Point Source: Stack EA1						
Actual Stack Height (m)	**Building Height[1] (m)**	**Effective Stack Height[2] (m)**	Emission Velocity[3] (ms^{-1})	**Flow Rate (m^3s^{-1})**	**Stack Diameter (m)**	**Discharge Temperature (K)**
17.1	29	0	16.01	11.3	0.95	293

	Normal Operations						Abnormal Operations			
Substance	**Frequency & Period of Emission**	**Average Emission Rate (gs^{-1})**	**Average Emission Conc. (mgm^{-3})**	**Maximum Emission Rate (gs^{-1})**	**Maximum Emission Conc. (mgm^{-3})**	**Annual Mass Emitted (kg)**	**Frequency & Period of Emission**	**Emission Rate (gs^{-1})**	**Emission Conc. (mgm^{-3})**	**Annual Mass Emitted (kg)**
Beryllium	Continuous emission of variable concentration, depending on operations being performed – see Appendix 1 for derivation of emission rates	7.16×10^{-11}	6.33×10^{-9}	1.2×10^{-10}	1.06×10^{-8}	2.2×10^{-6}	No abnormal operations undertaken	-	-	-
Lead	No normal operations undertaken	-	-	-	-	-	Periodic emissions, dependant on operations being performed; lead emission monitoring is only requested when lead machining operations are undertaken - see Appendix 1 for derivation of emission rates	7.5×10^{-11}	6.6×10^{-9}	1.3×10^{-7}
Aluminium Oxide	Periodic emissions (up to fifty times per year) - the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.1.	1.4×10^{-9}	1.2×10^{-7}	4.7×10^{-7}	4.1×10^{-5}	4.0×10^{-5}	No abnormal operations undertaken	-	-	-
HFE-7100	Continuous but of variable concentration dependant upon operations performed.	0.023	2.03	0.046	4.07	750	No abnormal operations undertaken	-	-	-

[1] Height of the tallest building within a radius of five stack heights.
[2] Effective Stack Height (ESH) derived from the actual stack height (ASH) and the height of the tallest building within a radius of 5 stack heights (BH) i.e. ESH = 1.66 xBH((ASH/BH)-1).
[3] The reported emission velocity is a measured figure.

Substance	Estimated Monthly Average Emission Conc. (mgm^{-3})	Benchmark Figure (mgm^{-3})	Comparison of Monthly Average Emission Conc. with Benchmark Figure
Beryllium[4]	6.4×10^{-9}	0.005	The estimated monthly average emission concentration is substantially lower than the Benchmark Figure. The impact of these emissions on the environment is considered in Document B4.
Lead[5]	6.6×10^{-9}	2.0	The estimated monthly average emission concentration is substantially lower than the Benchmark Figure. The impact of these emissions on the environment is considered in Document B4.
Aluminium Oxide[6]	1×10^{-10}	5.0	The estimated monthly average emission concentration is substantially lower than the Benchmark Figure. The impact of these emissions on the environment is considered in Document B4.
HFE-7100[7]	2.03 – 4.07	50	The estimated monthly average emission concentration is lower than the Benchmark Figure. The impact of these emissions on the environment is considered in Document B4.

[4] Benchmark figure for beryllium taken from Environment Agency, (2001) *Technical Guidance Note IPPC S2.03 Technical Guidance for Non-ferrous Metals* (Draft 1), Environment Agency Web Site p. 91

[5] Benchmark figure for lead taken from Environment Agency, (2001) *Technical Guidance Note IPPC S2.03 Technical Guidance for Non-ferrous Metals* (Draft 1), Environment Agency Web Site p. 91

[6] No Benchmark Figure is available for emissions of aluminium oxide, therefore, the Benchmark Figure for 'particulate' has been used - Environment Agency, (2001) *Technical Guidance Note IPPC S2.03 Technical Guidance for Non-ferrous Metals* (Draft 1), Environment Agency Web Site p. 90

[7] Benchmark figure for 'VOCs' taken from Environment Agency, (2001) *Technical Guidance Note IPPC S2.03 Technical Guidance for Non-ferrous Metals* (Draft 1), Environment Agency Web Site p. 90

Point Source: Stack EA7						
Actual Stack Height (m)	**Building Height (m)**	**Effective Stack Height (m)**	Emission Velocity[19] (ms^{-1})	**Flow Rate[20] (m^3s^{-1})**	**Stack Diameter[21] (m)**	**Discharge Temperature (K)**
30.4	9.1	35.5	7.9	11.11	1.41	293

	Normal Emissions						**Abnormal Emissions**			
Substance	**Frequency & Period of Emission**	**Average Emission Rate (gs^{-1})**	**Average Emission Conc.[22] (mgm^{-3})**	**Maximum Emission Rate (gs^{-1})**	**Maximum Emission Conc. (mgm^{-3})**	**Annual Mass Emitted (kg)**	**Frequency & Period of Emission**	**Emission Rate (gs^{-1})**	**Emission Conc. (mgm^{-3})**	**Annual Mass Emitted (kg)**
Beryllium	Continuous emission – the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.1.	$1.4x10^{-10}$	$1.4x10^{-8}$	$1.4x10^{-10}$	$1.4x10^{-8}$	$4.4x10^{-6}$	No abnormal operations undertaken	-	-	-
Titanium Dioxide	Periodic emissions (up to four times per year) - the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.1.	$1.9x10^{-9}$	$1.9x10^{-7}$	$4.0x10^{-6}$	$4.0x10^{-4}$	$6.0x10^{-5}$	No abnormal operations undertaken	-	-	-
Aluminium Oxide	Periodic emissions (up to fifty times per year) - the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.1.	$1.3x10^{-9}$	$1.3x10^{-7}$	$2.4x10^{-7}$	$2.4x10^{-5}$	$4.3x10^{-5}$	No abnormal operations undertaken	-	-	-
Trichloroethene	Continuous emission – the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.1.	$9.09x10^{-5}$	$9.09x10^{-3}$	0.027	2.66	2.91	No abnormal operations undertaken	-	-	-
Alkanes C9-C12	Continuous emission – the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.1.	$1.59x10^{-5}$	$1.59x10^{-3}$	$4.58x10^{-3}$	0.458	0.5	No abnormal operations undertaken	-	-	-

[19] The emission velocity provided has been derived from the reported flow rate and the stack orifice area (i.e EV=FR/SOA).
[20] The flow rate provided is the stack flow rate at the stack sampling point
[21] The stack orifice is rectangular (1.47 x 1.07 m) however, the diameter of a circular stack of the same area (1.57 m^2) has been supplied here.
[22] All average and maximum emission concentrations reported in this table have been derived from the emission rate and the reported flow rate (i.e. EC=ER/FR).

Facts ?

Substance	Estimated Monthly Average Emission Conc. (mgm^{-3})	Benchmark Figure (mgm^{-3})	Comparison of Average Emission Conc. with Benchmark Figure
Beryllium[23]	$1.35x10^{-8}$	0.005	The estimated monthly average emission concentration is substantially lower than the Benchmark Figure. The impact of these emissions on the environment is considered in Document B4.
Titanium Dioxide[24]	$1.9x10^{-7}$	2.0	The estimated monthly average emission concentration is substantially lower than the Benchmark Figure. The impact of these emissions on the environment is considered in Document B4.
Aluminium Oxide[25]	$2.6x10^{-7}$	5.0	The estimated monthly average emission concentration is substantially lower than the Benchmark Figure. The impact of these emissions on the environment is considered in Document B4.
Trichloroethene[26]	1.11	50	The estimated monthly average emission concentration is substantially lower than the Benchmark Figure. The impact of these emissions on the environment is considered in Document B4.
Alkanes C9-C12[26]	$2.04x10^{-3}$	50	The estimated monthly average emission concentration is lower than the Benchmark Figure. The impact of these emissions on the environment is considered in Document B4.

[23] Benchmark figure for beryllium taken from Environment Agency, (2001) *Technical Guidance Note IPPC S2.03 Technical Guidance for Non-ferrous Metals* (Draft 1), Environment Agency Web Site p. 91

[24] Benchmark figure for titanium dioxide taken from Environment Agency, (2001) *Technical Guidance Note IPPC S2.03 Technical Guidance for Non-ferrous Metals* (Draft 1), Environment Agency Web Site p. 94

[25] No Benchmark Figure is available for emissions of aluminium oxide, therefore, the Benchmark Figure for 'particulate' has been used - Environment Agency, (2001) *Technical Guidance Note IPPC S2.03 Technical Guidance for Non-ferrous Metals* (Draft 1), Environment Agency Web Site p. 90

[26] Benchmark figure for 'VOCs' taken from Environment Agency, (2001) *Technical Guidance Note IPPC S2.03 Technical Guidance for Non-ferrous Metals* (Draft 1), Environment Agency Web Site p. 90

Bay 1/2

Point Source: EA9						
Actual Stack Height (m)	**Building Height (m)**	**Effective Stack Height (m)**	**Emission Velocity[30] (ms^{-1})**	**Flow Rate[31] (m^3s^{-1})**	**Stack Diameter[32] (m)**	**Discharge Temperature (K)**
37.8	29	14.9	6.3	13.89	1.675	297

	Normal Emissions						Abnormal Emissions			
Substance	**Frequency & Period of Emission**	**Average Emission Rate (gs^{-1})**	**Average Emission Conc.[33] (mgm^{-3})**	**Maximum Emission Rate (gs^{-1})**	**Maximum Emission Conc. (mgm^{-3})**	**Annual Mass Emitted (kg)**	**Frequency & Period of Emission**	**Emission Rate (gs^{-1})**	**Emission Conc. (mgm^{-3})**	**Annual Mass Emitted (kg)**
Beryllium	Continuous emission – the derivation of the emission rates from stack monitoring data is provided in Appendix 2 of this document.	$1.0x10^{-10}$	$1.4x10^{-9}$	$5.1x10^{-11}$	$7.4x10^{-10}$	$2.2x10^{-6}$	No abnormal operations undertaken	-	-	-
Aluminium Oxide	Periodic emissions (up to fifty times per year) - the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.1.	$1.4x10^{-9}$	$1.0x10^{-7}$	$4.7x10^{-7}$	$3.4x10^{-5}$	$4.3x10^{-5}$	No abnormal operations undertaken	-	-	-
Perchloroethylene	Continuous emission – the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.1.	2.2×10^{-3}	$1.6x10^{-1}$	$3.1x10^{-1}$	22	67.2	Disposal of degraded perchloroethylene by direct evaporation to air over a period of 16 hours; performed up to four times per year.	1.4	100	320

[30] The emission velocity provided has been derived from the reported flow rate and the stack orifice area (i.e EV=FR/SOA).
[31] The flow rate provided is the stack flow rate at the stack sampling point and has been taken from *Radioactive Substances Authorisation BB0523: Compilation of Environment Agency Requirements (CEAR) – Discharges of Radioactive Gaseous Waste from AWE plc at Aldermaston* (Ref. AWE/DSDG/A/EC/M.Env/004)
[32] Circular stack orifice of area 0.95 m^2.
[33] All average and maximum emission concentrations reported in this table have been derived from the emission rate and the reported flow rate (i.e. EC=ER/FR).

Bay 1/2

	Normal Emissions						Abnormal Emissions			
Substance	Frequency & Period of Emission	Average Emission Rate (gs^{-1})	Average Emission Conc.[34] (mgm^{-3})	Maximum Emission Rate (gs^{-1})	Maximum Emission Conc. (mgm^{-3})	Annual Mass Emitted (kg)	Frequency & Period of Emission	Emission Rate (gs^{-1})	Emission Conc. (mgm^{-3})	Annual Mass Emitted (kg)
Trichloroethylene (USVD)	Continuous emission – the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.1.	$9.5x10^{-4}$	$1.7x10^{-2}$	$6.9x10^{-1}$	50	30	Disposal of degraded trichloroethylene by direct evaporation to air over a period of 12 hours; performed up to four times per year.	1.7	125	300
Trichloroethylene (Hand Wiping)	Frequent emissions (up to 2000 times per year) – the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.1.	$4.2x10^{-2}$	3.0	$4.2x10^{-2}$	3.0	150	No abnormal operations undertaken	-	-	-
Ethanol (Machining Operations)	Periodic emissions (up to 100 times per year) - the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.1.	0.53	38.4	0.53	38.4	64	No abnormal operations undertaken	-	-	
Ethanol (Be Machining)	Periodic emissions (up to 100 times per year) - the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.1.	0.22	15.8	0.22	15.8	40	No abnormal operations undertaken			-

[34] All average and maximum emission concentrations reported in this table have been derived from the emission rate and the reported flow rate (i.e. EC=ER/FR).

Box 3/a

Point Source: EA10						
Actual Stack Height (m)	**Building Height (m)**	**Effective Stack Height (m)**	**Emission Velocity[38] (ms^{-1})**	**Flow Rate[39] (m^3s^{-1})**	**Stack Diameter[40] (m)**	**Discharge Temperature (K)**
37.8	29	14.9	7.01	15.45	1.675	297

	Normal Emissions						Abnormal Emissions			
Substance	**Frequency & Period of Emission**	**Average Emission Rate (gs^{-1})**	**Average Emission Conc.[41] (mgm^{-3})**	**Maximum Emission Rate (gs^{-1})**	**Maximum Emission Conc. (mgm^{-3})**	**Annual Mass Emitted (kg)**	**Frequency & Period of Emission**	**Emission Rate (gs^{-1})**	**Emission Conc. (mgm^{-3})**	**Annual Mass Emitted (kg)**
Beryllium	Continuous emission – the derivation of the emission rates from stack monitoring data is provided in Appendix 3 of this document.	$1.0x10^{-10}$	$1.6x10^{-9}$	$5.1x10^{-11}$	$7.9x10^{-10}$	$3.1x10^{-6}$	No abnormal operations undertaken	-	-	-
Perchloroethylene	Periodic emissions (up to fifty times per year) - the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.1.	0.01	$7.2x10^{-1}$	0.01	$7.2x10^{-1}$	0.96	Disposal of degraded perchloroethylene by direct evaporation to air over a period of 10 hours; undertaken up to twelve times per year.	0.01	$7.2x10^{-1}$	4.8
Ethanol	Periodic emissions (up to fifty times per year) - the reported emission rates are estimates, the derivation of which is provided in Section 1 of Document B2.3.	$4.2x10^{-2}$	2.7	$4.2x10^{-2}$	2.7	4	No abnormal operations undertaken	-	-	-

[38] The emission velocity provided has been derived from the reported flow rate and the stack orifice area (i.e EV=FR/SOA).
[39] The flow rate provided is the stack flow rate at the stack sampling point and has been taken from *Radioactive Substances Authorisation BZ1994: Compilation of Environment Agency Requirements (CEAR) – Discharges of Radioactive Gaseous Waste from AWE plc at Aldermaston* (Ref. AWE/DSDG/A/EC/M.Env/004)
[40] Circular stack orifice of area 0.95 m^2.
[41] All average and maximum emission concentrations reported in this table have been derived from the emission rate and the reported flow rate (i.e. EC=ER/FR).

Substance	Estimated Monthly Average Emission Conc. (mgm^{-3})	Benchmark Figure (mgm^{-3})	Comparison of Average Emission Conc. With Benchmark Figure
Beryllium[42]	$5.3x10^{-9}$	0.005	The estimated monthly average emission concentration is substantially lower than the Benchmark Figure. The impact of these emissions on the environment is considered in Document B4.
Perchloroethylene[43]	$7.2x10^{-1}$	50	The estimated monthly average emission concentration is lower than the Benchmark Figure. The impact of these emissions on the environment is considered in Document B4.
Ethanol	$8.3x10^{-3}$	50	The estimated monthly average emission concentration is lower than the Benchmark Figure. The impact of these emissions on the environment is considered in Document B4.

[42] Benchmark figure for beryllium taken from Environment Agency, (2001) *Technical Guidance Note IPPC S2.03 Technical Guidance for Non-ferrous Metals* (Draft 1), Environment Agency Web Site p. 91

[43] Benchmark figure for 'VOCs' taken from Environment Agency, (2001) *Technical Guidance Note IPPC S2.03 Technical Guidance for Non-ferrous Metals* (Draft 1), Environment Agency Web Site p. 90