment and measured on the dB(A) scale. These are the noisiest pieces of equipment in the building, and the measurements are recorded from within the building at close range to the pieces of equipment;

- Sharples Centrifuge – 88.6 dB
- Sonicator – 78.4 dB
- Powder Blending Operations – 89.4 dB
- Westfalia – 86 dB
- Rotortron – 83.5 dB
- Kompas Ultra Scale-Down Rotating Disc Shear Device – 81.0 dB
- Alfa Laval High Speed Centrifuge MB 601 – 78.0 dB

Noise control is in place by:

- maintaining equipment as part of the planned preventative maintenance schedule.
- Switching off items when not in use
- Majority of work is undertaken between the hours of 08:30hrs and 16:30hrs – All deliveries to the site, take place during the hours.
    - Shifts run, but not on 24 hours, 7 days a week basis.
- Biocatalysts Ltd is situated on an industrial estate and is not surrounded by close residential areas.

Condition I –

Point source emissions are also noted in Condition G above.

Unless specified otherwise, all sources are serviced annually as a minimum.

- Emissions to air –

- Steam Boiler systems [1] -
  - Flue gas - O2% 6.7, CO2% 8.1 – flue extends above roof apex
  - Blowdown vapour - daily brief release of hot treated water vapour – vented at 2m above ground level
  - Condense return vapour - daily brief release of hot treated water vapour - vented at 2m above ground level
  - Over pressure relief - emergency brief release of treated hot water vapour - vented to ground level
- Electric Steam Boiler [2] –
  - Over pressure relief – emergency brief release of treated hot water vapour - vented to ground level
  - Blowdown vapour – daily brief release of hot treated water vapour - vented to ground level
- Gas boiler (Space heating) [3] –
  - Flue gas - O2% 4.4, CO2% 9.4 - flue height 1m above roof apex
  - Over pressure relief – emergency brief release of hot water vapour - vented to ground level
- Gas fired Hot Water Storage Heater [4] -
  - Over pressure relief – emergency brief release of hot water vapour - vented to ground level
  - Flue gas - flue height 1m above roof apex
- Laboratory fume cabinet local exhaust ventilation (LEV) [5] - flue height approx. 9m above ground level
- Laboratory general ventilation exhaust [6] - vented at less than 5m above ground level – dust filtered
- EPP Production area general ventilation exhaust [6] - vented at less than 5m above ground level – dust filtered
- Powder Production area -
  - Production area general ventilation exhaust [6] - vented at less than 5m above ground level - dust filtered
  - Production area local exhaust ventilation (LEV) [7] - vented at 2m above ground level – dust filtered
- Toilet area general ventilation exhaust - vented at 2m above ground level
- Office area general ventilation exhaust [8] - vented at less than 5m above ground level
- Production fermenters [9] –
  - Exhaust process gases - steam & process frequent release to atmosphere - vented to ground level - can contain trace amounts of ammonia and methanol, C02 (+2%), O2, H2O
- Production Autoclave [10] –
  - Exhaust steam vapour - steam & process frequent release to atmosphere - vented to ground level - can contain food approved biological media and waste (dead culture). No deactivation agents are used.
- Yard Area
  - 6000L Methanol storage tank. (in emergency instances of over pressure)
- Steam Boiler systems [EMP] -
  - Flue gas - O2% 6.7, CO2% 8.1 – flue extends above roof apex
  - Blowdown vapour - daily brief release of hot treated water vapour – vented at 2m above ground level

        - Condense return vapour - daily brief release of hot treated water vapour - vented at 3m above ground level
        - Over pressure relief - emergency brief release of treated hot water vapour - vented to ground level
    - Compressor Exhaust Air (EMP)-
        - Heat load from variable speed compressor
        - Over pressure relief - emergency brief release of compressed air from accumulators
    - Production Autoclave [10] –
        - Exhaust fume/vapour – steam & process condense - frequent release to atmosphere

    - Extension Chemical Storage [11] –
        - Heated atmospheric ventilated storage container – Caustic soda
        - Bunded - Phosphoric acid 800lts and HCL acid.
        - atmospheric ventilated storage container – Aqueous ammonia 2 cu.m.

- Emissions to land –
    - Steam boiler system [1] -
        - Blowdown condensate – treated water cooled and released to drain
        - Condense return vapour condensate - emergency brief release of hot treated condensate to ground level soakaway
        - Over pressure relief condensate - emergency brief release of hot treated condensate to ground level soakaway
    - Electric boiler [2] –
        - Over pressure relief condensate - emergency brief release of hot treated condensate to drain
        - Blowdown vapour condensate - emergency brief release of hot treated condensate to drain
    - Production fermenter [9] –
        - Exhaust fume/vapour - steam & process condense - frequent release to atmosphere - vented to ground level soakaway - can contain fermentation media, H2O, biocide cleaning chemicals, flocculant

- Emissions to water –
    - Toilet waste [A]
    - Domestic kitchen waste [B]
    - Laboratory & Micro-laboratory sink waste [C] – dilute Acids, Alkalis, Salts, Alcohols, Phenols
    - Autoclave [10] -
        - cooling water – mains tank water at temperature below 70 deg.C.

        - steam condense – sterile treated water at temperature below 70 deg.C.
    - Emergency rinse shower [D] – emergency brief release of release of mains water with dilute Acids, Alkalis, Salts, Alcohols, Phenols
    - RO water plant [E] – mains & demineralised water frequent process release to foul drain
    - Water softening plant [F] - occasional brief process release of softened water to foul drain
    - Tank water overflow [G] - emergency brief release of mains water to foul drain
    - Steam boiler [1]
        - blowdown discharge - daily brief release of hot treated water to foul drain at approx. 60 deg.C.
        - Condense return tank discharge (during drain down) – emergency brief release of hot treated water to foul drain
    - Electric steam boiler condense discharge [2] - occasional brief release of hot condensate to foul drain
    - Water storage heater over pressure discharge [4] - emergency brief release of hot mains water to foul drain
    - Gas boiler (space heating) condense discharge [3] - occasional brief release of hot condensate to foul drain
    - Powder production area sink waste [H] – frequent release of cleaning solutions and water to foul drain.
    - Domestic Shower waste [J] – emergency brief release to foul drain of Laboratory chemicals,
    - Liquid production area –
        - floor foul drain waste [K] – detergents, cleaning chemicals, water and trace amounts of raw material
        - UF plant [P] - process waste – can contain 4% salts, acetic acid neutralised using caustic
    - EPP production area
        - sink waste [L] – detergents, cleaning chemicals, water and trace amounts of raw material
        - Floor foul drain waste [L] – detergents, cleaning chemicals, water and trace amounts of raw material
        - Production fermenters [9] - process water & condense - frequent release - can contain – detergents, cleaning chemicals, water and trace amounts of raw material
        - DSP plant [N] - process water & waste – can contain – detergents, cleaning chemicals, water and trace amounts of raw material
    - General ventilation (AHU) condensate discharge [6] - occasional brief release of hot condensate to drain
    - Toilet area Hot water gas boiler [M] –
        - Condense - occasional brief release of hot condensate to drain

Condition J – Odour

There have been no complaints from neighbouring companies or residents. There are no odours emitted from outside the walls of the factory during the manufacturing process, or when the process

is not running. Therefore, no offensive smells are noticeable outside the installation boundary. With regards to H4, there is no odour found beyond the boundary and therefore, it is deemed that there is no pollution.

Condition K – Compliance History

- **Prosecution** – There has been none.
- **Formal Caution** – There has been none.
- **Suspension Notice** – There has been none.
- **Enforcement Notice relating to an actual or potential environmental incident** – There has been none.

Biocatalysts Ltd has not been involved in any enforcement action under EPR or any other environmental regimes. \\biofs01\draft wip\Shared Information\Logos List.xlsx