Technical Note

CLIENT:	**Altilium Metals Ltd**
PROJECT:	**ACT 1: Tavistock Technology Centre Facility**
SUBJECT:	**H1 Screening Tool – Emissions to Air** **Technical Summary Note**
JOB NO.:	**BM12752**
DATE:	**July 2024**
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1 CONTEXT

1.1.1 This note has been prepared to provide a summary of the H1 Screening Tool Assessment of emissions to air from the ACT 1 Technology Centre Facility (Unit 20, Plymouth Road Industrial Estate, Tavistock, Devon, PL19 9QN). The Site is currently operational under a Local Enforcement Position.

1.1.2 The Technology Centre is divided into three separate laboratory areas within the main laboratory, these comprise a Hydrometallurgy Laboratory, Solvent Extraction Laboratory and Analytical Laboratory

1.1.3 In order to assess the impact of the emission to air, each laboratory's gaseous waste product and concentration has been assessed.

2 PROCESS SUMMARY

[redacted]

2.2.1 [redacted]

2.3 *Analytical Laboratory*

2.3.1 Sample Analysis takes place in this lab using:

[redacted]

[redacted]

3 STAGE 1 SCREENING ASSESSMENT

3.1.1 In order to assess the potential impacts of the emission to air, the Version 8 H1 Screening Tool has been completed to assess the impact of emissions alongside the Environment Agency's guidance on 'Air Emissions Risk Assessment for your Environmental Permit.'

3.1.2 The process contributions of emissions to air have been calculated by using the following methodology:

$$PC_{air} = DF \times RR$$

Where PC is the Process Contribution

Where DF is the Dispersion Factor

Where RR is the Release Rate of the substance

3.2 Effective Height of Release and Location

3.2.1 There will be three emission points (stacks) from the facility, one associated with each part of the laboratory.

3.2.2 The National Grid References (NGR) of the three release points are:

- [redacted] **SX 48154 73196**
- [redacted] **SX 48161 73210**
- [redacted] **SX 48145 73210**

3.2.3 These national grid references will be used to name and identify the three emissions points throughout this document

3.2.4 Each stack is between 2-2.5m above the roof of the building. The building is 7.5m tall, approximately 91.5mAOD. As the height of the releases is less than 3m above the building the effective height of release is 0m for the purposes of the H1 assessment.

3.2.5 This effective stack height gives a long term dispersion factor of 148 and short term dispersion factor of 3,900.

3.3 Release Rate

- The flow rate from the [redacted] SX 48154 73196 is predicted to be 2,600m^3/hr,
- The flow rate from the [redacted] SX 48161 73210 is 423m^3/hr,

- The flow rate from the [redacted] SX 48145 73210 is 904m^3/hr.

3.4 This is a total of 3,927m^3/hr from the building as a whole.

3.4.1 The efflux velocity for the SX 48154 73196 stack is ~12.3m/s and SX 48145 73210 stack is ~24.48m/s and for the SX 48161 73210 stack is 15.67m/s.

3.4.2 The release rate for each substance is shown in Table 1.1.

3.5 Operating Mode

3.5.1 The operating mode is expected to be ~25% given site operating hours, holidays and weekends, however to ensure the H1 assessment has been carried out as worst case scenario with regard to emissions, an operating mode of 50% has been inputted into the tool.

3.5.2 The operating hours of the Analytical Lab will be less than the other labs only operating 7-10 hours per week which equates to 6% of the week. 10% operating mode has been used as a reasonable top end scenario in this instance.

4 RESULTS

4.1.1 Table 1.1 below provides the substances which may be released as part of each of the phases, and the long and short-term worst-case concentrations and the long- and short-term PC calculated by the H1 tool.

4.1.2 Expected emissions have been calculated using the maximum concentration expected in the extract even though not all of this is expected to vaporise.

4.1.3 Emissions of metals from the Analytical lab have been calculated using the highest expected volume expected to be present in the extract after use of the nebuliser, The maximum concentration of any one metal expected to be present in the extract is 0.0013ppm. This value has then been converted to mg/m^3 based on the molecular weight of the metal, an ambient air temperature and 1 atmosphere.

4.1.4 Substances will not exceed the Best Available Techniques (BAT) AEL indicative emission levels for channelled emissions to air. The substance concentrations have been calculated on a worst-case scenario where estimated figures are not available in that the BAT AEL maximum have been inputted for both long term and short-term concentrations.

4.1.5 BAT AELs have been derived from the BREF Document for Common Waste Gas Management and Treatment Systems in the Chemical Sector[1], apart from the AEL for Sulphuric Acid which is derived from the BREF for Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilizers[2]. These are reference in the table to provide a comparison with the estimated outputs and the worst-case allowable outputs under BAT.

Table 1.1: Substances, Concentrations and Long and Short-Term PC

Process Phase	Substance	BAT AEL	Emission Concentrations (mg/m³)	Long term PC (ug/m³)	Short term PC (ug/m³)
[redacted] SX48154 73196	Sulphuric acid	10 – 35 mg/Nm³	**0.03**	0.0063	0.2216
	Ammonia	2-10 mg/Nm³	**7.18**	0.5756	20.2237
[redacted] SX48145 73210	Sulphuric acid	10 – 35 mg/Nm³	**0.14**	0.0063	0.2216
	Benzene	<0.5-1 mg/Nm³	**0.033**	0.0001	0.0019
[redacted] SX48161 73210	PM10	5 mg/Nm³	**5**	0.01	1.35
	PM2.5	5 mg/Nm³	**5**	0.01	2.29
	Nickel	<0.02-0.1 mg/Nm³	**0.0031**	0.000005	0.0014
	Manganese	<0.01-0.1 mg/Nm³	**0.0029**	0.000005	0.0013
	Copper	Not Available	**0.0034**	0.000006	0.0015
	Lead	Not Available	**0.0109**	0.000019	0.0050
	Chromium	Not Available	**0.0028**	0.000005	0.0013
	Arsenic	Not Available	**0.0039**	0.000007	0.0018
	Zinc Oxide	Not Available	**0.0035**	0.000006	0.0016
	Cadmium	Not Available	**0.0059**	0.000010	0.0027

Notes
Sulphuric acid is part of the emissions inventory for the Hydro and SX Labs. In total combination the sulphuric acid releases will not exceed the maximum AEL of 35 mg/m$^{3.}$ Combined PC shown in table.
To provide the most conservative screening the maximum concentration of Sulphuric Acid in the extract has been used however, not all of this will vaporise.
Benzene had been used as a worst case Scenario for [redacted] known to contain <0.1% aromatic content
BAT AEL Value for PM10 & PM2.5 used as a worst-case scenario

4.2 Stage One Screening Results

4.2.1 The H1 Screening Tool Stage 1 screens out all of the substance releases as insignificant and less than 10% of the Short Term EAL and less than 1% of the Long Term EAL.

[1] https://eippcb.jrc.ec.europa.eu/reference/common-waste-gas-treatment-chemical-sector
[2] https://eippcb.jrc.ec.europa.eu/reference/large-volume-inorganic-chemicals-ammonia-acids-and-fertilisers