5. AIR QUALITY

This chapter summarises the findings of the supplementary air quality assessment undertaken to address updates to the project description made since the Surat Gas Project Environmental Impact Statement (EIS) (Coffey Environments, 2012b) was finalised.

The Supplementary Air Quality Assessment, prepared by Pacific Environment Ltd (Pacific Environment), is included in Appendix 2. The study supplements the Air Quality Impact Assessment presented in Appendix C of the EIS, the main findings of which are summarised in Chapter 9 of the EIS.

The revised project description is provided in Chapter 3, Project Description, however aspects relevant to air quality are also discussed in this chapter. In addition to the study findings, a list of key issues raised in submissions is presented, with responses to all issues provided in Part B, Chapter 19, Submission Responses.

5.1 Studies and Assessments Completed for the EIS

This section provides an overview of the air quality impact assessment completed by Pacific Environment (previously PAE Holmes).

To understand the impact of air emissions from project activities across the project development area, an air quality impact assessment was undertaken, which included a baseline assessment of the air quality and meteorology at a local and a regional scale. The meteorological variability across the project development area was determined through modelling (using The Air Pollution Model, TAPM). The year with the worst-case meteorological conditions (i.e., conditions that concentrate air pollutants such as low wind speeds and temperature inversions), as determined from historical meteorological information, was used in the modelling. Pacific Environment compiled an air emissions inventory for all applicable sources resulting from project activities (routine and non-routine operations).

Potential impacts were assessed through the use of air dispersion models including the CSIRO developed chemical transport model (CTM). The air dispersion modelling incorporated the existing climate, meteorology, air quality and land use as well as predicted emissions from project activities from the air emissions inventory.

The assessment predicted that emissions to air from the operation and maintenance activities associated with the production facilities (including central gas processing facilities (CGPFs) and field compression facilities) and wells would be greater than the emissions from construction and decommissioning activities for these facilities. The emissions from construction and decommissioning activities were relatively low and of a short-term nature.

The key air pollutants were determined to be nitrogen dioxide (NO_2) and ozone (O_3). Oxides of nitrogen (NO_X) generated by gas combustion processes lead to elevated concentrations of NO_2 in the near-field when nitric oxide is oxidised to form NO_2. Ozone, a secondary pollutant (also known as photochemical smog), forms in a chemical reaction between NO_2 and volatile organic compounds (VOC) and was considered in the regional assessment.

Other pollutants (such as sulfur dioxide, carbon monoxide, and particulate matter) were anticipated to be emitted in low quantities by the project and also had low concentrations in the existing environment; therefore, these pollutants were not assessed further.

Odourants including hydrogen sulfide are only present in trace quantities in the coal seam gas. Therefore as fugitive emissions, i.e., releases of coal seam gas, are emitted in low quantities by the project, odour impacts were not assessed further.

The regional and local assessments of the air quality impact assessment for the EIS are discussed in further detail below.

5.1.1 Regional Assessment for the EIS

The EIS regional assessment assessed the air quality over the project development area and surrounds. The regional assessment incorporated emissions from all project activities that would occur in the project development area including the operation and maintenance of wells and production facilities, as well as traffic from project vehicles. The cumulative impacts of the relevant regional pollutants, NO_2 and O_3, were assessed through inclusion of emission sources from current and proposed projects in the project development area and surrounding region.

Regional modelling, with TAPM-CTM, of the dispersion and chemical formation of regional air pollutants (NO_2 and O_3) provided an estimate of the concentrations due to project activities under two scenarios. Scenario 1 considered the theoretical situation in which all production facilities (18, including 12 CGPFs and six field compression facilities) and wells (7,500) were operational. Scenario 2 was based on the indicative field development sequence, assessing the year during which it was anticipated that the maximum number of wells (2,307) and facilities (nine) would be operational at the one time. Emissions from traffic and flaring were included in these scenarios.

The modelling predicted that the Queensland Environmental Policy (Air) 2008 (EPP (Air)) objectives for NO_2 and O_3 would not be exceeded on a regional scale due to emissions from project activities in either scenario.

5.1.2 Localised Assessment for the EIS

The air quality experienced in the immediate vicinity of project emission sources was captured in the localised assessment. The aim of the localised assessment was to determine whether the maximum air pollutant concentrations would be less than the EPP (Air) objectives. Where the air pollutant concentrations exceeded the EPP (Air), then the distance from the emission source at which the objective would be met (i.e., the minimum separation distance required between an emission source and the nearest sensitive receptor) was determined from modelling.

Localised dispersion modelling, using the Ausplume model, was used to predict ground-level concentrations of air pollutants close to the emission sources, including a CGPF operating at maximum capacity, a field compression facility and a single well. The meteorology for the regional assessment, which captured the variation in meteorological conditions for the northern, central and southern regions of the project development area, was also used in the localised assessment.

The results indicated that, to achieve the EPP (Air) objectives for NO_2, a separation distance from the nearest sensitive receptor of 225 m would be required for a CGPF co-located with a water treatment facility and 175 m would be required for a stand-alone CGPF. Maximum air pollutant concentrations at a field compression facility and a single well were less than EPP (Air) objectives.

5.1.3 EIS Commitments for Air Quality

Measures to limit and manage air emissions were developed based on advice from Pacific Environment. Table 5.1 lists the air quality commitments presented in the EIS.

Table 5.1 Air quality EIS commitments

No.	Commitment
C001	Conduct site-specific air quality modelling once site locations are known to ensure project-related air emissions meet EPP (Air) objectives at the nearest sensitive receptor.
C002	Select equipment with consideration for low emissions to air (NO_X, SO_X), high energy efficiency and fuel efficiency.
C003	Design facilities to meet relevant EPP (Air) objectives at sensitive receptors.
C011	Ensure all engines, machinery equipment and pollution control mechanisms are operated and maintained in accordance with manufacturer's recommendations.
C012	Implement dust suppression measures for roads and construction sites to ensure that dust does not cause a nuisance.
C013	Cover dust-generating materials prior to transportation.
C014	Consult with potentially affected landowners prior to undertaking activities.
C015	Clear areas progressively and implement rehabilitation as soon as practicable following construction and decommissioning activities.
C016	Prevent venting and flaring of gas as far as practicable and where safe to do so.
C017	Manage odours so that they do not cause a nuisance or harm to sensitive receptors.
C020	Minimise the disturbance footprint and vegetation clearing.
C511	Monitoring and inspection of mitigation and management measures will be implemented to ensure that the calculated ground-level concentrations of relevant pollutants do not exceed EPP (Air) objectives throughout the lifetime of the project.

5.2 Study Purpose

The supplementary air quality assessment was undertaken to address updates to the project description that have occurred since completion and publication of the EIS. Project description updates relevant to the supplementary air quality assessment are described below.

5.2.1 Updated Project Description for Regional Assessment

The main updates to the EIS project description that influence the regional air quality assessment relate to the reduced number of facilities (production facilities, water treatment facilities and production wells), the change to the proposed primary power supply, and the increased distances travelled by project vehicles during the project.

The updated project description reduces the total number of CGPFs from 12 to eight and the total number of water treatment facilities from six to two. The updated project description not only reduces the number of wells (from 7,500 to 6,500) but also includes two well types: a vertical well (for a single well pad) and a combination of vertical and deviated wells (for a multi-well pad). Deviated wells allow multiple wellheads to be located on the same pad, thereby reducing the number of temporary onsite power sources and the footprint of a well.

The current power supply option being taken forward involves temporary self-generation until connection to the Queensland electricity grid can be made. Power for wells will be self-generated either temporarily until a grid connection is made, or permanently at locations where a grid connection is not possible.

The predicted increase in the distance travelled by project vehicles calculated for the revised project description is presented in Chapter 12, Roads and Transport.

A summary of the revised project description in comparison to what was assessed in the EIS is presented in Table 5.2.

Table 5.2 Description of project design updates relevant to the regional air assessment

Project Component	EIS Chapter 5, Project Description	SREIS Chapter 3, Project Description
Production wells	Wellhead count approximately 7,500, comprising single well pads.	Wellhead count approximately 6,500, comprising single- and multi-well pads.
Production facilities	Twelve CGPFs (six co-located with a water treatment facility) with the capacity to compress gas at up to 150 TJ/d.	Eight CGPFs (two co-located with a water treatment facility) with the capacity to compress gas at up to 225 TJ/d, with an optional sparing capacity of 75 TJ/d, if required.
Power requirements and scenarios	Primary power requirements fulfilled through self-generation (using gas-powered generators) for a maximum capacity of 48 MW for each CGPF and capacity of 56 MW where the CGPF is co-located with a water treatment facility.	• Primary power requirements fulfilled through connection to the Queensland electricity grid. • Temporary self-generation may be required to support facilities during initial production for a period of up to two years with a maximum capacity of 50 MW for each CGPF. • Connection to the grid may not be possible and therefore in some cases, wells may retain power generation equipment at the wellhead.
Traffic	A maximum of 29,130,000 km travelled by project vehicles in one year.	A maximum of 37,837,798 km travelled by project vehicles in one year.

5.2.2 Updated Project Description for Localised Assessment

The updates to the EIS project description that influence the localised air quality impact assessment relate to the increased gas compression capacity at a CGPF, the introduction of the multi-well pad concept and small- and medium-capacity power generation equipment for CGPFs and multi-well pads either temporarily or until connection to the grid. Single- and multi-well pads may continue to be powered by power generation equipment where connection to the grid is not possible.

At CGPFs, the maintenance flaring rates due to unplanned and planned shutdowns have increased due to the increased compression capacity available at the facilities. However, advancements in the development of the project since the submission of the EIS include nitrogen purging, which means that pilot flaring is not expected to be required at CGPFs.

A review of power generation equipment found that small- and medium-capacity units, e.g., 1.1-MW engines and 5.7-MW gas turbines, are available to meet the temporary power requirements at the CGPFs prior to connection to the Queensland electricity grid. As the detailed design and procurement strategy has not yet been developed, the specific type of power generation equipment has not been selected. To capture the range of possible configurations to meet the 50-MW temporary power supply requirement for a CGPF (including a water treatment facility), a configuration comprising 47 of the 1.1-MW engines (Configuration 1) and another comprising 10 of the 5.7-MW gas turbines (Configuration 2) were assessed.

Similarly, a 749-kW engine was assessed to capture the 720-kW power requirement for a multi-well pad with up to 12 wellheads until a grid connection is made or at locations where a grid connection is not possible.

A summary of the updated project description in comparison to what was assessed in the EIS is presented in Table 5.3.

Table 5.3 Description of project design updates relevant to the localised assessment

Project Component	**EIS Chapter 5, Project Description**	**SREIS Chapter 3, Project Description**
CGPF	• Producing capacity of 30 to 150 TJ/d. • Power requirement of 10 to 48 MW (supplied by up to 16 engines with 3 MW capacity). • Power requirement of 10 to 56 MW where co-located with a water treatment facility (supplied by up to 19 engines with 3 MW capacity). • Power requirements fulfilled through self-generation (using gas-powered generators). • Maintenance and upset conditions flaring as follows: – One occurrence per year at a rate of 150 TJ/d for 12 hours. – 24 occurrences per year at a rate of 30 TJ/d for 8 hours. – 48 occurrences per year at a rate of 10 TJ/d for 8 hours. • Pilot flaring at a rate of 0.02 TJ/d. • Typical facility layout as per Chapter 5, Figure 5.6 of the EIS.	• Producing capacity of 75 TJ/d to 225 TJ/d with additional sparing capacity of one train (75 TJ/d), if required. • Power requirement of up to 50 MW per CGPF (including where a CGPF is co-located with a water treatment facility), supplied by temporary self-generation for up to two years. • Temporary self-generation power supply in two configurations: 47 engines with capacity of 1.1 MW (Configuration 1) and 10 gas turbines with capacity of 5.7 MW (Configuration 2). Both configurations include a sparing capacity of 'n+1'. • Unplanned and planned maintenance flaring as follows: – One occurrence per year at a rate of 225 TJ/d for 12 hours. – One occurrence per year at a rate of 225 TJ/d for 24 hours. – Four occurrences per year at a rate of 75 TJ/d for 32 hours. – Six occurrences per year at a rate of 25 TJ/d for 48 hours. • No pilot flaring. • Revised typical facility layout as per Chapter 3, Project Description, Figure 3.4.
Production wells	• Vertical wells (single wells). • Single well pad power requirement of 60 kW supplied by on-site engine.	• Well types include vertical (for a single well pad) and both vertical and deviated (for a multi-well pad, which allows multiple wellheads to be located on the same pad, approximately 8 m apart). • Maximum of 12 wells on a multi-well pad. • Typical multi-well pad will contain nine wells. • Power requirement for a multi-well pad with up to 12 wellheads of 720 kW to be powered by a 749-kW engine. • Single well pads to be powered by a 60-kW engine as per EIS however following connection to the grid will be powered by electricity. • Wells may retain power generation equipment at the wellhead in some cases.

5.3 Legislative Update

No changes have been made to the legislated air quality objectives since the EIS was finalised and exhibited. The supplementary air quality assessment was prepared in accordance with the relevant guidelines and legislation presented in Section 4.3 of Appendix C of the EIS.

5.4 Study Method

The supplementary air quality assessment adopted the same methods for emission estimation and modelling as those used for the air quality impact assessment for the EIS, including assessing project air emissions at both a regional and a local scale. This method is detailed in Section 4.4 of Appendix C of the EIS. The models and model outputs for the background air quality and meteorology used in the EIS were also adopted for this assessment.

Where the updated project description presented the potential for greater emissions to air than those calculated for the EIS assessment, a quantitative assessment i.e., modelling, was undertaken. Where the EIS had already assessed the worst-case scenario, no further assessment was warranted (e.g., the emissions from construction and decommissioning activities were assessed in the EIS to be relatively low and of a short-term nature and were not reassessed for the SREIS).

As identified in the air quality impact assessment for the EIS, the key air quality pollutant associated with the operation and maintenance of production facilities and wells is NO_2. For reference, the EPP (Air) 1-hour NO_2 objective is 250 µg/m^3. As discussed in the EIS, sulfur dioxide, carbon monoxide, and particulate matter had low background concentrations and were anticipated to be emitted in low quantities by the project; therefore, these pollutants were not assessed further.

As per the EIS, the SREIS assessments assumed that 30% of the NO_X is converted to NO_2 at ground-level (ratio of NO_X to NO_2 of 0.3). This ratio is conservative as the actual ratio is more likely to be 0.1 close to the emission source.

5.4.1 Regional Assessment Method

A comparison of EIS Scenario 1 (which assumed all production facilities and wells operating concurrently) with the revised project description, showed a reduction in the number of wells (from 7,500 to 6,500), CGPFs (from 12 to 8) and water treatment facilities (from six to two). This will result in reduced air emissions generated by wells and facilities in the revised project description, thus, no further assessment was required as the EIS has assessed the worst-case.

When the CGPFs and wells are connected to the Queensland electricity grid, emissions from temporary power generation will cease. Therefore, this project description update did not require assessment.

The updated vehicle kilometres travelled for traffic generated by the project were calculated for the supplementary roads and transport assessment and results of this assessment are presented in Chapter 12, Roads and Transport. There was a predicted increase of 30% in the number of kilometres travelled in the worst-case year from the calculated kilometres travelled in the EIS in Scenario 1. The NO_X emission rate of the revised traffic data was estimated to have increased to 6.35 g/s spread out over the entire project development area. As a comparison, the NO_X emission rate for a CGPF in the EIS was 24 g/s and this would be emitted at one point. Note that the vehicle emission rate of NO_X at any point, or on any road, would be significantly less than 6.35 g/s. Although emissions of NO_X from vehicles are expected to increase when compared to the EIS, the revised project description (reduced number of wells, CGPFs and water treatment facilities) has led to a reduced NO_X emission rate over the region even when accounting for the increase in vehicle movement. Thus, in consideration of the reduction in emissions, no further assessment was required for the impact of traffic on regional air quality.

The EIS air quality impact assessment assessed the worst-case scenario for the regional assessment on the basis of a greater number of wells, CGPFs and water treatment facilities than proposed in the revised project description.

5.4.2 Localised Assessment Method

The dispersion modelling for the localised assessment was used to determine the ground-level concentrations of NO_2 and if a separation distance would be required to meet EPP (Air) objectives.

Central Gas Processing Facility

The stack parameters and emission rates used in the modelling assessment for the SREIS and EIS power generation configurations that may be used to supply temporary power to a CGPF are presented in Table 5.4. Note that the SREIS configurations are based on the 50 MW of power required for a CGPF with or without a co-located water treatment facility, while the EIS Configuration is based on a stand-alone CGPF only.

Table 5.4 Stack parameters for EIS and SREIS configurations for temporary power generation at CGPFs

Scenario		EIS Configuration (3-MW Capacity)	SREIS Configuration 1 (1.1-MW Capacity)	SREIS Configuration 2 (5.7-MW Capacity)
Height of release (m)		7.0	5.21	7.3
Stack diameter (m)		0.635	0.3	1.06
Exit velocity (m/s)		28.4	55	49
Exhaust volume flow rate (Am^3/s)[a]		9.0	3.88	43.1
Exit temperature (°C)		385	469	514
Cumulative emission rate (g/s)	CO	48	31	9.3
	NO_X-NO_2[b]	24	22	11.6
	VOC	7.2	7.0	2.7
	PM_{10}	0.56	0.005	0.15

[a] Am^3 is defined as cubic metres at actual conditions (i.e., actual temperature).

[b] NO_X-NO_2 represents emissions of NO_X (NO and NO_2) expressed on a NO_2 molecular weight basis.

SREIS Configuration 1 comprises 47 1.1-MW engines, and Configuration 2 comprises 10 5.7-MW gas turbines. The EIS Configuration for a stand-alone CGPF was 16 3-MW engines. Modelling of the estimated emissions was conducted to determine the maximum ground-level concentrations of NO_2 attributable to the supply of temporary power to a CGPF for all configurations.

The assessment of the revised planned and unplanned maintenance flaring rates at a CGPF was based on the modelling in the EIS. The predicted NO_2 concentrations from associated EIS flare rates (10 TJ/day, 30 TJ/day and 150 TJ/day) were used to determine the NO_2 concentrations for the revised SREIS flare rates (25 TJ/day, 75 TJ/day and 225 TJ/day). The estimated NO_2 concentrations were then compared with the EPP (Air) objective.

Production Wells

Dispersion modelling of the emission rates presented in Table 5.5 predicted the ground-level concentrations of NO_2 due to operation of a 749-kW power engine for a multi-well pad (with up to 12 wellheads). The stack parameters and emission rates for power generation at a single well pad have not changed from those presented in the EIS. Power for wells will be self-generated either until grid connection, or permanently at locations where a grid connection is not possible.

Table 5.5 Multi-well pad 749-kW gas engine stack parameters

Parameter		Value
Height of release (m)		10
Stack diameter (m)		0.3
Exit velocity (m/s)		37.8
Exhaust volume flow rate (Am^3/s)[a]		2.67
Exit temperature (°C)		446
Cumulative emission rate (g/s)	CO	0.57
	NO_X-NO_2[b]	0.56
	VOC	0.083
	PM_{10}	0.000072

[a] Am^3 is defined as cubic metres at actual conditions (i.e., actual temperature).

[b] NO_X-NO_2 represents emissions of NO_X (NO and NO_2) expressed on a NO_2 molecular weight basis.

Meteorology at three representative locations in southern, central and northern project development area were used as input for the model (as per the methodology detailed in Section 4.4.3 of Appendix C of the EIS).

5.5 Study Findings

The supplementary air quality assessment findings for the regional and localised assessments are presented below.

The main source of NO_X emissions from project activities is the temporary power generation equipment. When CGPFs and wells are connected to the Queensland electricity grid, NO_X emissions from temporary power generation will cease.

5.5.1 Regional Assessment Findings

It was determined that the air quality impact assessment for the EIS had assessed the worst-case scenario for the regional assessment.

Following connection to grid power, the main source of air pollutant emissions which are regionally significant during operations will be from traffic and the wells which are unable to be connected to the grid and will therefore continue to use self-generated power. These sources are relatively minor sources of air emissions in the EIS and SREIS.

5.5.2 Localised Assessment Findings

The findings for the localised assessment of central gas processing facilities and production wells are presented below.

Central Gas Processing Facility

The graphical comparison of predicted ground-level concentrations of NO_2 that resulted from Ausplume modelling of the NO_X emissions for the EIS and SREIS CGPF temporary power supply configurations is presented in Figure 5.1.

The maximum NO_2 concentration for both of the SREIS configurations complies with the EPP (Air) 1-hour NO_2 objective of 250 µg/m^3. The maximum 1-hour ground-level concentration for NO_2 was 140 µg/m^3 for SREIS Configuration 1 (i.e., 47 of the 1.1-MW engines). The outcome of the assessment, which presents a lowering of the emissions generated by temporary power supply to a CGPF, reflects the type of lean-burn technology that Arrow seeks to incorporate in the project design to further reduce emissions and implement energy-efficient solutions.

Following connection to grid power, the main source of air pollutant emissions in the operation of a CGPF will be flaring. Flaring is a relatively minor source of air emissions in the EIS and SREIS, as discussed further below.

The predicted NO_2 concentrations for the SREIS flaring rates (derived from the NO_2 concentrations associated with the EIS flare rates) are presented in Table 5.6 with comparison to the predicted NO_2 concentrations calculated in the EIS.

Table 5.6 Maximum predicted flaring NO_2 concentrations for EIS and SREIS

	EIS Flare Rate (TJ/day)			SREIS Flare Rate (TJ/day)		
	10	**30**	**150**	**25**	**75**	**225**
Predicted NO_2 concentration (µg/m^3)	0.7	1.0	3.5	1.0	2.0	5.0

The predicted emissions associated with planned and unplanned flaring events for the updated project description have increased due to the increased gas compression capacity of the CGPFs. However, the predicted ground-level concentrations remain significantly lower than the EPP (Air) objective of 250 µg/m^3.

Production Wells

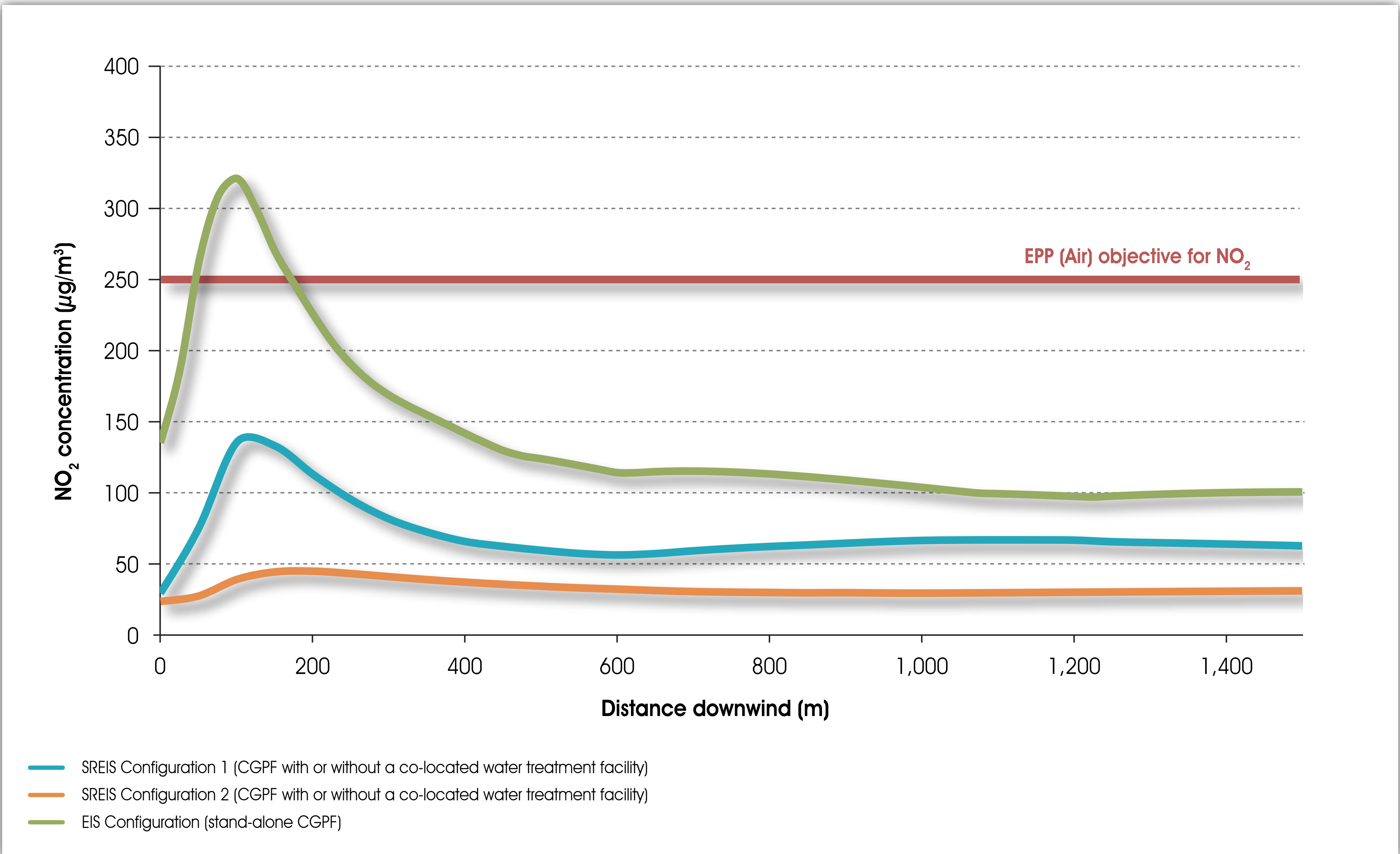
The predicted maximum NO_2 ground-level concentration resulting from temporary power generation for a multi-well pad (comprising 12 wellheads) is 29 µg/m^3 at a distance of 50 m from the engine, which is below the EPP (Air) objective.

The findings for a single well pad remain the same as those given in the EIS.

5.6 Conclusions

The supplementary air quality assessment predicted air quality impacts for the updated project description. The most significant changes in the updated project description related to the operation phase and included the reduction in the number of wells, CGPFs and water treatment facilities as well as connection to grid power where available. The assessment considered NO_2 and O_3. Sulfur dioxide, carbon monoxide, and particulate matter were anticipated to be emitted in low quantities against a low background environment; therefore, no impacts from these pollutants were anticipated.

No additional regional air quality assessment was required, as the regional assessment presented in the EIS was considered to have assessed worst-case. This is on the basis that although vehicle emissions of NO_X are expected to increase when compared to the EIS, the reduced numbers of wells and CGPFs in the revised project description has led to a reduced NO_X emission rate over the region even when accounting for the increase in vehicle movement.



coffey environments	Date: 05.06.2013	Arrow Energy	arrow energy go further	Comparison of predicted 1-hour NO_2 ground-level concentrations for a CGPF	Figure No: 5.1
	File Name: 7040_12_F05.01_VS	Surat Gas Project			

The localised assessment of air emissions resulting from CGPF operation showed that for the SREIS temporary power supply configurations assessed, the maximum predicted ground-level NO_2 concentration met the EPP (Air) objective. The change in the power generation configurations assessed, has seen a reduction in the separation distance required for air quality between a CGPF and nearest sensitive receptor. Ultimately, the distance at which the EPP (Air) objectives are met will depend on final equipment selection.

The assessment of the revised flaring scenario at a CGPF showed that maximum NO_2 concentrations were significantly lower than the EPP (Air) objective. Arrow is investigating options other than flaring to assist in managing ramp-up gas.

The multi-well pad engine will not contribute significant levels of NO_X in the immediate vicinity of the wells and ground-level concentrations of NO_2 were significantly less than the EPP (Air) objective.

When the CGPFs and wells are connected to the Queensland electricity grid, NO_X emissions from temporary power generation will cease. Following connection to grid power, the main sources of air pollutant emissions during operations will be from traffic, flaring and the wells which retain power generation equipment at the wellhead. These sources are relatively minor sources of air emissions.

The air pollutant concentrations, estimated based on the revised project description, have been shown to be less than predicted in the EIS. Therefore, the management measures presented in the EIS remain valid and no changes to the air quality commitments as a result of the study findings are proposed.

5.7 Issues Raised in Submissions

Submissions on the EIS raised a diverse range of issues relating to air quality. The issues fall into broad topics, which are listed below:

- Air quality complaint management.
- Appropriateness of baseline air quality and meteorology data used in assessment.
- Assessment of the impact of flaring and venting and mitigation measures.
- Assessment method and worst-case assessment.
- Determination of cumulative air quality impacts on the region.
- Exclusion of fugitive emissions at wellheads.
- Impact of nitrogen oxides emission rates and high concentrations due to project activities.
- Impact of odour from project activities, including water storage dams and traffic.
- Lack of consideration of road dust and health impacts of dust.
- Lack of information on the health impact of odour and the application of mitigation measures.
- Method of not using site-specific data in assessment.
- Use of separation distances to meet air quality objectives.

The topics list is provided to give an idea of the types of issues that have been raised in relation to air quality and for which responses have been provided under the heading ‘Air Quality’, in Part B, Section 19, Submission Responses.