Reporting of Emission to Groundwater for the period of November 2024

Operator: CCR Energy Ltd **Form: Groundwater1**

Location: Aberthaw Ash Disposal Site

Permit/Variation Number: DP3432SW

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
BH3B	Aluminium, Dissolved		17.7 µg/L		28/11/2024	Sampling WSP / Testing ALS	
	Antimony, Dissolved		10.6 µg/L				
	Arsenic, Dissolved		145 µg/L				
	Boron, Dissolved		21600 µg/L				
	Cadmium, Dissolved		<0.08 µg/L				
	Calcium, Dissolved		338000 µg/L				
	Chromium, Dissolved		3.83 µg/L				
	Hexavalent Chromium		<30 µg/L				
	Copper, Dissolved		0.835 µg/L				
	Magnesium, Dissolved		201000 µg/L				
	Manganese. Dissolved		238 µg/L				
	Molybdenum, Dissolved		2160 µg/L				
	Nickel, Dissolved		3.23 µg/L				
	Selenium Dissolved		6.58 µg/L				
	Vanadium, Dissolved		47.4 µg/L				
	Mercury, Dissolved		<0.01 µg/L				
	Alkalinity to pH 4.5 as $CaCO_3$		263000 µg/L				
	Iron, Dissolved		42.3 µg/L				
	Potassium, Dissolved		92400 µg/L				
	Sodium, Dissolved		348000 µg/L				
	Sulphate, Dissolved as SO_4		1400000 µg/L				
	Nitrogen: Total Oxidised as N		300 µg/L				
	Chloride		797000 µg/L				
	Fluoride		<500 µg/L				
	Ammoniacal Nitrogen as N		515 µg/L				
	Carbon, Organic: Total as C		3470 µg/L				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
	Electrical conductivity		5043 µS/cm	Field measurements			
	Temperature		12.3 °C				
	Dissolved oxygen		2.15 mg/L				
	pH		7.46				
	Oxidation reduction potential		15 mV				
	Groundwater level		4.51 mAOD				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
BH5	Aluminium, Dissolved		<10 µg/L		28/11/2024	Sampling WSP / Testing ALS	
	Antimony, Dissolved		<1 µg/L				
	Arsenic, Dissolved		0.744 µg/L				
	Boron, Dissolved		199 µg/L				
	Cadmium, Dissolved		<0.08 µg/L				
	Calcium, Dissolved		172000 µg/L				
	Chromium, Dissolved		1.78 µg/L				
	Hexavalent Chromium		<30 µg/L				
	Copper, Dissolved		0.702 µg/L				
	Magnesium, Dissolved		15300 µg/L				
	Manganese. Dissolved		118 µg/L				
	Molybdenum, Dissolved		10.9 µg/L				
	Nickel, Dissolved		3.7 µg/L				
	Selenium, Dissolved		<1 µg/L				
	Vanadium, Dissolved		<1 µg/L				
	Mercury, Dissolved		<0.01 µg/L				
	Alkalinity to pH 4.5 as $CaCO_3$		315000 µg/L				
	Iron, Dissolved		419 µg/L				
	Potassium, Dissolved		4460 µg/L				
	Sodium, Dissolved		23600 µg/L				
	Sulphate, Dissolved as SO_4		216000 µg/L				
	Nitrogen: Total Oxidised as N		<100 µg/L				
	Chloride		27800 µg/L				
	Fluoride		<500 µg/L				
	Ammoniacal Nitrogen as N		<200 µg/L				
	Carbon, Organic: Total as C		6050 µg/L				
	Electrical conductivity		1015 µS/cm	Field measurements			
	Temperature		9.2 °C				
	Dissolved oxygen		7.63 mg/L				
	pH		6.86				
	Oxidation reduction potential		-96 mV				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
	Groundwater level		10.74 mAOD				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
BH6	Aluminium, Dissolved		<10 µg/L		28/11/2024	Sampling WSP / Testing ALS	
	Antimony, Dissolved		19.4 µg/L				
	Arsenic, Dissolved		95.5 µg/L				
	Boron, Dissolved		12400 µg/L				
	Cadmium, Dissolved		<0.08 µg/L				
	Calcium, Dissolved		472000 µg/L				
	Chromium, Dissolved		<1 µg/L				
	Hexavalent Chromium		<30 µg/L				
	Copper, Dissolved		<0.3 µg/L				
	Magnesium, Dissolved		154000 µg/L				
	Manganese. Dissolved		113 µg/L				
	Molybdenum, Dissolved		1880 µg/L				
	Nickel, Dissolved		1.99 µg/L				
	Selenium Dissolved		116 µg/L				
	Vanadium, Dissolved		247 µg/L				
	Mercury, Dissolved		<0.01 µg/L				
	Alkalinity to pH 4.5 as $CaCO_3$		426000 µg/L				
	Iron, Dissolved		39.9 µg/L				
	Potassium, Dissolved		35900 µg/L				
	Sodium, Dissolved		44200 µg/L				
	Sulphate, Dissolved as SO_4		1670000 µg/L				
	Nitrogen: Total Oxidised as N		2210 µg/L				
	Chloride		2170000 µg/L				
	Fluoride		<500 µg/L				
	Ammoniacal Nitrogen as N		722 µg/L				
	Carbon, Organic: Total as C		3460 µg/L				
	Electrical conductivity		8680 µS/cm				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
	Temperature		11.7 °C	Field measurements			
	Dissolved oxygen		2.58 mg/L				
	pH		7.17				
	Oxidation reduction potential		103 mV				
	Groundwater level		9.18 mAOD				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
BH7A	Aluminium, Dissolved		<10 µg/L			Sampling WSP / Testing ALS	
	Antimony, Dissolved		<1 µg/L				
	Arsenic, Dissolved		24.8 µg/L				
	Boron, Dissolved		19800 µg/L				
	Cadmium, Dissolved		<0.08 µg/L				
	Calcium, Dissolved		602000 µg/L				
	Chromium, Dissolved		<1 µg/L				
	Hexavalent Chromium		<30 µg/L				
	Copper, Dissolved		<0.3 µg/L				
	Magnesium, Dissolved		111000 µg/L				
	Manganese. Dissolved		858 µg/L				
	Molybdenum, Dissolved		3030 µg/L				
	Nickel, Dissolved		0.465 µg/L				
	Selenium Dissolved		2.37 µg/L				
	Vanadium, Dissolved		<1 µg/L				
	Mercury, Dissolved		<0.01 µg/L				
	Alkalinity to pH 4.5 as $CaCO_3$		380000 µg/L				
	Iron, Dissolved		4670 µg/L				
	Potassium, Dissolved		198000 µg/L				
	Sodium, Dissolved		1430000 µg/L				
	Sulphate, Dissolved as SO_4		1510000 µg/L				
	Nitrogen: Total Oxidised as N		112 µg/L				
	Chloride		2240000 µg/L				
	Fluoride		<500 µg/L				
	Ammoniacal Nitrogen as N		2480 µg/L				
	Carbon, Organic: Total as C		<3000 µg/L				
	Electrical conductivity		9362 µS/cm	Field measurements			
	Temperature		11.6 °C				
	Dissolved oxygen		1.13 mg/L				
	pH		7.09				
	Oxidation reduction potential		-75 mV				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
	Groundwater level		2.82 mAOD				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
BH7B	Aluminium, Dissolved		<10 µg/L			Sampling WSP / Testing ALS	
	Antimony, Dissolved		<1 µg/L				
	Arsenic, Dissolved		44.5 µg/L				
	Boron, Dissolved		16000 µg/L				
	Cadmium, Dissolved		<0.08 µg/L				
	Calcium, Dissolved		493000 µg/L				
	Chromium, Dissolved		<1 µg/L				
	Hexavalent Chromium		<30 µg/L				
	Copper, Dissolved		0.435 µg/L				
	Magnesium, Dissolved		123000 µg/L				
	Manganese. Dissolved		1480 µg/L				
	Molybdenum, Dissolved		2770 µg/L				
	Nickel, Dissolved		<0.4 µg/L				
	Selenium Dissolved		<1 µg/L				
	Vanadium, Dissolved		<1 µg/L				
	Mercury, Dissolved		<0.01 µg/L				
	Alkalinity to pH 4.5 as $CaCO_3$		509000 µg/L				
	Iron, Dissolved		11400 µg/L				
	Potassium, Dissolved		168000 µg/L				
	Sodium, Dissolved		1090000 µg/L				
	Sulphate, Dissolved as SO_4		1360000 µg/L				
	Nitrogen: Total Oxidised as N		<100 µg/L				
	Chloride		1800000 µg/L				
	Fluoride		<500 µg/L				
	Ammoniacal Nitrogen as N		2440 µg/L				
	Carbon, Organic: Total as C		4570 µg/L				
	Electrical conductivity		8418 µS/cm				
	Temperature		12.5 °C				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
	Dissolved oxygen		0.35 mg/L	Field measurements			
	pH		7.06				
	Oxidation reduction potential		-109 mV				
	Groundwater level		2.8 mAOD				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
BH8A	Aluminium, Dissolved		298 µg/L			Sampling WSP / Testing ALS	
	Antimony, Dissolved		11.1 µg/L				
	Arsenic, Dissolved		55.8 µg/L				
	Boron, Dissolved		14000 µg/L				
	Cadmium, Dissolved		<0.08 µg/L				
	Calcium, Dissolved		518000 µg/L				
	Chromium, Dissolved		<1 µg/L				
	Hexavalent Chromium		<30 µg/L				
	Copper, Dissolved		<0.3 µg/L				
	Magnesium, Dissolved		17100 µg/L				
	Manganese. Dissolved		24.8 µg/L				
	Molybdenum, Dissolved		3320 µg/L				
	Nickel, Dissolved		<0.4 µg/L				
	Selenium Dissolved		38.7 µg/L				
	Vanadium, Dissolved		141 µg/L				
	Mercury, Dissolved		<0.01 µg/L				
	Alkalinity to pH 4.5 as $CaCO_3$		54400 µg/L				
	Iron, Dissolved		<19 µg/L				
	Potassium, Dissolved		78300 µg/L				
	Sodium, Dissolved		516000 µg/L				
	Sulphate, Dissolved as SO_4		1220000 µg/L				
	Nitrogen: Total Oxidised as N		9550 µg/L				
	Chloride		892000 µg/L				
	Fluoride		<500 µg/L				
	Ammoniacal Nitrogen as N		1080 µg/L				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
	Carbon, Organic: Total as C		<3000 µg/L				
	Electrical conductivity		5623 µS/cm	Field measurements			
	Temperature		11.8 °C				
	Dissolved oxygen		0.33 mg/L				
	pH		8.66				
	Oxidation reduction potential		47 mV				
	Groundwater level		7.68 mAOD				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
BH8B	Aluminium, Dissolved		<10 µg/L			Sampling WSP / Testing ALS	
	Antimony, Dissolved		<1 µg/L				
	Arsenic, Dissolved		1.51 µg/L				
	Boron, Dissolved		2250 µg/L				
	Cadmium, Dissolved		<0.08 µg/L				
	Calcium, Dissolved		851000 µg/L				
	Chromium, Dissolved		<1 µg/L				
	Hexavalent Chromium		<30 µg/L				
	Copper, Dissolved		<0.3 µg/L				
	Magnesium, Dissolved		524000 µg/L				
	Manganese. Dissolved		456 µg/L				
	Molybdenum, Dissolved		54.4 µg/L				
	Nickel, Dissolved		0.944 µg/L				
	Selenium Dissolved		1.13 µg/L				
	Vanadium, Dissolved		<1 µg/L				
	Mercury, Dissolved		<0.01 µg/L				
	Alkalinity to pH 4.5 as $CaCO_3$		417000 µg/L				
	Iron, Dissolved		9630 µg/L				
	Potassium, Dissolved		145000 µg/L				
	Sodium, Dissolved		3830000 µg/L				
	Sulphate, Dissolved as SO_4		960000 µg/L				
	Nitrogen: Total Oxidised as N		<100 µg/L				
	Chloride		8590000 µg/L				
	Fluoride		<500 µg/L				
	Ammoniacal Nitrogen as N		8100 µg/L				
	Carbon, Organic: Total as C		3170 µg/L				
	Electrical conductivity		25680 µS/cm	Field measurements			
	Temperature		11.3 °C				
	Dissolved oxygen		0.89 mg/L				
	pH		6.86				
	Oxidation reduction potential		-115 mV				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
	Groundwater level		8.53 mAOD				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
BH9B	Aluminium, Dissolved		<10 µg/L			Sampling WSP / Testing ALS	
	Antimony, Dissolved		<1 µg/L				
	Arsenic, Dissolved		0.599 µg/L				
	Boron, Dissolved		249 µg/L				
	Cadmium, Dissolved		<0.08 µg/L				
	Calcium, Dissolved		101000 µg/L				
	Chromium, Dissolved		<1 µg/L				
	Hexavalent Chromium		<30 µg/L				
	Copper, Dissolved		<0.3 µg/L				
	Magnesium, Dissolved		22700 µg/L				
	Manganese. Dissolved		48.7 µg/L				
	Molybdenum, Dissolved		4.94 µg/L				
	Nickel, Dissolved		0.809 µg/L				
	Selenium Dissolved		1.22 µg/L				
	Vanadium, Dissolved		<1 µg/L				
	Mercury, Dissolved		<0.01 µg/L				
	Alkalinity to pH 4.5 as $CaCO_3$		451000 µg/L				
	Iron, Dissolved		94 µg/L				
	Potassium, Dissolved		15500 µg/L				
	Sodium, Dissolved		35400 µg/L				
	Sulphate, Dissolved as SO_4		<2000 µg/L				
	Nitrogen: Total Oxidised as N		<100 µg/L				
	Chloride		63600 µg/L				
	Fluoride		<500 µg/L				
	Ammoniacal Nitrogen as N		38800 µg/L				
	Carbon, Organic: Total as C		91900 µg/L				
	Electrical conductivity		1120 µS/cm				
	Temperature		10.4 °C				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
	Dissolved oxygen		0.61 mg/L	Field measurements			
	pH		6.81				
	Oxidation reduction potential		-251 mV				
	Groundwater level		4.88 mAOD				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
BH10B	Aluminium, Dissolved		<10 µg/L			Sampling WSP / Testing ALS	
	Antimony, Dissolved		<1 µg/L				
	Arsenic, Dissolved		71.4 µg/L				
	Boron, Dissolved		19500 µg/L				
	Cadmium, Dissolved		<0.08 µg/L				
	Calcium, Dissolved		403000 µg/L				
	Chromium, Dissolved		3.93 µg/L				
	Hexavalent Chromium		<30 µg/L				
	Copper, Dissolved		<0.3 µg/L				
	Magnesium, Dissolved		209000 µg/L				
	Manganese. Dissolved		1110 µg/L				
	Molybdenum, Dissolved		2320 µg/L				
	Nickel, Dissolved		2.85 µg/L				
	Selenium Dissolved		<1 µg/L				
	Vanadium, Dissolved		<1 µg/L				
	Mercury, Dissolved		<0.01 µg/L				
	Alkalinity to pH 4.5 as $CaCO_3$		652000 µg/L				
	Iron, Dissolved		11500 µg/L				
	Potassium, Dissolved		81900 µg/L				
	Sodium, Dissolved		639000 µg/L				
	Sulphate, Dissolved as SO_4		1290000 µg/L				
	Nitrogen: Total Oxidised as N		<100 µg/L				
	Chloride		1040000 µg/L				
	Fluoride		<500 µg/L				
	Ammoniacal Nitrogen as N		2270 µg/L				
	Carbon, Organic: Total as C		<3000 µg/L				
	Electrical conductivity		6205 µS/cm	Field measurements			
	Temperature		11.9 °C				
	Dissolved oxygen		0.67 mg/L				
	pH		7.12				
	Oxidation reduction potential		-100 mV				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
	Groundwater level		1.76 mAOD				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
BH11A	Aluminium, Dissolved		<10 µg/L			Sampling WSP / Testing ALS	
	Antimony, Dissolved		9.17 µg/L				
	Arsenic, Dissolved		23.8 µg/L				
	Boron, Dissolved		13000 µg/L				
	Cadmium, Dissolved		<0.08 µg/L				
	Calcium, Dissolved		317000 µg/L				
	Chromium, Dissolved		<1 µg/L				
	Hexavalent Chromium		<30 µg/L				
	Copper, Dissolved		<0.3 µg/L				
	Magnesium, Dissolved		93000 µg/L				
	Manganese. Dissolved		520 µg/L				
	Molybdenum, Dissolved		1170 µg/L				
	Nickel, Dissolved		3.03 µg/L				
	Selenium Dissolved		26.9 µg/L				
	Vanadium, Dissolved		38.2 µg/L				
	Mercury, Dissolved		<0.01 µg/L				
	Alkalinity to pH 4.5 as $CaCO_3$		596000 µg/L				
	Iron, Dissolved		651 µg/L				
	Potassium, Dissolved		37900 µg/L				
	Sodium, Dissolved		82100 µg/L				
	Sulphate, Dissolved as SO_4		718000 µg/L				
	Nitrogen: Total Oxidised as N		360 µg/L				
	Chloride		110000 µg/L				
	Fluoride		<500 µg/L				
	Ammoniacal Nitrogen as N		909 µg/L				
	Carbon, Organic: Total as C		<3000 µg/L				
	Electrical conductivity		2480 µS/cm				
	Temperature		12.1 °C				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
	Dissolved oxygen		1.89 mg/L	Field measurements			
	pH		7.03				
	Oxidation reduction potential		8 mV				
	Groundwater level		10.85 mAOD				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
BH11B	Aluminium, Dissolved		<10 µg/L			Sampling WSP / Testing ALS	
	Antimony, Dissolved		<1 µg/L				
	Arsenic, Dissolved		33.9 µg/L				
	Boron, Dissolved		15000 µg/L				
	Cadmium, Dissolved		<0.08 µg/L				
	Calcium, Dissolved		540000 µg/L				
	Chromium, Dissolved		<1 µg/L				
	Hexavalent Chromium		<30 µg/L				
	Copper, Dissolved		<0.3 µg/L				
	Magnesium, Dissolved		127000 µg/L				
	Manganese. Dissolved		1350 µg/L				
	Molybdenum, Dissolved		1800 µg/L				
	Nickel, Dissolved		0.502 µg/L				
	Selenium Dissolved		<1 µg/L				
	Vanadium, Dissolved		1.01 µg/L				
	Mercury, Dissolved		<0.01 µg/L				
	Alkalinity to pH 4.5 as $CaCO_3$		626000 µg/L				
	Iron, Dissolved		11900 µg/L				
	Potassium, Dissolved		162000 µg/L				
	Sodium, Dissolved		1270000 µg/L				
	Sulphate, Dissolved as SO_4		247000 µg/L				
	Nitrogen: Total Oxidised as N		<100 µg/L				
	Chloride		520000 µg/L				
	Fluoride		<500 µg/L				
	Ammoniacal Nitrogen as N		1940 µg/L				
	Carbon, Organic: Total as C		6500 µg/L				
	Electrical conductivity		4246 µS/cm	Field measurements			
	Temperature		10.6 °C				
	Dissolved oxygen		2.96 mg/L				
	pH		7.27				
	Oxidation reduction potential		-64 mV				

Emission Point	Substance / Parameter	Emission Limit Value	Result [1]	Test Method [2]	Sample Date and Times [3]	Accreditation/ Certification [4]	Uncertainty [5]
	Groundwater level		4.01 mAOD				

[1] The result given is the maximum value (or the minimum value in the case of a limit that is expressed as a minimum) obtained during the reporting period, expressed in the same terms as the emission limit value. Where the emission limit value is expressed as a range, the result is given as the 'minimum – maximum' measured values.
[2] Where an internationally recognised standard test method is used the reference number is given. Where another method that has been formally agreed with the Agency is used, then the appropriate identifier is given. In other cases the principal technique is stated, e.g. colorimetry.
[3] For non-continuous measurements the date and time of the sample that produced the result is given. For continuous measurements, or flow/time proportional samples, the percentage of the process operating time covered by the monitoring is given.
[4] The accreditation status of the equipment and/or the monitoring organisation, as appropriate, for the methods used for both sampling and analysis.
[5] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated.

Signed [redacted] ..... Date.....12/12/2024.....
(authorised to sign as representative of the Operator)