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23 October 2023

Lachlan McWha
Environmental Compliance & Approvals Coordinator
Great Southern Energy Pty Ltd (trading as Delta Coal)
Off Construction Road (Off Ruttleys Road)
Mannering Park, NSW, 2259

Re: Chain Valley Colliery - response to DPE submission on air quality impact assessment

Dear Lachlan,

EMM Consulting Pty Limited (EMM) prepared an air quality Impact Assessment (AQIA) for the Chain Valley Colliery Consolidation Project ('the Project') in September 2022. A response to submissions was prepared in March 2023 to address comments made by the Environmental Justice Australia (EJA) on behalf of the Nature Conservation Council (NCC) of NSW dated 16 December 2022 (EMM Consulting 2023). A request for more information was issued by the Department of Planning and Environment (DPE) in August 2023 (Department of Environment 2023).

This report addresses the comments made in the DPE letter. We hope that this additional assessment meets your needs. Please do not hesitate to contact me using the details below if you have any questions.

Yours sincerely

Francine Manansala
Associate, Air Quality

1 Introduction

1.1 Overview

Chain Valley Colliery (CVC) and Mannering Colliery (MC) are underground coal mines located on the southern shore of Lake Macquarie, NSW. The CVC and MC operations are owned and operated by Great Southern Energy Pty Ltd (trading as Delta Coal). Delta Coal is seeking approval for the Project, which would provide for the consolidation of the existing operations at CVC and MC under a single development consent under the EP&A Act.

In September 2022, an Environmental Impact Statement (EIS) was prepared for the Project (Umwelt (Australia) Pty Limited 2022), with the air quality impact assessment (AQIA) forming part of the EIS document (EMM 2022).

In December 2022, submissions on the EIS for the Project were received. A submission was prepared by EJA on behalf of the NCC of NSW (Environmental Justice Australia 2022). Section 3a of the submission is of relevance to the AQIA report, and a response to comments was prepared in March 2023 (EMM 2023).

In August 2023, a request for additional information was issued by the Department of Planning and Environment (DPE) requesting an assessment of combustion emissions from the Project.

This report addresses the request submitted by DPE for further assessment of combustion emissions from operations at CVC and MC for the two scenarios assessed in EMM 2022. The full request made by DPE is provided in Appendix A.

1.2 Assessment approach

The methodology from EMM 2022 largely remains the same for this assessment. The assessment year and scenarios, as well as dispersion model configuration are consistent with those from EMM 2022. Additional detail is given in the proceeding sections of this assessment.

In order to assess the impacts from combustion related emissions from the Project, the following has been included in this study:

- a description of relevant pollutants for assessment and applicable impact assessment criteria
- a description of baseline conditions in particular the existing air quality environment as it relates to this study
- a detailed air pollution emissions inventory for combustion emissions (NO_x, SO_2, CO and VOCs)
- atmospheric dispersion modelling for the quantified emissions, including analysis of Project-only and cumulative impacts accounting for baseline air quality for the following two scenarios:
    - scenario 1 – coal handling at maximum approved rate of 2.8 Mt from MC pit top (no coal handling at CVC pit top)
    - scenario 2 – MC Pit Top operating at a coal handling rate of 1.3 Mt simultaneously with CVC pit top operating at a coal handling rate of 1.5 Mt (for a total maximum approved rate of 2.8 Mt).

This assessment has been prepared in general accordance with the guidelines specified by the NSW Environment Protection Authority (EPA) in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA 2022), referred to herein as 'the Approved Methods for Modelling'.

1.3 Assessment location

Consistent with EMM 2022, the same assessment locations have been used in this report. These assessment locations are presented in Table 1.1.

Table 1.1 Assessment locations

Assessment location ID	Receptor type	Easting	Northing
4	Residential	363695	6327245
5	Residential	363940	6327347
6	Residential	364178	6327282
7	Residential	365322	6328073
8	Residential	365018	6328096
9	Residential	365173	6328884
11	Residential	365312	6328713
18	Residential	365265	6328839
20	Residential	365169	6329047
R5	Residential	363758	6330736
R6	Residential	364001	6330867
R8	Residential	363990	6330529
R9	Residential	364145	6330566
R11	Residential	365218	6329388
R12	Residential	365213	6329347
R13	Residential	365391	6329169
R14	Residential	365949	6328530
R15	Residential	365145	6328317
R17	Residential	366560	6328590
R19	Residential	366350	6329578
R22	Residential	366401	6331137
R22B	Residential	366492	6331099
School	School	363610	6331139

1.4 Applicable air quality assessment criteria

The NSW EPA's impact assessment criteria for gaseous pollutants, as documented in Section 7 of the Approved Methods for Modelling, are presented in Table 1.2.

The Approved Methods for Modelling classifies CO, NO_x and SO_2 as criteria pollutants. Assessment criteria for pollutants are applied at the nearest existing or likely future off-site sensitive receptor and compared against the 100th (i.e. the highest) dispersion modelling prediction for each averaging period. Both incremental (project impacts only) and cumulative (project including background) impacts need to be presented, the latter requiring consideration of existing ambient background concentrations for the pollutants assessed.

An impact assessment criterion is not prescribed for total VOCs (assessed here as total hydrocarbons, or THC). However, some of the more commonly assessed THCs from diesel combustion are benzene, 1,3-butadiene, and formaldehyde. The impact assessment criteria for these pollutants from the Approved Methods for Modelling is provided in Table 1.2. The predictions for THCs were compared against these criteria (see Sections 4.3 and 4.4 for further detail).

Table 1.2 Impact assessment criteria for gaseous pollutants

Pollutant	Averaging period	Impact assessment criterion
NO_2	1 hour	164 µg/m^3
	Annual	31 µg/m^3
SO_2	1 hour	286 µg/m^3
	24 hour	57 µg/m^3
CO	1 hour	30 mg/m^3
	8 hour rolling	10 mg/m^3
Benzene	1 hour	29 µg/m$^{3(a)}$
1,3-butadiene	1 hour	40 µg/m$^{3(a)}$
Formaldehyde	1 hour	20 µg/m$^{3(a)}$

Notes: µg/m^3 : micrograms per cubic metre; mg/m^3 : milligrams per cubic metre.

(a) gas volumes are expressed at 25°C and at an absolute pressure of 1 atmosphere (101.3 kPa).

2 Meteorology and background air quality

2.1 Meteorology

The same meteorological data analysis and modelling files from EMM 2022 were adopted for this study. The 2018 calendar year was deemed representative of existing conditions and was adopted as the assessment year.

Consistent with EMM 2022, atmospheric dispersion modelling for this assessment was completed using The Air Pollution Model (TAPM) and the CALMET/CALPUFF model suite.

Hourly average meteorological data from Delta Coal's Mannering AWS and RTD002 were used as observations in the TAPM and CALMET modelling.

Further details of the TAPM and CALMET meteorological modelling parameters and analysis are presented in Section 4.2.3 of EMM 2022.

2.2 Background air quality

Although Delta Coal and Delta Electricity maintain an air quality monitoring network for their operations, gaseous pollutants are not measured from this network. The NSW DPE maintains an air quality monitoring station (AQMS) at Wyong approximately 16.1 km south-west of the Project. Hourly concentrations of NO_2, SO_2 and CO were collated from the DPE Wyong AQMS for the 2018 assessment period.

Throughout the collated data period, there were a number of missing data points for each pollutant at the Wyong AQMS. Gap filling was completed for the dataset using a combination of interpolation and using data from a previous period where the gap was considered to be too large.

Summary statistics for NO_2, SO_2 and CO for 2018 at the Wyong AQMS are presented in Table 2.1. During 2018 there were no recorded exceedances of the EPA criterion for any of the measured gaseous pollutants.

Table 2.1 Statistics for NO_2, SO_2 and CO – DPE Wyong AQMS - 2018

Pollutant	Criterion	Maximum 1-hourly average concentration	Annual mean concentration	Hours over assessment criterion
NO_2 ($\mu g/m^3$)	1-hourly – 164 $\mu g/m^3$ Annual – 31 $\mu g/m^3$	71.8	8.9	0
SO_2 ($\mu g/m^3$)	1-hourly – 286 $\mu g/m^3$ Annual – N/A	177.0	1.9	0
CO (mg/m^3)	1-hourly – 30 mg/m^3 Annual – N/A	1.5	0.1	0

3 Emissions from diesel engines

Combustion emissions were estimated for future scenarios 1 and 2 of the Project using information for a 'baseline' scenario (financial year 2020/2021) incorporating existing data. Coal extraction, diesel use data and equipment information for the baseline scenario were provided by Delta and were used to calculate emissions and then develop emissions. This information was then used to develop the emissions inventory for the future scenarios. This is further detailed below.

It is noted that this report includes an assessment of combustion emissions related to the operation of mining plant and equipment and trucks hauling coal on-site and to the Vales Point Power Station in scenario 2. It is does not include an assessment of emissions related to hauling of product further off-site to other locations. It is noted that hauling off-site (apart from to the VPPS), will be limited to 600,000 tonnes per year of coal during daytime hours only to Kooragang via the M1 Motorway and Industrial Drive (an approximate 70 km one-way haulage distance). The modelling assessment presented in this report and in the September 2022 report includes hauling of 1.3 Mt of coal from the project to VPPS. Assessment locations in the vicinity of this haul route were predicted to be below the impact assessment criteria. Other residential locations along the off-site hauling route are likely to result in lower predicted impacts given the smaller tonnage of coal hauled (i.e. 600,000 tonnes) and the restriction on hours of operation.

3.1 Baseline scenario (2020/2021)

In the baseline scenario, diesel consumption and emissions from non-road diesel engines were calculated using the NONROAD2008a methodology (USEPA 2010). Emissions were estimated for financial year 2020/21 using a bottom-up approach for CO, THC, NO_X and SO_2. Each item of equipment was characterised in terms of its rated power (kW), emission standard (USEAP tier), usage (hours per year), engine load factor (%) and median life (h), and the equipment was allocated to either surface operation or underground operation. The bottom-up diesel consumption calculations by equipment type (e.g. loaders, forklifts, lighting) were then calibrated to within 1% using real-world diesel use statistics for 2020/2021 provided by Delta Coal.

All surface emissions were allocated to MC; surface emissions at CVC were assumed to be zero as there were no surface operations at CVC in financial year 2020/21. Underground emissions were allocated to MC or CVC based on the equipment types and diesel consumption data provided by Delta Coal.

Diesel use and emissions in the baseline scenario are summarised in Table 3.1.

Table 3.1 Diesel engine emissions – baseline scenario

Location	Diesel use (L/y)	Emissions (kg/year)			
		CO	THC	NO_x	SO_2
Surface (MC only)	61,882	439	104.4	1,215	1.02
Underground (MC)	54,054	101	57.5	1,244	0.64
Underground (CVC)	347,936	851	414.2	7,951	4.12
Total	463,872	1,391	576.1	10,410	5.78

It was not possible to determine which underground operations corresponded to the emissions from the various ventilation stacks. Emissions from the stacks in the baseline scenario were therefore estimated based on in-stack NO_X measurements taken by Ektimo (2021). Ektimo found that in-stack NO_X concentrations were below the instrument detection limits. It was therefore conservatively assumed that NO_X would be emitted at the detection limits (Table 3.2).

Table 3.2 Calculation of stack NO_x emission rates – baseline scenario

NO_x emission rate	Units	MC		CVC	
		Vent 1	Vent 2	Vent 1	Vent 2
Measured (Ektimo 2021)	g/min	<10	<20	<30	<30
Assumed	g/min	10	20	30	30
Assumed	g/s	0.1667	0.3333	0.5000	0.5000

3.2 Scenario 1

The NO_X emission rates in Table 3.1 were associated with a total ROM coal production in 2020-21 of 1,489,783 tonnes.

For surface operations at MC, the NO_X emission rates in Table 3.1 were scaled according to the ratio of the total RoM coal in the scenario (2,800,000 tonnes) and the baseline RoM coal. The results are shown in Table 3.3. Emissions by equipment type (not shown) were calculated as part of this process. The NO_X emission rates in Table 3.1 were associated with a total RoM coal production in 2020-21 of 1,489,783 tonnes.

Table 3.3 Surface emissions – scenario 1

Location	Emissions (kg/year)			
	CO	THC	NO_X	SO_2
Surface (MC only)	825	196	2,284	1.92

Stack emission rates in scenario 1 were calculated in two steps. Firstly, the NO_X emission rates in Table 3.2 were scaled according to the ratio of the total RoM coal in the scenario (2,800,000 tonnes) and the baseline RoM coal. Secondly, for CO, THC and SO_2, the stack emission rates were based on the ratios of emissions (e.g. CO/NO_X) from underground operations at MC and CVC (see Table 3.1). The resulting emission rates for scenario 1 are given in Table 3.4. It should also be noted that these emission rates were also used in scenario 2, as there was no way of knowing which underground operations corresponded to the emissions from the various ventilation stacks.

Table 3.4 Stack emission rates – scenario 1

Pollutant	Units	MC		CVC	
		Vent 1	Vent 2	Vent 1	Vent 2
NO_X	g/s	0.3132	0.6265	0.9397	0.9397
CO	g/s	0.0255	0.0510	0.1006	0.1006
THC	g/s	0.0145	0.0289	0.0490	0.0490
SO_2	g/s	0.0002	0.0003	0.0005	0.0005

3.3 Scenario 2

For surface operations at MC and CVC, the NO_X emission rates in Table 3.1 were scaled according to the ratios of the total RoM coal handled at MC (1,300,000 tonnes) and CVC (1,500,000 tonnes), and the baseline RoM coal. Again, emissions by equipment type (not shown) were calculated as part of this process. In addition, surface operations at CVC would include the hauling of coal to the Vales Point Power Station. These were therefore included as an additional source using the NONROAD model in conjunction with assumptions[1] about the vehicle used and the annual distance travelled. The results are shown in Table 3.5.

Table 3.5 Surface emissions – scenario 2

Location	Emissions (kg/year)			
	CO	THC	NO_x	SO_2
Surface (MC)	383	91	1,060	0.89
Surface (CVC)	1,425	323	4,086	4.73

The stack emission rates for scenario 2 were the same as those given for scenario 1 in Table 3.4.

[1] It was assumed that haul trucks would have a rated power of 280 kW, and would be operational for 6,722 hours of the year based on an average speed of 30 km/h and an annual vehicle-kilometres travelled (VKT) of 201,667.

4 Dispersion modelling

4.1 Dispersion model selection and configuration

The dispersion modelling approach used in EMM 2022 was adopted for this assessment. This included the use of TAPM to produce prognostic upper air data which was then fed into CALMET (the meteorological pre-processor for CALPUFF). CALPUFF was then to predict concentrations at assessment locations.

Further details including the modelled source locations are provided in Chapter 6 of EMM 2022.

4.2 NO_x to NO_2 conversion

NO_x emissions from combustion sources are primarily emitted as nitric oxide (NO) and, at the point of emissions, would typically consist of 90%-95% NO and 5%-10% NO_2. Impact assessment criteria are prescribed for NO_2, and therefore it is necessary to account for the transformation of NO to NO_2 as the plume travels from the source. The dominant short-term conversion of NO to NO_2 is through oxidation with atmospheric ozone (O_3).

The Approved Methods for Modelling prescribes three methods to account for the oxidation of NO to NO_2, as follows:

- Method 1: assume 100% conversion of NO to NO_2
- Method 2: the ozone limiting method (OLM), which is a conservative approach that assumes all available ozone in the atmosphere will react with NO in the plume until either all the ozone of all the NO is used up
- Method 3: an empirical equation developed by Janssen et al. (1988) for estimating the oxidation rate of NO in power plant plumes.

For this assessment, the ozone limiting method (OLM) has been applied to convert model-predicted ground-level concentrations (GLCs) of NO_x to NO_2 for comparison with the applicable impact assessment criteria.

Reference has been made to the hourly-varying O_3 concentrations recorded at the DPE Wyong AQMS during 2018, consistent with the background air quality dataset discussed in Section 2.2.

The equation used to calculate the NO_2 concentrations from predicted NO_x concentration is as follows:

$$[NO_2]_{TOTAL} = \{0.1 \times [NO_x]_{PRED}\} + MIN\{(0.9) \times [NO_x]_{PRED} \text{ or } (46/48 \times [O_3]_{BKGD}\} + [NO_2]_{BKGD}$$

Where:

$[NO_2]_{TOTAL}$ = The predicted concentration of NO_2 in µg/m^3

$[NO_x]_{PRED}$ = The CALPUFF predictions of ground level NO_x concentrations in µg/m^3

MIN = the minimum of the two quantities within the braces

$[O_3]_{BKGD}$ = the background ambient O_3 concentration – hourly varying dataset in µg/m^3

46/48 = the molecular weight of NO_2 divided by the molecular weight of O_3

$[NO_2]_{BKGD}$ = the background ambient NO_2 concentration – hourly varying dataset in µg/m^3.

The OLM assumes that all available O_3 in the atmosphere will react with NO in the plume until either all the O_3 or all the NO is used up. As stated in the Approved Methods for Modelling, the approach assumes that the atmospheric reaction is instant. In reality, the reaction takes place over a number of hours. The OLM will therefore tend to overestimate concentrations at near-source locations. Therefore, the NO_2 GLCs calculated using the OLM approach are considered conservative.

4.3 Incremental (Project-only) results

Predicted incremental CO, NO_2, SO_2 and THC concentrations for Scenarios 1 and 2 are presented in Table 4.1 and Table 4.2 respectively for each of the assessment locations.

The predicted concentrations for all pollutants and averaging periods are below the applicable NSW EPA assessment criteria at all assessment locations. Analysis of cumulative impact compliance is presented in Section 4.4.

Table 4.1 Incremental (Project-only) concentration results – Scenario 1

Assessment location ID	Predicted incremental concentration						
	CO		NO_2		SO_2		THC
	1-hour maximum	8-hour rolling average	1-hour maximum	Annual average	1-hour maximum	24-hour maximum	1-hour maximum
Criterion [1]	30	10	164	31	215	57	See footnote [2]
Units	mg/m³	mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
4	0.002	0.0015	9.8	0.3	0.007	0.0015	0.60
5	0.003	0.0020	13.9	0.3	0.011	0.0020	1.00
6	0.003	0.0018	15.5	0.3	0.009	0.0018	0.76
7	0.002	0.0012	13.4	0.3	0.007	0.0014	0.65
8	0.003	0.0020	11.7	0.5	0.008	0.0022	0.83
9	0.002	0.0015	8.7	0.5	0.005	0.0019	0.53
11	0.002	0.0013	8.8	0.4	0.006	0.0014	0.49
18	0.002	0.0013	8.6	0.5	0.005	0.0016	0.48
20	0.002	0.0013	8.8	0.5	0.006	0.0016	0.50
R5	0.001	0.0004	15.2	0.1	0.008	0.0010	0.73
R6	0.001	0.0004	10.6	0.1	0.006	0.0007	0.52
R8	0.002	0.0005	16.4	0.2	0.009	0.0009	0.80
R9	0.001	0.0005	12.8	0.1	0.007	0.0007	0.63
R11	0.001	0.0008	6.7	0.3	0.004	0.0010	0.34
R12	0.001	0.0009	6.5	0.4	0.004	0.0011	0.36
R13	0.001	0.0010	7.9	0.3	0.005	0.0011	0.45
R14	0.001	0.0005	7.2	0.1	0.004	0.0005	0.36
R15	0.003	0.0015	11.6	0.5	0.006	0.0018	0.65
R17	0.001	0.0004	5.5	0.1	0.004	0.0004	0.32
R19	0.001	0.0006	6.1	0.1	0.004	0.0006	0.32
R22	0.001	0.0003	3.9	0.1	0.003	0.0005	0.29
R22B	0.001	0.0003	4.1	0.1	0.003	0.0005	0.30
School	0.001	0.0004	8.1	0.1	0.004	0.0010	0.39

Note: [1] The criteria for CO, NO_2, SO_2 and THC are applicable to cumulative (incremental + background). The criteria are provided for comparison purposes only.

[2] The maximum results for THCs are below the individual criteria for benzene, 1,3-butadiene, and formaldehyde.

Table 4.2 Incremental (Project-only) concentration results – Scenario 2

Assessment location ID	Predicted incremental concentration						
	CO		NO_2		SO_2		THC
	1-hour maximum	8-hour rolling average	1-hour maximum	Annual average	1-hour maximum	24-hour maximum	1-hour maximum
Criterion [1]	30	10	164	31	215	57	See footnote [2]
Units	mg/m³	mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
4	0.002	0.0015	10.4	0.3	0.007	0.0017	0.58
5	0.003	0.0017	13.9	0.3	0.011	0.0019	1.00
6	0.002	0.0015	14.9	0.3	0.009	0.0017	0.77
7	0.002	0.0011	13.3	0.3	0.007	0.0014	0.65
8	0.002	0.0015	11.3	0.4	0.006	0.0019	0.61
9	0.004	0.0021	13.0	0.5	0.011	0.0028	1.13
11	0.003	0.0015	14.1	0.4	0.008	0.0021	0.80
18	0.003	0.0018	14.8	0.5	0.008	0.0026	0.90
20	0.004	0.0024	14.9	0.6	0.013	0.0037	1.37
R5	0.002	0.0013	15.5	0.2	0.011	0.0018	0.99
R6	0.002	0.0014	16.4	0.2	0.010	0.0020	0.99
R8	0.003	0.0020	16.6	0.3	0.012	0.0025	1.07
R9	0.003	0.0020	14.0	0.3	0.010	0.0029	0.93
R11	0.005	0.0037	27.0	0.6	0.013	0.0045	1.42
R12	0.005	0.0036	25.5	0.6	0.013	0.0044	1.34
R13	0.003	0.0024	24.4	0.4	0.009	0.0028	1.34
R14	0.002	0.0008	14.6	0.2	0.005	0.0012	0.77
R15	0.002	0.0014	12.2	0.4	0.007	0.0017	0.67
R17	0.001	0.0008	7.7	0.2	0.004	0.0011	0.40
R19	0.002	0.0016	21.3	0.3	0.011	0.0017	1.11
R22	0.008	0.0046	59.8	1.3	0.039	0.0102	3.87
R22B	0.009	0.0032	47.4	1.0	0.046	0.0086	4.55
School	0.003	0.0011	21.9	0.2	0.011	0.0018	1.41

Note: [1] The criteria for CO, NO_2, SO_2 and THC are applicable to cumulative (incremental + background). The criteria are provided for comparison purposes only.

[2] The maximum results for THCs are below the individual criteria for benzene, 1,3-butadiene, and formaldehyde.

4.4 Cumulative (Project + background) results

Predicted cumulative CO, NO_2 and SO_2 concentrations associated the project for Scenario 1 and 2 are presented in Table 4.3 and Table 4.4 respectively for each of the assessment locations. There are no background measurements available for THC concentrations, however results have been included in the following tables for the purpose of comparison.

Cumulative impacts at the assessment locations have been quantified in the following way:

- for 1-hourly average concentrations, each hourly varying model predicted CO, NO_2 and SO_2 concentrations were combined with the corresponding concentration from the adopted 2018 Wyong AQMS background dataset (Section 2.2)
- for 8-hour rolling average concentrations, each 8-hour rolling average calculated from 1-hourly model predicted CO concentrations were combined with the corresponding concentration from the adopted 2018 Wyong AQMS background dataset
- for 24-hour average concentrations, each daily-varying model predicted SO_2 concentrations from both were combined with the corresponding concentration from the adopted 2018 Wyong AQMS background dataset (Section 2.2)
- for annual average concentrations, the predicted NO_2 annual average concentrations were calculated using the OLM described in Section 4.3 using measured NOx and O3 concentrations from the 2018 Wyong AQMS dataset (Section 2.2).

The predicted cumulative concentrations for all pollutants and averaging periods are below the applicable NSW EPA assessment criteria at all assessment locations for Scenario 1 and 2.

Table 4.3 Cumulative (Project plus background) concentration results – Scenario 1

Assessment location ID	Predicted cumulative concentration						
	CO		NO_2		SO_2		THC[1]
	1-hour maximum	8-hour rolling average	1-hour maximum	Annual average	1-hour maximum	24-hour maximum	1-hour maximum
Criterion	30	10	164	31	215	57	See footnote [2]
Units	mg/m³	mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
4	1.5	1.1	72.2	9.1	177.0	21.1	0.6
5	1.5	1.1	71.9	9.2	177.0	21.1	1.0
6	1.5	1.1	71.8	9.1	177.0	21.1	0.8
7	1.5	1.1	71.8	9.2	177.0	21.1	0.6
8	1.5	1.1	71.8	9.4	177.0	21.1	0.8
9	1.5	1.1	71.8	9.4	177.0	21.1	0.5
11	1.5	1.1	71.8	9.3	177.0	21.1	0.5
18	1.5	1.1	71.8	9.3	177.0	21.1	0.5
20	1.5	1.1	71.8	9.4	177.0	21.1	0.5
R5	1.5	1.1	71.8	9.0	177.0	21.1	0.7
R6	1.5	1.1	71.8	9.0	177.0	21.1	0.5
R8	1.5	1.1	71.8	9.0	177.0	21.1	0.8
R9	1.5	1.1	71.8	9.0	177.0	21.1	0.6
R11	1.5	1.1	71.8	9.2	177.0	21.1	0.3
R12	1.5	1.1	71.8	9.3	177.0	21.1	0.4
R13	1.5	1.1	71.8	9.2	177.0	21.1	0.4
R14	1.5	1.1	71.8	9.0	177.0	21.1	0.4
R15	1.5	1.1	71.8	9.3	177.0	21.1	0.7
R17	1.5	1.1	71.8	9.0	177.0	21.1	0.3
R19	1.5	1.1	71.8	9.0	177.0	21.1	0.3
R22	1.5	1.1	71.8	9.0	177.0	21.1	0.3
R22B	1.5	1.1	71.8	9.0	177.0	21.1	0.3
School	1.5	1.1	71.8	9.0	177.0	21.1	0.4

Note: [1] THC concentrations do not include background but have been included for comparison.

[2] The maximum results for THCs are below the individual criteria for benzene, 1,3-butadiene, and formaldehyde.

Table 4.4 Cumulative (Project plus background) concentration results – Scenario 2

Assessment location ID	Predicted cumulative concentration						
	CO		NO_2		SO_2		THC[1]
	1-hour maximum	8-hour rolling average	1-hour maximum	Annual average	1-hour maximum	24-hour maximum	1-hour maximum
Criterion	30	10	164	31	214	57	See footnote [2]
Units	mg/m³	mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
4	1.50	1.06	72.5	9.2	177.0	21.1	0.58
5	1.50	1.06	72.1	9.2	177.0	21.1	1.00
6	1.50	1.06	71.9	9.2	177.0	21.1	0.77
7	1.50	1.06	71.8	9.2	177.0	21.1	0.65
8	1.50	1.06	71.8	9.3	177.0	21.1	0.61
9	1.50	1.06	71.8	9.4	177.0	21.1	1.13
11	1.50	1.06	71.8	9.3	177.0	21.1	0.80
18	1.50	1.06	71.8	9.4	177.0	21.1	0.90
20	1.50	1.06	71.8	9.5	177.0	21.1	1.37
R5	1.50	1.06	71.8	9.1	177.0	21.1	0.99
R6	1.50	1.06	71.8	9.1	177.0	21.1	0.99
R8	1.50	1.06	71.8	9.2	177.0	21.1	1.07
R9	1.50	1.06	71.8	9.2	177.0	21.1	0.93
R11	1.50	1.06	71.8	9.5	177.0	21.1	1.42
R12	1.50	1.06	71.8	9.5	177.0	21.1	1.34
R13	1.50	1.06	71.8	9.3	177.0	21.1	1.34
R14	1.50	1.06	71.8	9.1	177.0	21.1	0.77
R15	1.50	1.06	71.8	9.3	177.0	21.1	0.67
R17	1.50	1.06	71.8	9.1	177.0	21.1	0.40
R19	1.50	1.06	71.8	9.2	177.0	21.1	1.11
R22	1.50	1.06	79.2	10.2	177.0	21.1	3.87
R22B	1.50	1.06	71.8	9.9	177.0	21.1	4.55
School	1.50	1.06	71.8	9.1	177.0	21.1	1.41

Note: [1] THC concentrations do not include background but have been included for comparison.

[2] The maximum results for THCs are below the individual criteria for benzene, 1,3-butadiene, and formaldehyde.

5 Conclusion

Dispersion modelling has been completed for two operational emission scenarios, with specific focus on combustion related emissions:

- Scenario 1 – coal handling at maximum approved rate of 2.8 Mt from MC Pit Top (no coal handling at CVC pit top)
- Scenario 2 – MC pit top operating at coal handling rate of 1.3 Mt simultaneously with CVC pit top operating at a coal handling rate of 1.5 Mt (for a total maximum approved rate of 2.8 Mt).

Atmospheric dispersion modelling was completed using CALPUFF model system. Hourly meteorological observations from 2018 were used as input to the dispersion modelling, consistent with EMM 2022.

The results of the modelling show that the predicted concentrations for incremental gaseous pollutants (NO_2, SO_2, CO and VOCs) were below the applicable impact assessment criteria at all assessment locations in both scenarios.

Cumulative impacts were assessed by combining modelled impacts with recorded ambient background levels measured at the DPE Wyong AQMS. The cumulative results showed that compliance with applicable NSW EPA impact assessment criteria is predicted at all assessment locations for all pollutants and averaging periods.

References

Ektimo 2021, *Emission Testing Report: Chain Valley (CVC) and Mannering (MC) Collieries, Report Number R010522*, Ektimo, Mitcham, Vicotria.

EMM 2022, *Chain Valley Colliery Consolidation Project: Air Quality Impact Assessment*, prepared by EMM Consulting Pty Limited for Delta Coal, September 2022.

EMM 2023, *Chain Valley Colliery Consolidation Project – response to air quality submissions*, prepared by EMM Consulting Pty Limited, March 2023.

Environmental Justice Australia 2022, *Submission on the Chain Valley Colliery Consolidation Project (SSD-17017460)*, prepared by Environmental Justice Australia on behalf of the Nature Conservation Council of NSW, December 2022.

Umwelt 2022, *Chain Valley Colliery Consolidation Project: Environmental Impact Statement*, prepared by Umwelt (Australia) Pty Limited) on behalf of Delta Coal, September 2022.

USEPA 2010, *Exhaust and Crankcase Emission Factors for Nonroad Engine Modelling – Compression-Ignition*, EPA420-R-10-018, July 2010, United States Environmental Protection Agency.

Appendix A

DPE's request for additional information

EMM
creating opportunities

Department of Planning and Environment

Our ref: SSD-17017460

Mr Lachlan McWha
Environmental Compliance Coordinator
Great Southern Energy Pty Ltd (t/as Delta Coal)
PO BOX 7115 Mannering Park NSW 2259

29 August 2023

Subject: Request for additional information

Dear Mr McWha

I refer to the Environmental Impact Statement (EIS) for the Chain Valley Colliery Consolidation Project (SSD-17017460). After careful consideration, the Department is requesting that you provide additional information.

The Air Quality Impact Assessment (September 2022) prepared by EMM Consulting (Appendix B of the EIS) does not include an impact assessment for all emission sources associated with the Project. Specifically, the AQIA does not assess the combustion emissions (i.e., NOx, SO2, CO and VOCs) predicted to be emitted from the operation of mining plant and equipment, or trucks transporting coal product by road.

It is understood that the project would not result in a significant change in the approved surface operations or the number of trucks, beyond an extension of these activities for an additional two years. However, in accordance with the approach adopted for odour emissions, combustion emissions should be quantified and assessed to determine existing and proposed future compliance with relevant criteria.

It is noted that this issue was raised in numerous submissions on the EIS, including the submission prepared by Environmental Justice Australia on behalf of the Nature Conservation Council.

The Department therefore requests that an impact assessment of the predicted combustion emissions (i.e., NOx, SO2, CO and VOCs) associated with the Project be prepared in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (EPA, 2022).

You are requested to provide the information, or notification that the information will not be provided, to the Department by 29 September 2023. If you cannot meet this deadline or do not intend to provide the additional information, please advise the department via the NSW planning portal.