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Your ref: SSD-67983064
Our ref: 12622054

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Response to EPA Advice on Air Quality – Wagga Wagga Lithium-Ion Battery Recycling Facility (SSD-67983064)

Dear Ellen

The Air Quality Impact Assessment (AQIA) (Revision 3) for the Wagga Wagga Lithium-Ion Battery Recycling Facility was submitted as part of the Response to Submissions on 29 January 2026. Subsequently, feedback on the AQIA was provided by the Environmental Protection Authority (EPA) on 17 February 2026 (ref: DOC26/62674-8).

This letter provides a response to each of the queries raised by the EPA

Issue 1: Exceedances of impact assessment criteria – PM_{10} (24-hour) at R35

The EPA recommend the AQIA is amended to:

– *Provide clarity on the cumulative assessment method, and if variable background air quality data has been used for the assessment (Level 2 assessment as per the Approved Methods).*
– *Provide further assessment to resolve the predicted PM_{10} (24-hour) exceedance at R35.*

Response:

Cumulative assessment method

Cumulative particulate impacts have been assessed using a Level 2 contemporaneous assessment approach in accordance with the *Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2022)* (Approved Methods). This method incorporates day-specific background air quality concentrations from the Department of Climate Change Energy, the Environment and Water (DCCEEW) Wagga Wagga North Air Quality Monitoring Station (AQMS), allowing modelled incremental particulate concentrations to be combined with corresponding background concentrations occurring on the same day. This approach provides a more representative assessment of short-term particulate impacts compared with a Level 1 approach, which applies a fixed background concentration. This is particularly relevant where elevated background PM_{10} concentrations are driven by regional sources that are unrelated to the project.

Table 1 presents the top five incremental PM_{10} concentrations at R35 and the top five background PM_{10} concentrations considered in the cumulative assessment, together with their respective occurrence dates. The table also shows the cumulative PM_{10} concentrations adopted for the assessment, noting that the maximum cumulative concentrations can occur on days which don't correspond with maximum incremental or background

days. Additional information including how background concentrations contribute with predicted incremental concentrations are provided below.

Table 1 Top 5 background, increment and cumulative PM_{10} in 2022 (R35)

Unit: µg/m³	Incremental		Background		Cumulative	
	PM_{10}	Date	PM_{10}	Date	PM_{10}	Date
Rank 1	7.0	16/10/2022	46.8	5/04/2022	49.8	5/04/2022
Rank 2	6.8	23/08/2022	44.6	21/02/2022	47.5	23/08/2022
Rank 3	6.6	18/02/2022	39.6	18/02/2022	46.2	18/02/2022
Rank 4	6.3	8/12/2022	39.2	30/03/2022	44.9	30/03/2022
Rank 5	6.1	8/10/2022	39.1	17/02/2022	41.1	29/03/2022

Particulate matter fraction

Due to the absence of specific PM_{10} and $PM_{2.5}$ data in the emission inventory, additional review has been undertaken and PM_{10} and $PM_{2.5}$ fractions have been derived as 92% and 82% of TSP respectively. These fractions represent the worst-case particle size distributions based on a review of the following source categories in Generalised Particle Size Distributions (US EPA, 1996):

– Category 2: Combustion
– Category 3 / 4: Mechanically Generated
– Category 8: Melting, Smelting, and Refining.

On this basis, the assessment results have been updated, and all results in this response in Table 1, Table 2 and Figure 1 adopt this methodology.

Resolution of the PM_{10} (24-hour) exceedance at R35

Predicted incremental and cumulative particulate concentrations at key receptors are presented in Table 2. The revised modelling predicts a highest cumulative 24-hour PM_{10} concentration of 49.8 µg/m³ at receptor R35, which is below the 24-hour PM_{10} criterion of 50 µg/m³.

It is noted that under the Level 2 contemporaneous approach, the maximum incremental concentration and the maximum cumulative concentration do not necessarily occur on the same day. As shown in Table 2, the maximum incremental 24-hour PM_{10} concentration at R35 is 7.0 µg/m³, however this occurs on a day with a lower background concentration. The maximum cumulative concentration of 49.8 µg/m³ occurs on a day when the background PM_{10} is at its highest (46.8 µg/m³), on which the project contribution is approximately 3.0 µg/m³, representing less than 7% of the total concentration. This clarifies the apparent discrepancy between the incremental and cumulative values noted by the EPA in the previous revision.

To provide further insight into the project's anticipated contribution to particulate concentrations, Figure 1 presents the day-by-day incremental PM_{10} contribution and corresponding background PM_{10} concentrations at R35 throughout the modelled year. The figure demonstrates that the project only contributes a minor proportion of the overall concentration, and that elevated cumulative concentrations are driven by background levels rather than project emissions.

Overall, predicted cumulative particulate concentrations comply with the relevant assessment criteria at all assessed receptors.

Table 2 Predicted particulate concentrations (proposed operation)

Receptors	Predicted particulate concentration (µg/m^3)									
	Incremental[1]					Cumulative with DCCEEW AQMS				
	TSP	PM10		PM2.5		TSP	PM10		PM2.5	
	Annual	24-hour max	Annual	24-hour max	Annual	Annual	24-hour max	Annual	24-hour max	Annual
Criteria	**90**	**50**	**25**	**25**	**8**	**90**	**50**	**25**	**25**	**8**
R01	0.1	0.7	0.1	0.7	0.1	26.1	46.9	13.1	22.4	5.3
R02	0.0	0.5	0.0	0.4	0.0	26.1	46.8	13.1	22.4	5.3
R03	0.0	0.3	0.0	0.3	0.0	26.1	46.8	13.0	22.4	5.3
R04	0.0	0.3	0.0	0.3	0.0	26.1	46.8	13.0	22.4	5.3
R05	0.0	0.2	0.0	0.2	0.0	26.0	46.8	13.0	22.4	5.3
R06	0.0	0.2	0.0	0.2	0.0	26.0	46.8	13.0	22.4	5.2
R07	0.0	0.3	0.0	0.3	0.0	26.0	46.8	13.0	22.4	5.3
R08	0.0	0.3	0.0	0.3	0.0	26.0	46.8	13.0	22.4	5.3
R09	0.0	0.3	0.0	0.3	0.0	26.0	46.8	13.0	22.4	5.3
R10	0.0	0.3	0.0	0.3	0.0	26.0	46.8	13.0	22.4	5.3
R11	0.0	0.3	0.0	0.3	0.0	26.0	46.8	13.0	22.4	5.3
R12	0.0	0.3	0.0	0.3	0.0	26.0	46.8	13.0	22.4	5.3
R13	0.0	0.3	0.0	0.2	0.0	26.0	46.8	13.0	22.4	5.2
R14	0.0	0.2	0.0	0.2	0.0	26.0	46.8	13.0	22.4	5.2
R15	0.0	0.2	0.0	0.1	0.0	26.0	46.8	13.0	22.4	5.2
R16	0.0	0.3	0.0	0.3	0.0	26.0	46.8	13.0	22.4	5.2
R17	0.0	0.1	0.0	0.1	0.0	26.0	46.8	13.0	22.4	5.2
R18	0.0	0.3	0.0	0.3	0.0	26.0	46.8	13.0	22.4	5.2
R19	0.0	0.2	0.0	0.2	0.0	26.1	46.8	13.0	22.4	5.3
R20	0.0	0.2	0.0	0.2	0.0	26.1	46.8	13.0	22.4	5.3
R21	0.0	0.2	0.0	0.2	0.0	26.1	46.8	13.0	22.4	5.3
R22	0.0	0.1	0.0	0.1	0.0	26.0	46.8	13.0	22.4	5.2
R23	0.0	0.1	0.0	0.1	0.0	26.0	46.8	13.0	22.4	5.2
R24	0.0	0.2	0.0	0.2	0.0	26.0	46.8	13.0	22.4	5.2
R25	0.0	0.2	0.0	0.2	0.0	26.0	46.8	13.0	22.4	5.2
R26	0.0	0.2	0.0	0.2	0.0	26.0	46.8	13.0	22.4	5.2
R27	0.0	0.2	0.0	0.2	0.0	26.0	47.0	13.0	22.4	5.2
R28	0.0	0.3	0.0	0.2	0.0	26.0	46.9	13.0	22.4	5.2
R29	0.1	1.0	0.1	0.8	0.1	26.1	47.0	13.1	22.4	5.3
R30	0.1	1.2	0.1	1.0	0.1	26.2	47.1	13.1	22.4	5.3
R31	0.4	2.8	0.3	2.5	0.3	26.4	47.7	13.4	22.4	5.5
R32	0.3	1.7	0.2	1.5	0.2	26.3	47.4	13.3	22.4	5.5

[1] The day associated with the maximum incremental 24-hour particulate impact does not necessarily coincide with the day of the maximum cumulative 24-hour concentration, as cumulative impacts are influenced by background concentrations, which may peak on different days to project-related increments.

Receptors	Predicted particulate concentration (µg/m^3)									
	Incremental[1]					Cumulative with DCCEEW AQMS				
	TSP	PM10		PM2.5		TSP	PM10		PM2.5	
	Annual	24-hour max	Annual	24-hour max	Annual	Annual	24-hour max	Annual	24-hour max	Annual
R33	0.2	1.3	0.2	1.1	0.2	26.2	47.2	13.2	22.4	5.4
R34	0.1	0.9	0.1	0.8	0.1	26.2	47.0	13.1	22.4	5.4
R35	1.0	7.0	0.9	6.2	0.8	27.0	49.8[2]	13.9	22.4	6.0
R36	0.7	4.5	0.6	4.1	0.6	26.7	48.6	13.7	22.4	5.8

[2] The maximum cumulative 24-hour PM_{10} concentration of 49.8 µg/m^3 occurs on a different day to the maximum incremental impact and comprises a background contribution of 46.8 µg/m^3 and a project contribution of 3.0 µg/m^3.

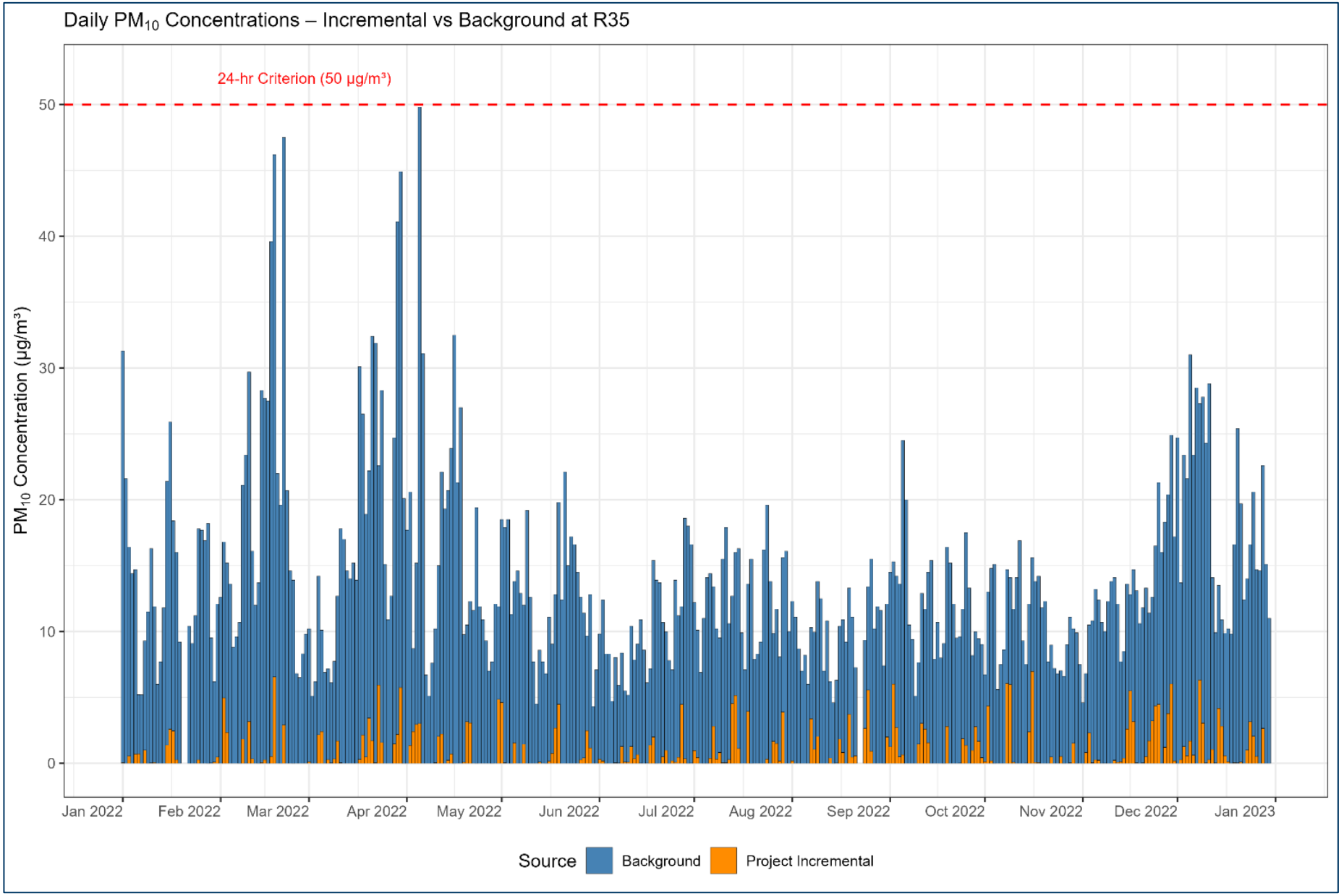

Figure 1 ***Daily incremental and background PM_{10} contributions at the most affected receptor R35***

Issue 2: Details of assessment approach for VOCs

The EPA recommend the AQIA is amended to provide a clear and transparent description of the assessment methodology for assessing VOCs, including clarity on whether the predicted impacts for speciated VOCs assumes all VOCs as being the speciated compounds assessed.

Response:

VOC emissions from the battery recycling plant stacks comprise a mixture of chemical species, as detailed in the stack test data provided. For assessment purposes, VOCs were modelled as a combined total, with predicted concentrations for individual species apportioned based on their proportional contributions to total VOC emissions, as determined from the stack test speciation data (refer Appendix A). This means each speciated VOC has been assessed at its proportional emission rate, rather than assuming all VOC emissions consist of a single compound.

Benzene, acetaldehyde, and formaldehyde were identified as indicator species based on their relatively high emission proportions and/or most stringent assessment criteria. The proportional contribution of each VOC species to total emissions alongside the applicable assessment criteria is presented in Table 3.

Predicted maximum ground-level concentrations of the indicator VOCs at key receptors are provided in Table 4. Due to the impact assessment criteria applying at and beyond the boundary of site, the maximum predicted grid values are included for comparison with criteria.

Benzene is the VOC predicted to be closest to the criteria, however the maximum predicted concentration on the modelling domain of 12.5 µg/m^3 is below the criteria of 29 µg/m^3. This indicates that there are no exceedances for all VOCs at and beyond the site boundary.

Table 3 VOC chemical species – emission proportions and assessment criteria

Chemical species	Proportion of Total VOC Emissions (%)	Criteria (mg/m^3)
Benzene	15.4%[3]	0.029
Acetaldehyde	12.0%[4]	0.042
Acetone	7.5%	9.2
Methyl Alcohol (Methanol)	6.1%	3
Chloromethane	4.7%	1.9
Ethanol	4.7%	2.1
Toluene	0.8%	0.36
Formaldehyde	0.8%	0.02[5]
Pentane	0.7%	33
Methylene chloride	0.5%	3.19
Butanol	0.3%	0.5
Xylene	0.3%	0.19

[3] Benzene is identified as the most dominant VOC, with the second most stringent assessment criterion of 0.029 mg/m^3
[4] Acetaldehyde is identified as the second most dominant VOC, with the third most stringent assessment criterion of 0.042 mg/m^3
[5] Formaldehyde has the most stringent assessment criterion among the VOCs assessed at 0.02 mg/m^3

Table 4 Maximum predicted VOC chemical concentrations

Receptors	Predicted incremental VOCs concentration (µg/m^3)		
Pollutants	**Benzene**	**Acetaldehyde**	**Formaldehyde**
Averaging period and percentile	**1 hour, 99.9th percentile**		
Percentage in VOCs	**15.4%**	**12.0%**	**0.8%**
Criteria	**29**	**42**	**20**
Maximum Predicted Grid Value	**12.5**	**9.8**	**0.6**

Issue 3: Details of assessment approach for metals

The EPA recommend the AQIA is amended to provide a clear and transparent description of the assessment methodology for assessing speciated metals and provide supporting data to justify the approach adopted.

Response:

Speciated metal fractions were derived from source sampling data collected at a similar operating facility, as provided by the technology partner Henan Zhengyang Machinery Equipment Co Ltd (Refer Appendix A). The sampling data includes metals speciation results which were used to determine the proportional contribution of each metal species to the total Type 1 and Type 2 substance emissions.

The speciated metal fractions from the sampling data were applied to the maximum Type 1 and Type 2 metals emission rates (1 mg/m^3 in aggregate) to derive the individual emission rate for each metal species. This approach ensures consistency with *Protection of the Environment Operations (Clean Air) Regulation 2022* reporting requirements while conservatively representing the potential impacts of individual metals by scaling speciated emissions to the maximum allowable emission limits.

The resulting speciated emissions for each discharge point are presented in Table 5 and Table 6.

The top six ranked metals were identified and assessed as representative indicators based on a compliance screening ratio, defined as the ratio of the predicted maximum concentration to the applicable assessment criterion. Results are presented in Table 7, confirming compliance with all relevant assessment criteria.

Overall, predicted concentrations for all assessed Type 1 and Type 2 metals comply with the relevant assessment criteria at all assessed receptors.

Table 5 Modelled emissions of Type 1 and Type 2 substances for DP2

DP2 - Process Gas Chimney **Principal Toxic Pollutants**	Emission (mg/Nm^3)	Volumetric Flow (Nm^3/h)	Emission Rate (g/s)	Type
Sb	1.40E-05	33,250	1.29E-07	1
As	3.49E-05	33,250	3.22E-07	1
Cd	2.45E-04	33,250	2.26E-06	1
Pb	1.40E-03	33,250	1.29E-05	1
Hg	6.99E-06	33,250	6.46E-08	1
Be	3.49E-05	33,250	3.22E-07	2
Cr	8.69E-05	33,250	8.03E-07	2
Co	6.86E-03	33,250	6.33E-05	2
Mn	3.01E-02	33,250	2.78E-04	2
Ni	2.25E-02	33,250	2.08E-04	2

DP2 - Process Gas Chimney Principal Toxic Pollutants	Emission (mg/Nm^3)	Volumetric Flow (Nm^3/h)	Emission Rate (g/s)	Type
Se	1.40E-05	33,250	1.29E-07	2
Sn	6.99E-06	33,250	6.46E-08	2
V	6.98E-05	33,250	6.44E-07	2

Table 6 Modelled emissions of Type 1 and Type 2 substances for DP3

DP3 – Baghouse Chimney Principal Toxic Pollutants	Emission (mg/Nm^3)	Volumetric Flow (Nm^3/h)	Emission Rate (g/s)	Type
Sb	4.01E-05	11,600	1.29E-07	1
As	1.00E-04	11,600	3.22E-07	1
Cd	7.01E-04	11,600	2.26E-06	1
Pb	4.01E-03	11,600	1.29E-05	1
Hg	2.00E-05	11,600	6.46E-08	1
Be	1.00E-04	11,600	3.22E-07	2
Cr	2.49E-04	11,600	8.03E-07	2
Co	3.43E-04	11,600	1.11E-06	2
Mn	3.27E-03	11,600	1.05E-05	2
Ni	1.01E-03	11,600	3.25E-06	2
Se	4.01E-05	11,600	1.29E-07	2
Sn	2.00E-05	11,600	6.46E-08	2
V	2.00E-04	11,600	6.44E-07	2

Table 7 Top 6 predicted metals maximum concentrations in type 1 and type 2 substances

Pollutants	Averaging period	Percentile	Max predicted value(µg/m^3)	Criteria (µg/m3)	Percentage of criteria (%)	Source of assessment criteria
Ni	1 hour	99.9th	0.09	**0.18**	48.2%	NSW Guideline
Co	24 hours	99.9th	0.01	**0.092**	21.6%	WA Guideline
Mn	1 hour	99.9th	0.12	**18**	0.7%	NSW Guideline
Pb	Annual	100th	0.0006	**0.5**	0.5%	NSW Guideline
Be	1 hour	99.9th	0.0003	**0.004**	8.1%	NSW Guideline
Cd	1 hour	99.9th	0.002	**0.018**	12.6%	NSW Guideline

Regards,

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Appendix A

Air Quality – sampling data for metals

		Sample Number	23-36842.001	
		Test Object	Flue emission	
		Sample Description	-	
Parameter	Method	Units	MDL	Testing Results
Sampling Date	-	-	-	2023/12/17
Weather condition	-	-	-	Sunny
Sampling location	-	-	-	NO.3 MP1 Air leaving RCO
Sample description	-	-	-	cartridge
Sampling Time(Humidity)	-	-	-	11:00-11:05
Sampling Time(Metal PM)	-	-	-	11:15-12:15
Sampling Time(NOx CO CO_2)	-	-	-	11:15-12:14
Sectional area	-	m^2	-	0.283
Exhaust Height	-	m	-	5
Gas Temp	GB/T 16157	℃	-	15.2
Stack gas velocity	GB/T 16157	m/s	-	4.8
Exhaust Flow	GB/T 16157	m^3/h	-	4.65 X 10^3
Static Pressure	GB/T 16157	kPa	-	-0.03
Humidity	TS SSESB1	%	0.20	**0.61**
Carbon dioxide (Emission conc.)	USEPA Method 3A	%(v/v)	0.1	**0.4**
Carbon monoxide (Emission conc.)	USEPA Method 10	mg/m^3	1.3	**47.6**
Carbon monoxide (Emission rate)	USEPA Method 10	kg/h	-	0.221
Nitrogen dioxide (Emission conc.)	USEPA Method 7E	mg/m^3	2	<2
Nitrogen dioxide (Emission rate)	USEPA Method 7E	kg/h	-	**<0.00929**
Particulate matter (Emission conc.)	USEPA Method 5	mg/m^3	20	**22**
Particulate matter (Emission rate)	USEPA Method 5	kg/h	-	0.102
Chromium (Emission conc.)	HJ 657	mg/m^3	0.000500	**0.000621**
Chromium (Emission rate)	HJ 657	kg/h	-	2.89 X 10^{-6}
Thallium (Emission conc.)	HJ 657	mg/m^3	0.000100	<0.000100
Thallium (Emission rate)	HJ 657	kg/h	-	$<4.65\times10^{-7}$
Copper (Emission conc.)	HJ 657	mg/m^3	0.00250	**0.0506**
Copper (Emission rate)	HJ 657	kg/h	-	0.000235
Manganese (Emission conc.)	HJ 657	mg/m^3	0.00500	**0.216**
Manganese (Emission rate)	HJ 657	kg/h	-	0.00100
Antimony (Emission conc.)	HJ 657	mg/m^3	0.000100	<0.000100
Antimony (Emission rate)	HJ 657	kg/h	-	$<4.65\times10^{-7}$
Arsenic (Emission conc.)	HJ 657	mg/m^3	0.00250	<0.00250
Arsenic (Emission rate)	HJ 657	kg/h	-	$<1.16\times10^{-6}$
Beryllium (Emission conc.)	HJ 657	mg/kg	0.000250	<0.000250
Beryllium (Emission rate)	HJ 657	kg/h	-	$<1.16\times10^{-6}$
Cadmium (Emission conc.)	HJ 657	mg/m^3	0.00175	<0.00175
Cadmium (Emission rate)	HJ 657	kg/h	-	$<8.13\times10^{-6}$
Cobalt (Emission conc.)	HJ 657	mg/m^3	0.0001	**0.0490**
Cobalt (Emission rate)	HJ 657	kg/h	-	0.000228
Lead (Emission conc.)	HJ 657	mg/m^3	0.0100	<0.0100
Lead (Emission rate)	HJ 657	kg/h	-	$<4.65\times10^{-5}$
Molybdenum (Emission conc.)	HJ 657	mg/m^3	0.000250	<0.000250

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		Sample Number		23-36842.001
		Test Object		Flue emission
		Sample Description		-
Parameter	Method	Units	MDL	Testing Results
Molybdenum (Emission rate)	HJ 657	kg/h	-	$<1.16\times10^{-6}$
Nickel (Emission conc.)	HJ 657	mg/m³	0.000500	**0.161**
Nickel (Emission rate)	HJ 657	kg/h	-	0.000749
Silver (Emission conc.)	HJ 657	mg/m³	0.000100	<0.000100
Silver (Emission rate)	HJ 657	kg/h	-	$<4.65\times10^{-7}$
Selenium (Emission conc.)	HJ 657	mg/m³	0.000100	<0.000100
Selenium (Emission rate)	HJ 657	kg/h	-	$<4.65\times10^{-7}$
Stannum (Emission conc.)	HJ 657	mg/m³	0.000100	**0.00256**
Stannum (Emission rate)	HJ 657	kg/h	-	1.19×10^{-5}
Vanadium (Emission conc.)	HJ 657	mg/m³	0.000500	<0.000500
Vanadium (Emission rate)	HJ 657	kg/h	-	$<2.32\times10^{-6}$
Bismuth (Emission conc.)	HJ 657	mg/m³	0.000250	<0.000250
Bismuth (Emission rate)	HJ 657	kg/h	-	$<1.16\times10^{-6}$
Uranium (Emission conc.)	HJ 657	mg/m³	0.000250	<0.000250
Uranium (Emission Rate)	HJ 657	kg/h	-	$<1.16\times10^{-6}$
Thorium (Emission conc.)	HJ 657	mg/m³	0.000500	<0.000500
Thorium (Emission rate)	HJ 657	kg/h	-	$<2.32\times10^{-6}$
Iron (Emission conc.)	HJ 777	mg/m³	0.500	<0.500
Iron (Emission rate)	HJ 777	kg/h	-	**<0.00232**

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